INCREASING THE NUMBER OF PETROLEUM ENGINEERING STUDENTS IN THE UNITED ARAB EMIRATES: AN IMPROVEMENT MODEL

by

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Abstract

This study utilizes Clark and Estes' (2008) gap analysis framework to develop an improvement model for the scholarship division at the Abu Dhabi National Oil Company (ADNOC). The purpose of this research was to identify the root causes of the low number of Emirati students applying for scholarships in petroleum engineering and to understand the lack of participation of women in the field. The methodological framework was a mixed method approach querying the parents of 533 students studying petroleum engineering at the Petroleum Institute in Abu Dhabi. A survey entitled "Career Choice for Emirati Students" was sent to 533 parents, and six randomly selected parents were subsequently interviewed. Further analysis was conducted using frequencies and descriptive analysis. Findings from this study revealed that parents of ADNOC scholarship student required guidance in identifying resources available to them to help make career decisions. This study also found that to encourage females to enter the field of petroleum engineering, there was a need for more female role models. Solutions developed through this study seek to bridge gaps that exist between current practices at the scholarship division and the desired results. The study also contributes transferrable approaches that may be applicable to other careers that face similar lack of participation from Emirati students.

DEDICATION

This work is dedicated to the soul of the father of the nation, the founder of the United Arab Emirates, Shiekh Zayed Bin Sultan Al Nahyan, to the mother of the nation Her Highness Sheikha Fatima bint Mubarak and to the leadership of United Arab Emirates.

His Highness Sheikh Khalifa Bin Zayed Al Nahyan the president of the United Arab Emirates.

His Highness Sheikh Mohammed bin Rashid Al Maktoum, the Vice President and Prime Minister of the UAE, and Ruler of Dubai.

His Highness Sheikh Mohamed bin Zayed Al Nahyan, Crown Prince of Abu Dhabi, Deputy Supreme Commander of the UAE Armed Forces.

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CHAPTER 1

INTRODUCTION

One of most important challenges plaguing Gulf countries like the United Arab Emirates (UAE) is the ability to produce human talent in the science, technology, engineering, and math (STEM) fields (Marcel, 2005). The UAE has traditionally relied upon foreign talent for their human capital, however, with the continued growth of the oil industry and the decline of interest in sciences, the UAE can no longer rely on foreign talent. In response, government intervention programs such as state funded universities, full scholarships and nationalization programs were designed to integrate nationals into the job market. These programs demonstrated success to a certain degree, but the oil industry has always been one of specialized trades, and there is a mismatch in the talent available to take over from foreigners who worked past retirement age (Marcel, 2005). The number of Emirati students enrolled in scientific disciplines is minimal when compared to that of non-oil producing countries (Marcel, 2005). This low enrollment will continue the cycle of shortages and hinder the growth the UAE seeks.

Parental involvement can be a significant factor in career choice. The purpose of this study was to address the challenge of attracting Emirati students particularly women into scholarships in the petroleum engineering discipline and the role that parents play in these career decisions. Clark and Estes' (2008) gap analysis was utilized to conduct surveys and interviews of parents to determine their view of the petroleum engineering career and the extent of their support for it as a career choice. Findings from these sources were used to generate solutions that would better inform parents of career choices.

Background of the Problem

The UAE is a significantly wealthy nation endowed with an abundance of onshore and offshore oil and gas reserves. Prior to the unification of the emirates in 1971 and long before the discovery of oil in 1960, the region was very poor and mainly comprised of Bedouin tribes. The people of the UAE relied heavily on their fishing, agriculture and pearling heritage (Alsayegh, 2001). The discovery of oil catapulted this nation into the modern era. What took most developed nations decades to achieve, the UAE attained in a relatively short period of time, mostly due to its reliance on oil production and exportation (Alsayegh, 2001).

UAE experienced economic, political and social stability as a result of its oil reserves. Politically, the UAE maintained its tribal roots by having a ruling royal family who governs the nation. In recent years, a cabinet of elected members was also introduced to give decision-making power back to people of the nation. The political strategy has also been to have warm relations internationally as to avoid disturbing the peace of the country. Revenues from oil have also allowed for building up the country's economic infrastructure (Shihab, 2001). Transportation, communication, sewage, water and electric systems are all investments made possible due to the discovery of oil, and providing a high standard of living for Emirati nationals maintains social steadiness in the region. In addition to high salaries, Emiratis have access to free and extensive health services, education, and social welfare.

The UAE's growth and strength have been directly tied to the oil in the region. UAE holds 10% of the world's oil reserves and, at its current rate of production, oil reserves can carry the UAE for at least 122 years (Shihab, 2001). In addition, the UAE also has 4% of the natural gas in the world, and its reserves of natural gas can sustain economic growth and development for an additional 60 years, yielding a greater picture of the role that oil plays in the region.

The UAE has always had a small population and has traditionally relied on foreign labor to sustain its rapid growth and development. By the year 2000, 30% of the population were international migrants (Tabutin & Schoumaker, 2005). However, as its national population grows, a shift towards reorganization of infrastructures and education reform becomes a priority. It is prudent for the UAE to place its most prized industry in the hands of local talent and to reduce the dependence on foreign labor in the oil industry. The large-scale attrition of the foreign workforce is already underway as expatriates retire and new petroleum engineers are reluctant to move to the UAE (ADIPEC, 2014). It is estimated that as many as 50% of the petroleum engineers worldwide will retire in the next 10 years (ADIPEC, 2014). While there will be no quick fix for the shortages, a comprehensive change in education will be needed to stimulate interest in the field of petroleum engineering.

The 2002 United Nations Development Program's (UNDP) Arab Human Development Report indicated that higher education systems were not responding to labor market needs for science and technology (Marcel, 2005). In the decade following this report, UAE worked tirelessly to improve the school model and to raise academic outcomes. Abu Dhabi Education Council (ADEC) was established to improve student learning and raise academic standards. In a 2005 census report, over 51% of Emiratis were fifteen years of age or younger. This finding indicated that there would be an influx of young Emiratis entering higher education institutes and, subsequently, the UAE work force (Sharif, 2013). The need for universities saw unprecedented growth; the UAE government also diversified its programs in order to accommodate the number of students wishing to enter postsecondary schools. Educational institutions such as public and private universities, vocational training institutes and military colleges were opened. However, as students graduated, the problems addressed in the UNDP

report became even more apparent. First, there was an oversupply of graduates and, second, there was a shortage of skills needed in the market place (Sharif, 2013).

The UAE's education system has greatly improved, but there is still a failure in the system in terms of promoting sciences and technology and of a quality of education that does not match the sophisticated skills required by the market. Young graduates are left with feelings of frustration and resentment when they are unable to secure jobs or, when they are employed, cannot perform their jobs adequately. This frustration leads to graduates turning to the government for solutions (Sharif, 2013). There is also the belief that public sectors pay handsomely (Daleure, Albon, Hinkston, Ajaif &McKeown, 2015), and, as such, Emiratis expect the government to create jobs in the public sector instead of venturing into the private sector. In 2005, UAE nationals comprised 20% of the population, and 10% were in the workforce. In spite of this small number, the unemployment rate among UAE nationals was still high (Gitsaki, 2011). In order to combat the rates of unemployed Emiratis, the government intervened with an Emiratization program whereby Emiratis received preference in the government sector. By the end of 2009, the public sector was saturated, and the push to prepare Emirati graduates for private sector positions became imminent (Gitsaki, 2011).

In spite of the fact that the oil sector is the primary source of funding for the nation, only 1.6% of the national labor force is involved in the quarrying, petroleum extraction and mining sector (Shihab, 2001). Data also reveals that, in 2006, graduates in the arts outnumbered those in the sciences 1.4 to 1, similarly 77% of graduates majored in the arts and only 49% majored in sciences (Gozale et al., 2008). Therefore, the UAE took steps to rectify the problem. One of these efforts is the formation of the Petroleum Institute (PI) in Abu Dhabi. The institute is modeled after western universities and is fully funded by Abu Dhabi National Oil Company

(ADNOC). PI currently offers five disciplines: petroleum engineering, chemical engineering, mechanical engineering, electrical engineering and petroleum geosciences engineering. In 2001, PI had its first class of 139 male undergraduate students. In 2006, 104 female undergraduate students were introduced into the program to create gender balance within the industry. Today, over 800 male and 600 female students are studying in one of the five engineering disciplines offered by PI.

The UAE continues to be one of the largest oil and gas producers in the world with reserves of about 98 billion barrels (Shayah, 2015). Petroleum oils and crude make up the largest export in the UAE. In fact, crude oil makes up 22% of the UAE's GDP. Abu Dhabi, the capital of the UAE, has 10% of the world's oil reserves. In spite of these staggering statistics, nationals are underrepresented both qualitatively and quantitatively in the oil and gas industry (Shayah, 2015). The skill level of Emirati petroleum engineers is not equivalent to the market standards and their representation is low in numbers. Emirati students' participation in STEM fields is low as compared to national students' participation in those fields in non-oil dependent countries such as Korea (34%), Algeria (50%) and China (53%). There is an expectation that foreigners are here for both menial and experienced skilled jobs, and, as such, nationals queue for public sector jobs, which have become almost like a welfare system designed to settle the local population (Gitaski, 2011). The demand caused an overload of the public sector, leaving many educated nationals unemployed. Until now, the UAE has depended on foreign talent and imports, but this can create lasting political, economic and social concerns (Alabed et al., 2008).

While there has been progress in the region in promoting the oil sector in education, there still remains a gap between the talent needed and the supply available. There is also urgency to the matter, as foreign labor in these specialized areas can no longer be easily acquired. As such, a

more comprehensive discussion needs to take place with all stakeholders in devising policies and strategies to alleviate the situation.

Importance of Addressing the Problem

The problem of low numbers of petroleum engineering students and lower participation of women is important to solve for several significant reasons. Lack of effort from nationals in innovative fields will increase dependence on importation of technology, machinery and equipment. Foreign nationals have already and will continue to have an impact on the social fabric of the UAE. Cultural norms, language and religion are affected by foreign influence, and there is also fear that ethnic, social and political ideas will destroy the order in place (Kapiszewski, 2015). It is apparent that having a highly skilled Emirati workforce and a self-sustaining economy is the only way to achieve global success. Moreover, women are increasingly entering higher education institution and not utilizing this talent is detrimental for the economic vision of the nation (Samulewicz, Vidican, & Aswad, 2012). Participation of women in the petrochemical sector can have a substantial impact of the industry's future.

Organizational Context and Mission

ADNOC, a government-owned organization, was established in 1971 in Abu Dhabi. The UAE is comprised of seven emirates: Abu Dhabi, Dubai, Sharhaj, Ajman, Ras Al Khaima, Um al Kwain, and Fujairah. ADNOC is a holding enterprise that is comprised of eighteen subsidiary companies. Combined, these entities operate both upstream and downstream processes in the oil and gas industry. The division studied herein is the Scholarship Division within ADNOC that was formed in 1974 to educate and develop nationals in fields deemed critical to the success of ADNOC and all associated enterprises. ADNOC Scholarship Division offers grants to students interested in fields of study such as petroleum engineering, chemical engineering, mechanical

engineering and geosciences. These grants include generous monthly allowances, travel benefits, all tuition, accommodation, and book allowance as well as semester-end bonuses for academic performance. Students enrolled with ADNOC scholarships have the opportunity to attain undergraduate and post graduate education in reputable academic institutions in twelve countries. The scholarship program also offers workshops and training courses during the summer semester for those interested in further development. Upon completion, graduates are guaranteed employment at ADNOC with generous remuneration packages. Currently, 5000 students are enrolled with ADNOC scholarships: 3000 males and 2000 females. ADNOC Scholarship Division's mission is to empower Emirati youth in careers that are critical to ADNOC and to the UAE economy. ADNOC hopes to raise awareness and increase the number of post-secondary students interested specifically in the engineering fields.

Organizational Performance Status

The organizational performance challenge of focus in this dissertation is the small number of UAE nationals principally women applying for Abu Dhabi National Oil Company scholarships in the field of petroleum engineering. Statistical data within the Scholarship Division reveal that only 5% of applicants are interested in scholarships in petroleum engineering (Maersk, 2014). ADNOC has 55,000 employees, 32% of whom are Emirati, but it hopes to Emiratize engineers by 75% in the next five years in keeping with the UAE'S Emiratization program (ADNOC, 2009). To meet this goal, ADNOC would have to ensure that 1300 new Emirati engineers are hired every year to add to the current workforce and to replace foreign workers. Unfortunately, as a country that has increasingly relied on foreign skilled workers, the UAE struggles to replace the foreign workforce with young Emirati talent (Maersk, 2014). The small workforce is not an issue exclusive to the UAE; in fact, shortages in manpower

are a regular occurrence in the petroleum industry worldwide (OPEC, 2014). OPEC predicts that the Middle East will remain as a leader in crude exporting (OPEC, 2014). Considering this prediction and the fact that ADNOC announced it will increase oil production from 2.8 million barrels a day to 3.5 million by the year 2018 into account, the impending shortages become apparent (OPEC, 2014). Oil and gas have been and continue to be a substantial part of the world economy. Specifically in the UAE, national wealth and stability are derived from the oil and gas industry (Marcel, 2005). As such, lack of interest among nationals for petroleum engineering is of concern.

Organizational Performance Goal

ADNOC Scholarship Division currently has a ten -year plan in that it hopes to have graduated 570 Emirati petroleum engineers by December of 2023. This is in addition to the 553 that are already in the pipeline. Accomplishing this goal would mean that, every year, 137 Emirati petroleum engineers need to graduate from the program. . A government-wide plan to nationalize the work force, especially the oil industry, entails that the ADNOC Scholarship Division work strategically with secondary schools across the UAE to ensure that full scholarships in the field of petroleum engineering are available to recruit talented Emirati students. The students would be offered full scholarships to pursue a career in petroleum engineering and would need to adhere to strict guidelines and goals in order to retain their scholarship funding. These requirements are primarily meant to keep the students on track and to protect ADNOC's investment. The students in the program would receive the necessary support to succeed, including preparatory programs, extra assistance outside of class, and summer programs. Students' progress would be monitored each term to ensure goals were met. ADNOC

scholarship division's goal achievement would be measured yearly by the number of graduates who enter the ADNOC workforce as petroleum engineers.

Description of Stakeholder Groups

The key stakeholder groups at ADNOC Scholarship Division in the context of this dissertation are the students, parents, administrative staff and ADNOC board members. These individuals have a direct role in meeting the organizational goal of focus in this dissertation. The students involved are all Emirati nationals from the seven states that make up the UAE. They are integral to the cause as they respect and value education and are interested in pursuing causes that are important to ADNOC and to the UAE's economic future. The role of the parents is to recognize talent and skills and to foster and encourage students to pursue petroleum engineering as a field of study. Most of these parents have seen the harder times of life, before the oil boom, and have a greater appreciation for their children's education and success in the global world. The role of the administrative staff is to process applications and to facilitate students' educational pursuits. ADNOC Scholarship Division's main headquarters in Abu Dhabi consists of 45 administrative staff members, 90% of whom are Emirati nationals. Most of the administrative staff have gone through the process of higher education themselves and understand the challenges that potential students may endure. The role of the ADNOC board members is to serve as an advisory council, to provide an opportunity for students to explore petroleum engineering as a career, and to raise funds and to provide placement opportunities for graduates.

Stakeholders' Performance Goal

Table 1

Organizational Mission and Performance Goal

Organizational Mission			
The mission of the ADNOC Scholarship Division is to provide scholarships in key areas of economic importance to the UAE.			
Organizational Performance Goal			
By December 2023, ADNOC hopes to have 570 Emirati graduates in the field of petroleum engineering.			
ADNOC Board Members	Scholarship Admin Staff	Students	Parents
By December 2018, ADNOC will conduct an overview of its 10-year plan to assess progress toward compliance.	By June 2020, ADNOC Scholarship Staff will have successfully processed and facilitated at least 570 Emirati nationals in completing a degree in petroleum engineering	By December 2023, 570 students will demonstrate the necessary proficiencies to earn an engineering degree and become petroleum engineers.	By May 2018, parents will inform and support their children in pursuing a career in petroleum engineering, yielding the annual target of 114 applicants.

Stakeholder Group for the Study

Close collaboration and cooperation among all stakeholders is critical to bring about positive change that supports the organizational goal. However, for practical reasons, the study focuses on parents as the key stakeholder group. The UAE is still a conservative and collectivist society governed by its deep culture and religion. Traditional Muslim values still play a role in the household and in how men and women interact in both the school and work setting. Decision making is usually left to the patriarchs of the family. This structure means that parents play a

vital role when it comes to not only choosing career paths but also to how far the pursuit of education goes. The goal is to educate parents about the importance of petroleum engineering in the UAE's economic future and as a meaningful career path. Parental involvement plays a key role in guiding students into the engineering disciplines as careers. In the past, many people making the decisions for their children were themselves unqualified, as higher education was not of importance until recently (Marcel, 2005). This meant that there was no clear direction for eager young Emiratis. Many entered fields chosen by their families and had no motivation or intrinsic fulfillment. Parental aversion to non-traditional careers such as engineering also had an impact on the choices students made (Samulewicz, Vidican, & Aswad, 2012). Female students suffered, as families were uncomfortable with daughters pursuing male-dominated careers. Likewise, males followed in their fathers, uncles and older siblings' footsteps by joining the military or the police force, which were easily accessible without the need for higher education. As such, it is critical to understand parental attitudes and involvement when it comes to the factors students face when deciding to enter petroleum engineering as a career.

Purpose of the Project and Questions

The purpose of this project is to conduct a gap analysis to examine the root causes of the lack of interest in applying for scholarships in petroleum engineering and to understand the low participation of women in the petroleum engineering field. As noted above, a full gap analysis would take into consideration all key stakeholders involved. However, for practical reasons, this study focuses on parental involvement and the gaps that exist in knowledge and skill, motivation, and organizational resources that interfere with students' decisions to pursue a career in petroleum engineering. The analysis begins by formulating possible influences that will be

examined analytically and from which validated influences will be determined. Two questions will guide the study:

1. What are the knowledge and skills, motivation, and organizational influences from the parents' perspective that impact ADNOC's goal of having 570 Emirati petroleum engineers by December of 2020?
2. What are the recommended knowledge and skills, motivation, and organizational solutions?

Conceptual and Methodological Framework

This study explores how parental involvement can help in understanding the lack of students' pursuing careers in the petroleum engineering field. Clark and Estes' (2008) gap analysis approach is utilized in order to identify influences and to determine strategies to improve the number of students applying for scholarships in the field of petroleum engineering. Using this conceptual framework, an organizational goal was identified, and analysis will focus on understanding the gap between the organizational goal and actual performance. The methodological framework is a qualitative case study utilizing descriptive statistics. Interviews, document analysis and literature review will be used to assess influences. Recommendations made will be based on solutions found through the research.

Definitions

ADNOC: Abu Dhabi National Oil Company.

Emiritization: Structural process whereby the government hopes to develop UAE nationals' skills and knowledge in targeted professions by making jobs available only to nationals.

Emirati: Citizens of UAE.

Expatriates: Foreign individuals living and working in the UAE.

Gendering: The attribution of maleness or femaleness to circumstances

PI: Petroleum Institute.

UAE: United Arab Emirates

Organization of the Dissertation

Five chapters are used to organize this dissertation. Chapter 1 discussed the foundation of the study and the background behind the research. A clear description of the organization's mission, goals and stakeholders was provided along with a brief discussion of the gap analysis. Key terminology surrounding the field of petroleum engineering in the United Arab Emirates is also presented. Chapter 2 documents current literature and the implications that it has on the study at hand. Topics about sociocultural context, education in the region and types of parental involvement as well as the importance of oil are discussed. Chapter 3 details the methodological approach utilized and the limitations that may occur in selection of participants, collection of data and analysis. Chapter 4 presents data analysis and results. Chapter 5 provides findings and links to existing literature. Based on the data, recommendations are presented along with implications, limitations and counsel for future research.

CHAPTER 2

LITERATURE REVIEW

The following is a literature review of parental involvement in influencing career choice of Emirati nationals in the petroleum-engineering field. The literature review is divided into several areas to examine parental involvement. The chapter reviews the history of the region in terms of education, parental involvement; and gendering. The theoretical framework is also discussed with a look at parental involvement through knowledge, motivation and organizational concepts.

Educational History of the UAE

Prior to the unification of the emirates in 1971 and long before the discovery of oil in 1960, the region was very poor and mainly comprised of Bedouin tribes, most notably the Bani Yas tribe. The people of the region relied heavily on their fishing, agriculture and pearling heritage. The UAE is described as a long standing port for pearl trade and of providing income and employment for its people (Gitaski, 2011). Alsayegh (2001) describes a life of contentment for the people who preferred the simple Bedouin traditions and manner of living. This Arab way of life remained for much of the early 20th century. In accordance with the seasons, many men adapted more than one occupation depending on the time of year (Gitsaki, 2011). The discovery of the cultured pearl by the Japanese and the taxation on pearl trade by India destroyed the wealth that the country experienced from pearl trading. Poverty, illness and illiteracy were directly related to this.

The Discovery of Oil

Alsayegh (2001), Gitaski, (2011) and Gaad, Arif and Scott (2006) mark the discovery of oil in 1960 as a turning point in education in the region. In 1966, Sheikh Zayed bin Sultan Al

Nahyan, one of four sons of Sheikh Sultan Al Nahyan took over the reins of the state known as Abu Dhabi. He brought forth a new vision in educating the people of the UAE. Sheik Zayed increased contribution to the state's development fund and took on the massive task of building infrastructures, which included schools (Alsayegh, 2001). In the year 2000, 30% of the population consisted of international migrants (Tabutin & Schoumaker, 2005). With the influx of foreign nationals also came changes in society and culture. Education, which had always been a priority for Sheikh Zayed, now became necessary and mandatory in the region that moved rapidly towards a global world.

Current Higher Education Situation

Gaad et al. (2006) call the system of higher education in the UAE a new concept in comparison to that of other countries. Traditionally, schools in the UAE consisted of reading and understanding the Quran, the holy book in Islam. This tradition produced a culture in education that focused on memorization more than creativity and critical thinking. Gaad et al. (2006) also describe the classes as being segregated by gender. The existing four-tier educational system was established in 1970 and all nationals were provided free access to primary and secondary education. The first university in the UAE was established in 1978, and federally funded colleges emerged in 1988 (Gaad et al., 2006). From the onset of the establishment of the first university, illiteracy rates for both males and females significantly decreased, but the need to overhaul the education system remained. In 2009, the Abu Dhabi Plan 2030 was introduced as a roadmap for educational development in the UAE. The plan is to be reviewed every five years to ensure that improvements are made in the educational sector. Gaad et al. (2006) describe the current higher educational system as divided into two sectors: public and private. Public institutions offer UAE nationals tuition-free education and are affiliated with the UAE Ministry of Education (MOE),

UAE University, Zayed University and the Higher Colleges of Technology are among these institutions, with several campuses across the UAE. All other institutions are considered private.

In 1997, only five licensed universities existed in the UAE. By 2008, there were about 58 and today there are over 102 accredited institutions. Although there has been growth within the higher educational sector, challenges in attracting and retaining nationals in critical careers such as petroleum engineering persist. Gaad et al. (2006) concur that UAE places growing emphasis on research and higher education. However, cultural challenges inhibit the evolution that the government seeks. Encouraging students to take advantage of free higher education and motivating them to enroll in technical majors still prove to be a struggle (Gaad et al., 2006). UAE nationals make up 22% of the total population; from this, only 12% hold a higher education designation from a university within the UAE and / or abroad (Gonzalez et al., 2008). In 2016, the UN estimated UAE population at 9.4 million, only 10% of this number are believed to be Emiratis.

Importance of Petroleum Engineering Careers

Alsayegh (2001) reports that life after the pearl trade diminished was difficult for the people of the region. Oil was the savior that brought people of the UAE out of dire conditions. Even today, as UAE attempts to move towards a more knowledge-based economy, dependence on the oil sector to fund for other resources is evident. UAE is the fourth largest exporter of crude oil in the gulf and has the sixth largest proven reserves of crude oil and seventh largest reserves of natural gas in the world (Alabed, 2008). According to Alabed (2008), the UAE is not utilizing its maximum potential of its hydrocarbon sector. This is to say that insufficient development and lack of manpower is restricting the UAE. Alabed (2008) goes on to state that the UAE has a long-term mission of expansion; however, large projects require adequate

planning, and, without the highly trained and skilled individuals in the hydrocarbon sector, the UAE cannot move forward with projects.

Parental Involvement in Educational Decisions

Daleure et al. (2015) explains how the west differs from the UAE with the use of Hofstede's model. Daleure et al. (2015) found that countries like the UAE have a collectivist society. Marcel (2005) and Crabtree (2007) also indicate that Arab societies operate in a collectivist manner, promoting interdependence and supporting discussion in all aspects of decision-making.

Parental Roles in the UAE

According to Schvaneveldt, Kerpelman and Schvaneveldt, (2005), and confirmed by Crabtree (2007) families are the foundation of Emirati society. Tabutin and Shoumaker (2005) argue that there has been a shift from extended families to the nuclear family. However, Alabed et al. (2008), Alsayegh (2001) and Crabtree (2007) maintain that extended families are still thriving in the UAE. In all family structures, whether extended, nuclear, or male with multiple wives, the power within the family when it comes to decision-making remains with its head figures. Daleure et al. (2015) cite that patriarchs are considered the head of the family and play a vital role over influence in decision-making. Moreover, Daleure et al. (2015) highlight that children are taught early on to obey the opinions and decisions of their parents and other patriarchs of the family. Alabed et al. (2008) concurs that, as parents and extended family members get older, their status in decision-making rises. The beliefs and decisions of parents and grandparents are given undying support in the UAE. In an orthodox Islamic country, religion dictates that parents must be respected and not disobeyed (Crabtree, 2007). When it comes to major life decisions such as education, marriage and family affairs, it is not uncommon for

individuals to have prolonged discussions with parents, grandparents, uncles, aunts and other prominent figures (Alabed et al., 2008). In a family study by the Higher College of Technology in Sharjah, 1,173 Emirati students and 30 randomly selected guardians were surveyed. The results revealed that Emiratis generally look up to their parents for guidance. The UAE is a nation bound by its culture and religion, and, as such, understanding the family involvement within this context is important in understanding how career choices are made.

Parental Values and Expectations

Theorists propose that experiences in childhood shape career choices in later stages. Parents are the individuals who help construct reality for children early on; their impact can be both positive and negative in nature (Jacobsen, 1999). In Eccles's (1993) expectancy value model, parents are positioned as role models who provide opportunity for the children and also give reinforcement. Parents have the ability to steer children towards or away form a particular path both intentionally and unintentionally. Jacobsen (1999) highlights that even parents who do not view themselves as being involved are, in fact, subconsciously involved. The manner in which parents act, the nurturing that children receive, the positive or negative reinforcement and the day-to-day decision making that takes place condition children to sway towards a certain career path. Parents and their actions have profound influence on career choice. Children's intellect, social and emotional behavior are directly influenced by parents (Jacobsen, 1999).

In the UAE, norms and expectations are adopted covertly; the roles of men and women are defined early on. Parents model expectations and values for male and female children. High expectations are put on males who are expected to take care of their families financially whilst females are expected to find suitable mates and raise children (Chope, 2006). Supportive families placed high expectations and produced higher educational aspirations Chope (2006). This

dynamic could explain why men in the UAE are pushed towards careers more than females. Parents also influence a child's progress by controlling the child's experiences. In the UAE, male children are allowed to play outside, go out alone, drive and attend colleges abroad, whereas females need parental permission for each of these actions (Crabtree, 2007). Male children also tend to inherit family businesses and property. Traditionally, family trade has been passed on, and merchant children became merchants, fishermen's children became fishermen and so forth. It is, thus, not uncommon for children to want to follow their parents' footsteps. Children are expected to carry on the family name and responsibility (Middleton & Loughead, 1993).

Family names are of importance in the UAE, and all locals must present a family book of lineage when applying for any grants, scholarships, and business ventures. Family names stem from the old tribal culture of allegiance, and, although this is not practiced today, loyalties to families and clans still preside. As such, family names can be used as favors. Some UAE children from well-known families grow up with a sense of entitlement from watching their parents' interactions, conversations and work ethics. Similarly, the title one holds in the UAE is of importance as the families get recognized for an individual's success (Daleure et al., 2015). Doctors, engineers, lawyers are not called by their names but, rather, by their title.

In addition, parents can have their own agendas for encouraging careers that could boost their family name or importance. This boost can be achieved through nonverbal responses, displaying interest in particular activities and by making specific remarks. Jacobsen (1999) described the importance of parental comments and reactions towards career as having impact on career choice. Children are very intuitive and catch on to the hidden meanings more readily then perceived. In the UAE, Children who were born in times of prosperity often hear remarks of the hard life from their parents or grandparents but are unable to grasp the hard life that existed

before oil (Marcel, 2005). Many adults saw significant growth and wealth within a short period as the country flourished after the discovery of oil. Children see this success and expect to have the same opportunities that their parents had. The reverse is also true for families who did not capitalize on the oil boom. Children in these families grow up watching their parents struggle financially and are encouraged to seek a better life for themselves. Ngessi (2003) found that children from disadvantaged families avoid careers that require extended education, which is true for low income Emirati families. When an Emirati male pursues higher education, he foregoes the earnings in the years that he spends in college; the loss of income can be unacceptable for some families who rely on the male figures for financial support. Moreover, parents' level of education will affect the dynamics of the household and the choices that children make. These choices are supported by the fact that many males in the UAE drop out of school and expect to gain public sector jobs just like their parents. Males generally join the police force or the army straight out of high school, so that there is no need for higher education (Marcel, 2005).

Barriers of Effective Parental Involvement Gender Socialization

Gender socialization begins before higher education; it starts the moment the sex of the baby is determined. In the UAE, the male child has always held precedence over the female stemming from its nomadic history and strict orthodox Islamic values. Simidi and Kamali (2004) shared this view in that religion and family were influencing factors when it came to career choice of Emirati males and females. In the early stages of education, males and females have equal participation and access to education. Under the UAE constitution and federal law established in 1972, education is compulsory for all UAE nationals up until the age of 18. Approximately 22% of federal funds are devoted to education and 10 billion AED were spent on public and higher education combined in 2009 alone. The federal government funds the building

of schools, teachers' salaries, textbooks, the transportation of students, and all other capital and recurrent expenditures on education. In 1970, only 48% of UAE adults were literate; today, over 93% are literate, with nearly equal rates for women and men. The Ministry of Education in UAE also reported females generally outperformed males at all levels of education and that enrollment rates at tertiary levels are higher for females (Crabtree, 2007). Parents tend to be supportive of education for females; however, they are selective in areas that can be pursued in later stages.

Parents often have strong opinions about career choices for their children, especially females. In some cases, parental aversion to nontraditional careers have a large impact on the choices that females make (Samulewicz et al., 2012). Gender stereotyping within a society can influence career choice influences career decision. Although women outnumber men in postsecondary education, there is often a cultural barrier that keeps them from entering male-dominated fields. Many Emirati parents were uncomfortable with females working alongside men or having to go outside of the country for their education (Samulewicz et al., 2012). Family reputation is of importance in the UAE, and decisions for females are made with regard to social norms and the careers that society deems appropriate. These decisions highlight the issue of gendering that takes place within households and the society at large, as females are not provided with the encouragement or tools to pursue technical degrees (Crabtree, 2007). In a typical Emirati family, men are considered the bread winners and are encouraged to take on the responsibilities of taking care of a family. Daleure et al. (2015) revealed that there was increasing pressure on men at later stages of education to succeed, whereas females had the liberty to opt out of higher education.

Marriage is also an important pillar of both the religion and the culture of the UAE; females fear that a suitable male proposal might not come to them because of their independence

or career choices (Gitsaki, 2011). Similarly, females carry the honor of the family in the Arab culture, and being in careers that are male dominated would mean interactions with males, which is frowned upon (Crabtree, 2007). Women in the UAE often find themselves in a no-win situation when it comes to decision-making. Even though higher rates of females are graduating from universities, the participation rate for females in the labor force remains low (Samulewicz et al., 2012). Females are also known to outperform males at secondary and tertiary education levels, yet their participation in the workforce is 28% whilst that of Emirati men is 63% (Samulewicz et al., 2012). These figures are partly due to a conservative culture that looks down upon breaking away from social norms.

Stakeholder Knowledge, Motivation, and Organization Influences

Anderson and Krathwohl's (2001) research on knowledge types and cognitive processes guide the identification of the assumed knowledge causes in this study.

Knowledge and Skills

Anderson and Krathwohl's (2001) taxonomy indicates that four main categories exist in knowledge: factual, conceptual, procedural, and metacognitive.

Factual knowledge. The simplest knowledge that an individual is equipped with in order to problem solve within any discipline is referred to as factual knowledge (Anderson & Krathwohl, 2001). One of the assumed factual knowledge cause may be that parents did not have the comprehension of a career in petroleum engineering. Parents' lack of knowledge of petroleum engineering careers, terminology and standards is classified as lack of factual knowledge. Understanding what a career means and the job description is the first crucial piece of the knowledge puzzle. A major reason for low numbers of petroleum engineering students is

the lack of information on the part of parents who directly make decisions or indirectly influence them.

Many Emirati students entering higher education institutes are first-generation students, so their parents, on whom they rely for guidance, are not equipped with the knowledge or the education to lead them (Gitaski, 2011). The first university in the UAE was established in 1978, and federally funded colleges emerged in 1988 (Gaad et al., 2006). Many parents grew up in an era that did not have higher education facilities or afforded options in terms of career. Education was focused on traditional methods, and children attended state-funded schools where memorization of the Quran and Islamic teachings was most important (Gitaski, 2011). At home, there was little importance given to attending school regularly or to completing homework. Upon completion of an education, children veered towards joining the family trade. Emirati parents grew up in the pearling and fishing era and jobs changed with the season. Work was seen as a way to sustain life and many occupied more than one job according to the season.

While Emirati parents may want to see their children succeed, they may not be equipped with the factual knowledge needed to help. Parents may not know the significance of having a career or, more importantly, the meaning of having a career in engineering. Parents may also not be aware of the opportunities that this career option can provide for their children. The older generation has endured the hardships of the past and can envision a less than prosperous future; therefore, they cling to what they know (Marcel, 2005). Lack of exposure to careers in sciences and misinformation do little to raise awareness of engineering. Trade has always been seen as a prosperous venture and, thus, it does not come as a surprise that parents push their children into fields such as business administration.

Conceptual knowledge. Anderson and Krathwohl (2001) define conceptual knowledge as underlying categories, principles, structure, or theory within a field. An assumed conceptual cause may be that parents do not understand the structure that makes up the work of a petroleum engineer. For inexperienced parents, vague descriptions and concepts of careers such as petroleum engineering can be very threatening, and lack of knowledge of these concepts constitutes a lack of conceptual knowledge. Many Emirati parents know about oil and its importance to sustain their way of life; however, the processes that are involved in the petrochemical field are foreign to the people of a nation that has been in existence for only forty-four years. There are no worked out examples of the features or the rules that define the petrochemical field. Parents are unable to group or relate the field to real life. Emirati parents have a very stereotyped view of the field of engineering. In the early phases of higher education in the region, science was taught as part of three major fields: physics, chemistry and biology. There was no connection drawn between the sciences and societal improvements and cultural advancements, leaving many parents isolated from understanding scientific concepts and preventing them from analogical thinking or applying that knowledge towards career decisions.

Procedural knowledge. Procedural knowledge is referred to as the tasks, techniques and methods an individual uses (Anderson & Krathwohl, 2001). In terms of assumed procedural causes, it was determined that parents do not have knowledge in regards to the techniques and methods for making college choices for their children. Parents' inability to locate and identify sources that can help them understand how to go about a career in petroleum engineering represents a lack of procedural knowledge. Many Emirati parents are unaware of the procedures involved, the methods and the steps necessary to acquire a degree in this discipline.

Metacognitive knowledge. Anderson and Krathwohl, (2001) refer to metacognitive knowledge reflection in planning, monitoring progress, and modifying strategies. Parents must also be aware of the lack of the metacognitive aspect of knowledge. The ability to be aware of one's thinking during decision making and being able to reflect on it at a later stage is important in knowledge processing. Two assumed metacognitive causes were identified. The first was that parents did not evaluate their children's skills and abilities. The second assumed metacognitive cause was that parents did not plan their approach in career decision-making.

Motivation

Pintrich (2008) described motivational theories as concerned with the movement of individuals towards activities and tasks. A plethora of research has been conducted to understand what motivates parents to become involved in their children's education. Career decision-making is a complex phenomenon with a multitude of psychological, behavioral and contextual variables.

Social cognitive theory and self-efficacy. Social cognitive theory maintains that people learn through observation. Bandura's (l986) social cognitive theory holds that individual behavior is shaped by personal, behavioral and environmental influences. Personal influences are what Bandura defined as having self-efficacy. Self-efficacy refers to the belief in one's ability to succeed. Bandura (l986) posits that sense of self-efficacy affects how an individual approaches goals and the extent of challenges that will be taken on. According to Bandura (1986), self-efficacy is a determinant in achieving goals. Constructed around Bandura's (l986) theory, Lent, Brown and Hackett (1994) formed the social cognitive career theory (SCCT) to explain the relationship among the myriad variables. SCCT posits that career decision is influenced by three primary factors: interest, self-efficacy and outcome expectancy. Hoover-Dempsey et al., (2005)

model supports the social cognitive realm in that parents are motivated by role construction and a sense of self-efficacy. Hoover-Dempsey et al., (2005) model of the parental involvement process highlights two areas concerned with parents' motivational beliefs; first is parental role construction, and second is parental self-efficacy.

***Parental self-efficacy*.** Within the social cognitive realm, self-efficacy is considered a predictor of parental influences in career decisions. Personal beliefs, perception of skills and expectations shape parental involvement. Parents will lean toward careers that they are confident of and move away from those that they do not have comprehension of or skill in. Gitaski (2011) points out that many Emirati parents saw quick succession through the ranks and success in the public sector as the country developed. Thus, they were certain that, if their parent's decisions had proved to be successful, then they, too, could do the same for their children. In the UAE parents generally believe that the public sector jobs are an excellent option.

Parents in the UAE also display high self-efficacy because of the conservative and authoritative culture, which inhibits the questioning of their decisions. Daleure et al. (2015) highlight that children learn early on to obey the opinions and decisions of their parents and other patriarchs of the family. Alabed et al. (2008) concurs that, as parents and extended family members age, their decision-making power increases. Parents and grandparents' beliefs and decisions receive undying support in the UAE. In an orthodox Islamic country, religion also dictates that parents must be respected and not disobeyed (Daleure et al., 2015). Parents have power over every minuet decision. Their status as parents propels the belief that they know what is best for their children.

When parents feel they are inadequate, they tend to look at other extended family members for help, and it is in these interactions that vicarious learning plays a role. Vicarious

learning is a part of self-efficacy through which parents may have learned that their children cannot succeed in certain disciplines after watching other children in the family fail (Bandura, 1986). Parents may doubt their own decisions or support them based on the decisions made by others in the extended family. According to Bandura (1997), weak commitment to goals and avoidance is a form of low self-efficacy. Gitaski (2011) notes that many Emiratis were unable to adapt to the English curriculum in higher education and saw themselves dropping out and deterring others from entering fields deemed difficult. In fact, many males in the UAE drop out of school and expect to gain public sector jobs just like their parents. Males generally join the police force or the army straight out of high school, so that there is no need for higher education (Marcel, 2005). Emirati parents encourage this career move, as they believe that attaining a job straight out of school will accelerate the chances of career success.

Parental expectancy value. Eccles (2011) expanded on the Atkinson model of the expectancy-value theory to propose that two efficient motivators of career choice are expectancies and task values. Task values can be further categorized into four different types of value: intrinsic value, extrinsic value, attainment value and cost value. Bandura (1997) concludes that these four principles also affect self-efficacy. Intrinsic value is motivation from within, meaning that people gravitate towards certain careers due to interest and internal desire. Extrinsic values are based on external factors such as the end result of the education. Attainment value refers to the importance of the task; high importance tasks receive more motivation then low. Cost value is related to the actual benefits that can be realized from the task.

Crabtree (2007) highlighted that Emirati mother's showcased high intrinsic interest in their daughter's careers. This interest is due to the fact that Emriati mothers did not want their daughters to face the hardships that the mothers had to endure. Mothers wanted their daughters to

have the same opportunity for education as their male counterparts. For the male students it was found that parents focused more on utility; the end of the means was more important than interest in the career. Men were encouraged to enter careers because they are the providers and are expected to take care of the family financially. Obeidat et al. (as cited in Daleure et al., 2015) found that Emiratis work more to cover costs of life than for self-fulfillment. In this manner parents are more encouraging towards careers that may have the most benefit for the family. Ngessi (2003) uncovered that children from disadvantaged families avoid careers that require extended education. When an Emirati male pursues higher education, he foregoes the earnings in the years that he spends in college; this can be unacceptable for some families who rely on the male figures for financial support.

Parental expectancy for success. The second concept of expectancy theory is success expectancy as a motivator. Whilst self-efficacy focuses on the evaluation of success in a given endeavor, expectancy focuses on projections of outcomes. Daleure et al. (2015) states that people tend to avoid uncertainty in cultures like the UAE. It is common for Emirati parents to encourage their children to enter the same careers that have been passed on through the generation. Emirati parents also base career choice on monetary, social, and self-satisfaction outcomes. Titles are of importance in the Emirati culture and careers that are regarded with titles are preferred. Daleure et al. (2015) states that Emirati parents believe that their children's success or failure is a direct reflection on them and their entire lineage. Emirati parents also have distorted perceptions of professional prospects. They do not want their children to toil in hard careers but, rather, expect office positions with fast promotions and movement up the ranks (Marcel, 2005).

Organization

Literature focused organization and cultural influences will be reviewed in relation to the stakeholders. Gallimore and Goldenberg (2001) refer to cultural models as "encoded shared environmental and event interpretations, what is valued and ideal, what settings should be enacted and avoided, who should participate, the rules of interaction, and the purpose of the interactions" (p. 46).

Parental cultural models. In a culturally diverse setting such as the UAE, decisions are patterned around one's experiences and sociocultural context. Specific community practices and family settings can have an impact on decision-making. In the cultural models of the UAE, authoritative leadership tends to play a role. Traditional Arab values and beliefs based on Islamic principles still reside in the culture. Baumrind (1971) found there are three basic types of parenting style: permissive, authoritarian and authoritative. Permissive parents listen to the demands of their children, authoritarian parents use rules and regulations to evaluate the behavior of their children, and authoritative parents have clear set of behaviors that they expect their children to display. Crabtree (2007) denotes that patriarchal and patrilineal models exist in the UAE where father, husband and older son are viewed as decision makers. In an orthodox Islamic country, male authority is predominant, and the decisions that the male heads of the family make must be respected and obeyed irrespective of the accuracy of the decision-making.

Similarly, Middleton and Loughead (1993) classified parents into three categories: positive involvement, non-involvement and negative involvement. Positively involved parents knew what they were doing; they were supportive of career exploration and individual goals. Non-supportive parents were unaware of what to do to help. They were not sure if their involvement was needed or wanted. Negatively involved parents pressured children into a career

path that was not of interest to the children. Emirati parents tend to be in the non-supportive category. Even though parents want their children to succeed, they are unaware of how to get involved and what to do.

Parental resistance to change. Parental resistance to change can be another barrier to decision-making. Werner and Lynch (1994) describe resistance in two phases: initial resistance and experiential resistance. During initial resistance, a person exhibits negative reactions to a change upon hearing of the change. Therefore, this is an individual's first response to the change before s/he has the opportunity to experience the change. With experiential resistance, an individual is likely to resist change in accordance with his/her experience to the change. In the UAE, parents have preset notions which are very difficult to change. Even before a change takes place, an opinion is already formed about the change. As a very conservative nation, religion plays a role in resistance to change (Simidi & Kamali, 2004). There are predetermined roles for men and women and the occupations that are acceptable for each. Education in the UAE has always been segregated, even in the higher education sector. However, with the introduction of western systems, these lines are being blurred both in the educational system and in the workforce. Men and women study and work alongside one another, and this is unacceptable for some UAE parents. Samulewicz et al. (2012) state that Emirati parents were uncomfortable with females working alongside men or having to go outside of the country for their education. Women's participation in higher education is also a very recent phenomenon, and it is understandable that many parents who did not grow up with this phenomenon resist it.

Parental cultural barriers. Societal restrictions often prevent women from working alongside men. In fact, in many households, this is looked down upon, and women have to tread carefully in the community so as not to soil their own reputation and family name (Crabtree,

2007). In certain cases, women also have to have a chaperone, and this can make certain careers and levels of education impossible to attain. These restrictions are not of concern to men, as they have full autonomy to go about their lives without repercussions (Crabtree, 2007). There is considerable belief that petroleum engineering careers should be restricted to men only.

A further barrier is the negative attitude directed towards careers that are deemed below the status of the family name. Physically demanding work is considered to be for expatriates mainly from the Indian sub-continent region. UAE, as a country, has also piggybacked off the oil boom and relied heavily on foreign labor for its operations and on social assistance from the government. However, with the population growing and unemployment on the rise, organizational changes must be made to change the culture that limits Emiratis from succeeding in technical fields (Al Ali, 2007). Now that there is a shift in the economy, UAE nationals find it difficult to adjust to the changes. Societal norms dictate that professions are for the working class, and many families feel entitled or above the working class because of their lineage.

CHAPTER 3

METHODOLOGY

The purpose of this project is to conduct a gap analysis to examine the root causes of the low number of Emiratis and particularly women applying for scholarships with ADNOC in the petroleum engineering field. This analysis will focus on parents as stakeholders and address the gaps present in areas of knowledge and skill, motivation and organizational issues. The analysis will examine possible causes and to highlight actual and validated cases. The following questions guided the research.

1. What are the knowledge and skills, motivation, and organizational influences from the parents' perspective that impact ADNOC's goal of having 570 Emirati petroleum engineers by December of 2020?
2. What are the recommended knowledge and skills, motivation, and organizational solutions?

The chapter explored the methodology, instrumentation and data analysis for the research. Validity, trustworthiness and limitations of the study are highlighted. The role of the researcher is also presented to explain biases, expectations and assumptions.

Methodological Framework

The purpose of this study was to identify reasons behind the low number of students especially women who apply for petroleum engineering scholarships with ADNOC. One of the pressing matters of concern at ADNOC has been to increase the number of Emirati students selecting petroleum engineering as a career and to integrate women into the petrochemical field. This study was conducted to formulate a strategy that ADNOC could utilize in its efforts to bridge the differences in current states of affair and the desired results. Clark and Estes' (2008)

gap analysis methodology was employed to develop an improvement model for the low number of petroleum engineering applicants. A comprehensive gap analysis would take into account all stakeholders involved. However, in this study, the analysis focused on parents as stakeholders. Areas concerning knowledge and skills, motivation and organizational barriers were examined through parental viewpoints. Perceived performance gaps were first identified and analyzed in order to construct concrete causes that served as hurdles to ADNOC goal achievement.

The rationale for the use of Clark and Estes' (2008) model stems from the perception that performance gaps can be narrowed and goals achieved when gaps in knowledge and skills, motivation, and organization are addressed. Figure 1 highlights the process. The gap analysis model begins with applying personal knowledge and related literature to identify assumed causes that preclude goal achievement. These assumed causes are tested for validity utilizing literature review, surveys and interviews. Root causes are extracted, and research-based solutions are derived for recommendation. This study presents a thorough evaluation of the projected gap analysis plan.

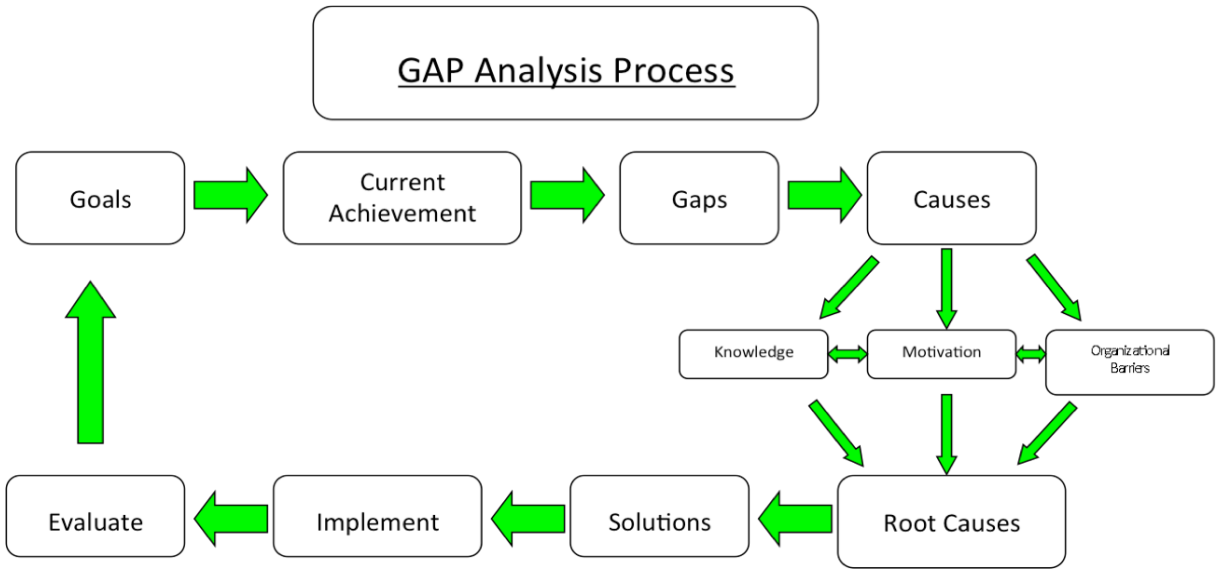

Figure 1. The gap analysis process (Yates, 2016)

Assumed Performance-Based Influences

A major advancement in psychology over the decades has been to understand how people and organizations function. Performance-related problems are a natural occurrence in even the best of companies; it is the way that organizations go about solving issues that differentiates good ones from the best. Mariam (2008) states that no problem exists in isolation because there are many variables that play a part in the formation and the solution of the problem. Clark and Estes (2008) provide the gap analysis as a tool for problem solving and improving performance. Often, organizations assume knowledge of the problems that are stunting improvement. However, this can prove to be detrimental. Lack of critical thinking, knowledge and perspective can lead organizations to jump to conclusions and organizations resort to quick fixes for the problem. Although these solutions may be feasible, they are rarely long term. A thorough review of the causes of performance gaps must be conducted.

Too often, organizations emphasize the end result and not the devising of the most appropriate and effective techniques of problem solving. Mayer (1992) describes learning as a two-way street. A reciprocal relationship must exist between theory and practice. As such, in order for learning to take place, the human mind must be understood. When there is no relation, organizations are susceptible to misdiagnoses and inappropriate solutions. Therefore, a thorough investigation into the causes of performance gaps must encompass three components: (a) scanning (informal) interviews with stakeholders; (b) learning, motivation, and organization/culture theory; and (c) a review of related literature. In Chapter 2, related literature was discussed. Chapter 3 includes tables of the causes as discussed in the related literature.

Preliminary Scanning Data

In the initial stages of research, informal conversations and personal knowledge are a valuable source of information. Observations serve to highlight the performance problems. Causes of the performance problems are discussed in depth utilizing categories of knowledge, motivation and organization.

Knowledge and skills. In the UAE, parents are unaware of careers in the petro chemical field. There is fear of the unknown, and, as such, confusion and vulnerability are avoided. Instead of engaging in discussions and learning about the prospects of a new career, parents rely on careers in the public sector, which they have knowledge about. Emirati parents fail to comprehend the knowledge and skills needed to be a petroleum engineer. Many parents rely on stereotypical views that math and physics are needed for such careers while other parents find it hard to define petroleum engineering. Few parents understand the process of becoming a petroleum engineer, the schooling needed, and the many areas that engineering affects. Furthermore, parents do not know about the ADNOC scholarships, where to find information or how to go about applying for a scholarship.

Motivation. Based on observations and conversations with parents who visit the ADNOC scholarship office, the main motivating factor is for their children to be accepted into a program that allows them to graduate in a timely manner and enter the workforce. Parents are not motivated by the job but, rather, the lifestyle that is associated with the career. In the UAE, parents have a very lax approach to their children's education. They are unmotivated towards careers that they are uncertain about. Parents are readily influenced by the prospects of remuneration; high-paying jobs are valued over academic degrees. Especially when it comes to

low income families, financial security is the top motivating factor when in making career decisions.

Organization. A myriad of organizational issues contributes to this problem. At the national level, there is a culture resistant to change. Old values and beliefs are held steadfastly, parents are averse to having men and women study and work together, and careers are still segregated by gender. Further, parents are not properly informed about the need to equip Emiratis in fields that are crucial to the country's economy. Emiritization goals have been introduced, but the need to diversify careers that students enter has not been emphasized. Parents, thus, do not promote technical careers.

Participating Stakeholders

While it is important to take into account all stakeholders, this study focuses on parents of undergraduate petroleum engineering students at the Petroleum Institute (PI) in Abu Dhabi. Merriam (1998) indicates that sample selection is dependent on a case basis, and, in a study of a qualitative nature, non-probability sampling is deemed most appropriate. In this study, a non-probability purposeful and convenient sampling strategy was used. This population was selected mainly due to the fact that, currently, there are approximately 1760 UAE nationals at the PI, and 553 of these are undergraduate students studying petroleum engineering under an ADNOC scholarship. Access to parents of these students was convenient, as PI is affiliated with ADNOC. Utilizing this sample was considered advantageous, as the most could be learned from them. Parents who already have children under a scholarship with ADNOC could provide valuable insights into the motivations behind these decisions.

The participants in the study were Emirati nationals, residing in one of the seven states that make up the UAE and have a child currently studying petroleum engineering at PI under an

ADNOC scholarship. Surveys were sent to all 553 parents whose personal emails were registered with PI. Participation of parents was voluntary. Past surveys sent to students and parents alike have resulted in a response rate of 20% to 30%, therefore it was predicted that between 110 and 180 responses would be received. From those who responded, invitations for interviews were extended to six randomly selected parents.

Data Collection

The purpose of this study was to identify factors that influence parental involvement in career decision making for petroleum engineering students. The instruments utilized for the study were surveys and structured interviews. In order to ensure validity and to be inclusive of a diverse range of the population, a survey partnered with structured interviews was administered. A survey titled "Career Choices for Emiratis Students" was designed specifically for this research by the researcher. In September 2016, with approval from the University of Southern California's Institutional Review Board, surveys were sent out to parents of 553 undergraduate petroleum engineering students at the PI in Abu Dhabi. These subsets of individuals were specifically targeted because they are directly involved in receiving ADNOC scholarships and would be able to highlight gaps in the processes. These individuals were also able to provide a wealth of knowledge relevant to the improvement that the researcher seeks.

Surveys

The survey was sent via email through the use of personal emails of parents on the PI database. The email contained a cover letter from the researcher explaining the purpose of the survey and the significance for ADNOC scholarships. As many parents are not fluent in the English language, it was deemed beneficial to have all correspondence in both English and Arabic. Therefore, the survey was available in both English and Arabic. In order to ensure

reliability, semantic, conceptual and normative equivalence was considered in the formulation of the survey. Two independent bilingual translators were utilized to translate the survey alongside a third translator who resolved any ambiguity or discrepancy and consolidated the versions for use. The survey consisted of three groups of questions. The first addressed assumed causes for knowledge and skill, the second asked participants about their motivational causes and the third group of questions focused on organizational barriers. Surveys allowed for the collection of a large amount of data in a relatively economical and timely manner. Surveys were administered rather easily and efficiently. The survey made use of a Likert-type scale with five options for responses. Surveys were to be completed in a three-week period and all responses received during this time frame were examined. Appendix A showcases the survey.

Interviews

Six parents were randomly selected from the responses to take part in structured interviews. Creswell (2014) calls this a systematic or probalistic sample in which individuals have an equal chance of being selected. The parents were randomly selected to ensure no bias in the selection and adequate representation from the population. The number of in-person interviews were kept small so that the data collection and data analysis process will be manageable and of quality. Time constraints and availability to conduct in-depth research was taken in to consideration when identifying the number of interviews to conduct. The interviews were limited to an hour, and questions were designed to address knowledge and skills, motivation and organizational assumed causes. The interviewer aimed to gain a deeper understanding of personal attitude, opinions and behaviors of the stakeholders. Interviews were also used as a triangulation method and to fill the gaps in research that the surveys did not

address. All participants were interviewed individually in person or over the phone. Interviews provided the opportunity to record conversations; this was done with the consent of the participants. All interviews were conducted in Arabic, thus transcription occurred in Arabic first. Two translators were used to translate the transcriptions into English, and a third translator mediated the discrepancies between the translations to produce the final edit for use in the analysis. Appendix B showcases the interview protocol.

Document Analysis

In order to thoroughly understand the low number of students applying for petroleum engineering scholarships, multiple documents will be reviewed for analysis. ADNOC scholarship data for student enrollment in petroleum engineering programs, reports on the scholarship program, and PI statistics will be gathered and used for triangulation. ADNOC 2020 plan, an organizational strategy document, will be reviewed to understand the guidelines in place to achieve specific ADNOC goals. The Abu Dhabi Economic Vision 2030, a comprehensive plan introduced by the government for diversifying the economy will also be assessed.

Validation of the Performance Needs

Validity has become crucial for research, as it indicates the appropriateness of instrumentation and whether tools used measure what they are intended to measure. Creswell (2014) describes three methods of validity: content, predictive and construct. Content validity refers to the extent to which the instruments measured what they set out to measure. Predictive validity is how well results relate to a criterion. Construct validity focuses on how well hypothetical constructs are measured.

Table 2

Conceptual Framework for Addressing the Inquiry Questions

	Survey	Interviews	Document Review
Assumed knowledge issues/needs/assets	X	X	X
Assumed motivation issues/needs/assets	X	X	X
Assumed organizational issues/needs/assets	X	X	X

For this research, a mixed-methods approach of data collection is applied to ensure validity. Assumed issues, needs and assets are measured through surveys, interviews and document analysis to ensure that results are inclusive of a number of perspectives and that there are no gaps in the information collected. Addressing the inquiry questions through each framework also eliminates researcher bias and further validates the results. Comparing and cross checking documents against survey and interview responses helps to understand the complexity of human behavior in decision making.

Trustworthiness of Data

Trustworthiness of research can be demonstrated through a variety of ways. Triangulation is a powerful mechanism utilized in this study. Merriam (2009) describes triangulation as the idea that use of multiple sources can provide confidence in results. According to Merriam (2008), Denzin's discussion of triangulation is widely accepted. It encompasses four categories: multiple methods, multiple sources of data, multiple investigators and multiple theories. For this study, multiple methods, multiple sources of data and multiple investigators were used to verify results. Data from surveys, interviews and document analysis were cross verified. The combination of several sources of data in regards to a single phenomenon strengthens the

triangulation of the research. Surveys will also measure for validity and reliability. The accuracy of the instrument is measured through statistical tests involving a pilot study. The assurance of survey anonymity and the confidential nature of the interviews assisted in the trustworthiness of the data. Having a panel of members to check the data is also beneficial to the trustworthiness of the data. Merriam (2009) points out that, ultimately, the trustworthiness of a study depends on the credibility of the researcher. Guidelines and regulations can aid; however, the researcher must be conscious of ethical issues and personal orientation.

Role of Investigator

I am the manager at ADNOC Scholarship Division. I oversee the educational progress of over five thousand Emirati students studying under the ADNOC scholarship in a multitude of programs that are crucial for sustaining the ADNOC group and its goals. My main role is to facilitate the students through the ADNOC scholarship program in a manner that guarantees that, at graduation, ADNOC receives both quality and quantity of students in fields that are crucial for the organization. As the program director, I manage all staff & Students in our offices located in Abu Dhabi UAE, London, England, and Melbourne, Australia. I am responsible for ensuring that stakeholder expectations are met and that we maintain quality in the programs and scholars that we promote. I review scholarship eligibility and approve curricula and universities that we partner with. In addition, within my offices I conduct all performance appraisals, handle the financial budget, and mitigate conflicts with staff, students and parents. As a principal investigator in this research, my role is to conduct a gap analysis of the performance problem at ADNOC and recommend solutions so that ADNOC can increase the number of students that apply for scholarships in petroleum engineering. Increased number of petroleum engineering applicants will assist ADNOC in Emiritizing its workforce and replacing retiring expats.

For this research, parents were aware of my role as the principal investigator. However, discretion and confidentiality of the participants was observed. Survey and interview participants were informed that research is being conducted to gather information so that ADNOC can improve its scholarship program. Parents' participation was voluntary, and the findings were to be presented in a doctoral dissertation.

Data Analysis

All survey results were compiled and descriptive statistics was applied to determine results. Clark and Estes (2008) framework was utilized to guide coding of data. Transcribed interviews were coded and divided into categories of knowledge, motivation and organization. Frequencies of common elements within sets of data were identified. Triangulation of the data was conducted using documents to provide a well-rounded assessment of the statistical data.

Limitations and Delimitations

Some limitations were observed in the design of the study. First, many parents were working for ADNOC or were part of the petrochemical industry, thus their answers could be biased in favour of the industry. Furthermore, parents were aware of my position as the manager of scholarship program, and, having children under the scholarship, there is likelihood that parents provided answers that were socially acceptable and favorable towards ADNOC. Moreover, as with all surveys, there is the possibility that the intended party is not the one who completed the survey. In addition, in several areas of the results derived from interviews and surveys the answers appeared to be predictable and this 47 could be attributed to selection bias amongst these parents.

The essence of research is to contribute to an already existing knowledge base and to improve the practices of ADNOC. This particular research focused on low number of petroleum

engineering applicants to the scholarship program at ADNOC. The research is directed towards the specific context of ADNOC as an organization, and this can prove to be an initial delimitation of the study. Maxwell (2013) highlights two further challenges that researchers face as being bias and reactivity. Theories, beliefs and expectation of the researcher can influence the conclusions derived. Similarly, having control over individuals and situations being studied is referred to as reactivity. In this study, the knowledge of the researcher and management position within the organization may influence results based on researcher bias and reactivity. The subjects of study are parents who have children studying under a scholarship from the researcher's division. As such, there is an element of bias that might be exhibited in answering both the surveys and interview questions.

This study is also delimited, as only one stakeholder group is examined and only one perspective can be presented to address the problem. The choice to use only parents as the focus for this study limits the scope of the research. The report is void of the contributions of other stakeholders, which are important in order to deliver an in depth project. Even though the mission of ADNOC and its goals cannot be generalized, other organizations such as universities can benefit from the research to improve their intake of students.

CHAPTER FOUR

RESULTS AND FINDINGS

This study evaluated the knowledge, motivation, and organizational needs required to increase the number of Emirati students who apply for petroleum engineering scholarships. Clark and Estes' (2008) gap analysis served as the framework. Surveys and interviews as were conducted to validate assumed knowledge, motivation and organization needs.

The chapter examines the data collected from a knowledge, motivation and organization needs perspective. Analysis reveals key findings and the chapter concludes by summarizing these findings and laying a framework for solutions to be developed in Chapter 5.

This study focused on the parents of the 553 undergraduate petroleum-engineering students at the Petroleum Institute (PI) in Abu Dhabi who were recipients of the ADNOC Scholarship. In total, 105 parents agreed to participate in the questionnaire that was sent out, 68 of these were male and 37 were female. Six of the 105 parents who completed the survey agreed to sit for an in-depth interview. The six interviewees included two female and four male parents.

The findings revealed that parents of ADNOC scholarship students at PI were not aware of the resources available to help them with career decisions for their children. Data also revealed that there were sentiments that the compensation packages offered by ADNOC for petroleum engineers were not reflective of the market salaries. Moreover, there was a need to have female role models to entice females into entering the male dominated career.

Results and Findings for Knowledge Needs

Knowledge is key factor in the Clark & Estes (2008) framework and knowledge can be best

understood through the categories in Anderson & Krathwohl, (2001) framework. Anderson and Krathwohl's (2001) framework reflects four dimensions of knowledge; they are factual, conceptual, procedural, and metacognitive. Given the importance of these dimensions of knowledge, the survey and interview protocols were designed to examine these dimensions.

Factual and Conceptual Knowledge about Petroleum Engineering Career

Anderson and Krathwohl's (2001) classified factual knowledge as basic details, terminology and standards in any discipline. Conceptual knowledge is knowledge of underlying categories, principles, structure, or theory of an area or field. To evaluate Emirati parents' factual and conceptual understanding of petroleum engineering career, parents of petroleum engineering students were first asked about their educational level. Of the 105 that responded to the survey, seven parents displayed some form of schooling, 40 completed their education with high school graduation, 35 graduated college, and 23 completed post-graduate higher education (such as a Masters or Ph.D.). This indicated that the parents making choices for students are in fact educated to some degree and have attended schooling. Having some form of education enables parents to understand critical concepts and definitions when it comes to career aspirations for their children. Bachman, Nokali, and Votruba-Drzal, (2010) reveal that parents who are academically experienced tend to be more involved in children's education, activities and decisions. Steinmayr (2010) also supports a relationship between children and parents' education in that higher educated parents would put more emphasis on academia.

Furthermore, parents were asked to answer statements on a Likert scale. When asked the statement "I understand the schooling needed to become a petroleum engineer" 88 out of the 103 parents that answered the questions about factual and conceptual knowledge displayed an understanding of the schooling needed to become a petroleum engineer. Additionally of the six

parents that agreed to be interviewed both male and female parents responded that they were aware of what a petroleum engineering career entailed. One parent expressed that "petroleum engineering is an excellent field of study that involves onshore and offshore workplaces and takes effort and persistence and a high level of specialized studies." Another parent stated "I am aware that the job will involve work in the wells, inside the state and offshore and related to petroleum, like industry refining and exploring." The data suggests that Emirati parents who have children enrolled in petroleum engineering degree programs are familiar with the concepts and terminology involved with these careers.

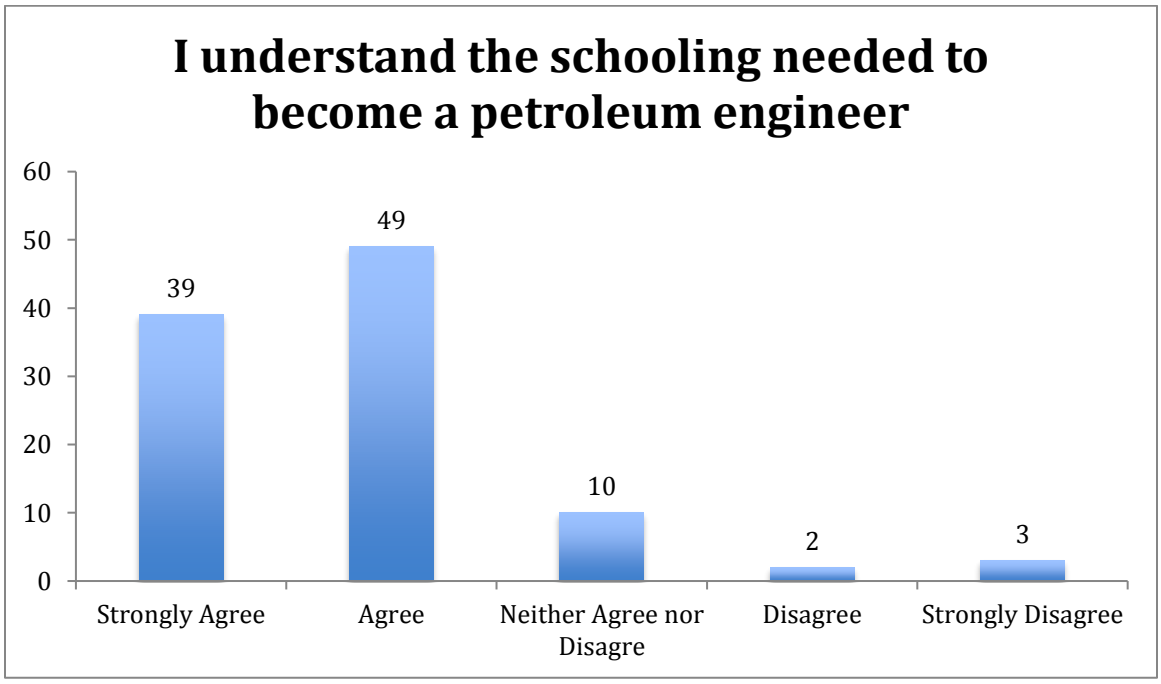

Figure 1. *Survey Results: Understanding of the schooling needed to be a petroleum engineer.*

The findings illustrate that parents displayed understanding of basic factual and conceptual elements with careers in petroleum engineering. The assumption that parents do not have the factual or conceptual knowledge needed to make sound career decisions for their children was not validate

Procedural Knowledge

Rueda, (2011) refers to the knowing of how to do something as procedural knowledge. The skills and procedures involved with the task, including techniques, methods and necessary steps to achieve the desired results. To validate if parents could identify sources that can help in understanding how to go about a career in petroleum engineering parents were asked to identify if they had ever had contact with the ADNOC Scholarship office. Out of the 104 that responded to this question 70 have either visited the office or regularly visit it 18 were unsure and 17 have never visited the office. The surveys demonstrated that there is a small number of parents who are not familiar with ADNOC offices and this is an area that does need to be addressed.

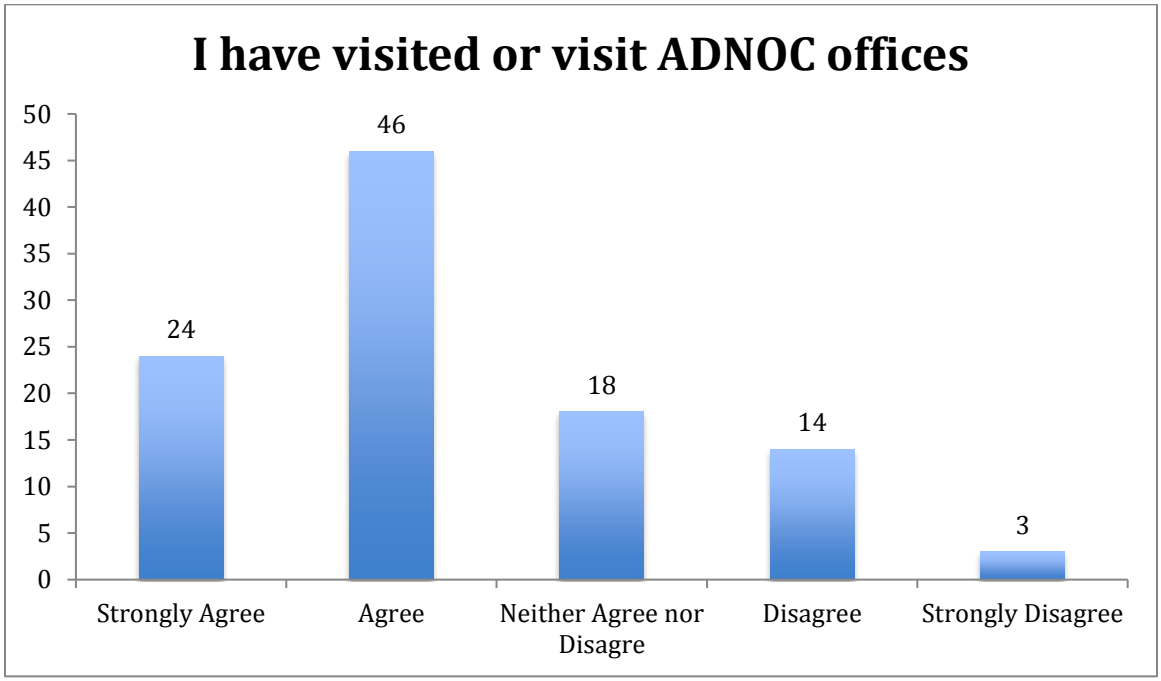

Figure 2. *Survey Results: I have visited or visit ADNOC offices*

For the interviews, parents were asked to choose a location to conduct their interview and all six opted to be interviewed at the ADNOC Scholarship Office in Abu Dhabi as this was a location they had already visited and were comfortable and familiar with. Parents were also asked in the interviews if they knew the types of scholarships that were offered, the careers that

were supported and the scholarship selection criteria and procedures. Parents were able to understand that the office provided scholarships in the oil and gas sector, but they did not understand the entire application process, nor were they aware of the internal procedures that must take place before a scholarship is granted. Additionally parents did not know that the office provided other resources apart from processing applications. Parents were unaware of the dedicated team of advisors and counselors that were available to develop road maps for students and assist when students faced difficulties. Furthermore, the office also had designated teams for each institution that scholarship students were affiliated with, and a dedicated scholarship personal positioned at PI to assist with day to day inquiries. These results suggest that there is insufficient knowledge among parents about the resources available to them and their children as their children pursue a career in petroleum engineering and inadequate knowledge to ensure their children receive the support and assistance they may need to successfully complete the program and enter the profession.

Metacognitive Knowledge

Anderson and Krathwohl (2001) argue that performance requires the ability to reflect and adjust as necessary including assessing demands, planning one's approach, modifying strategies and monitoring progress. Reuda (2011) calls understanding of "when and why to do something" metacognitive knowledge. Based on scanning interviews, it was an assumed need that Emirati parents lacked knowledge of the rules that define the petrochemical industry and also lacked a nuanced understanding of the importance of the petroleum industry. To validate this assumption, parents were asked if they encourage their children towards technical careers. Of the 104 who answered 93 agreed to encouraging their children to explore technical careers.

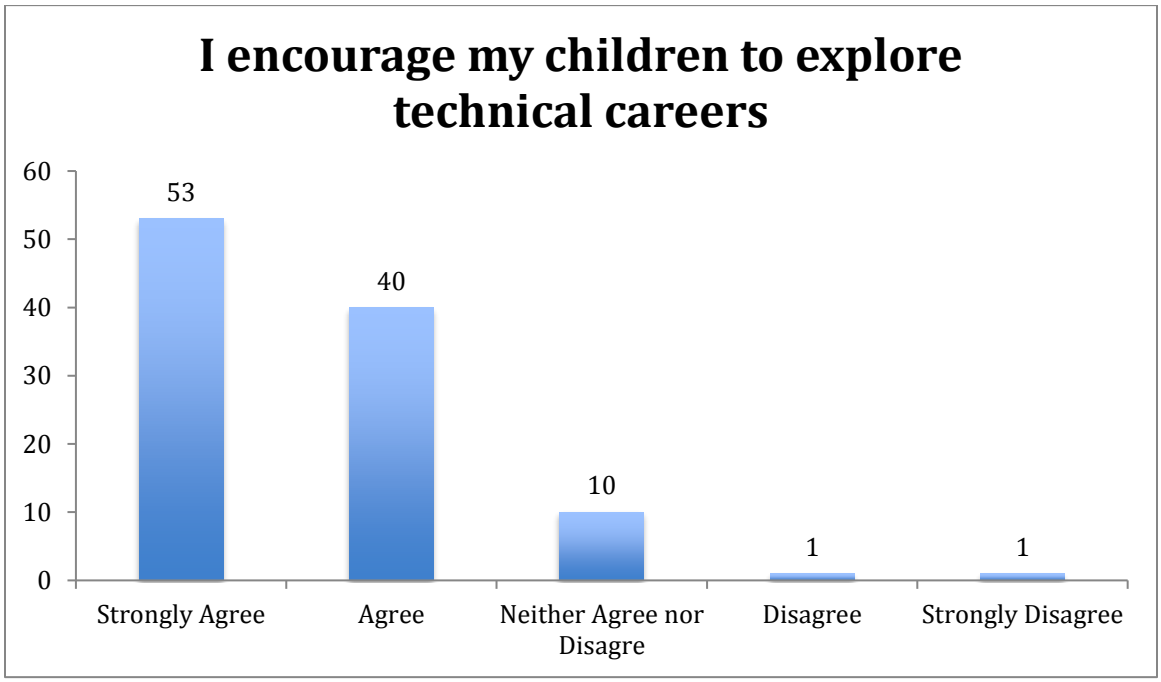

Figure 3. *Survey Results: I encourage my children to explore technical careers.*

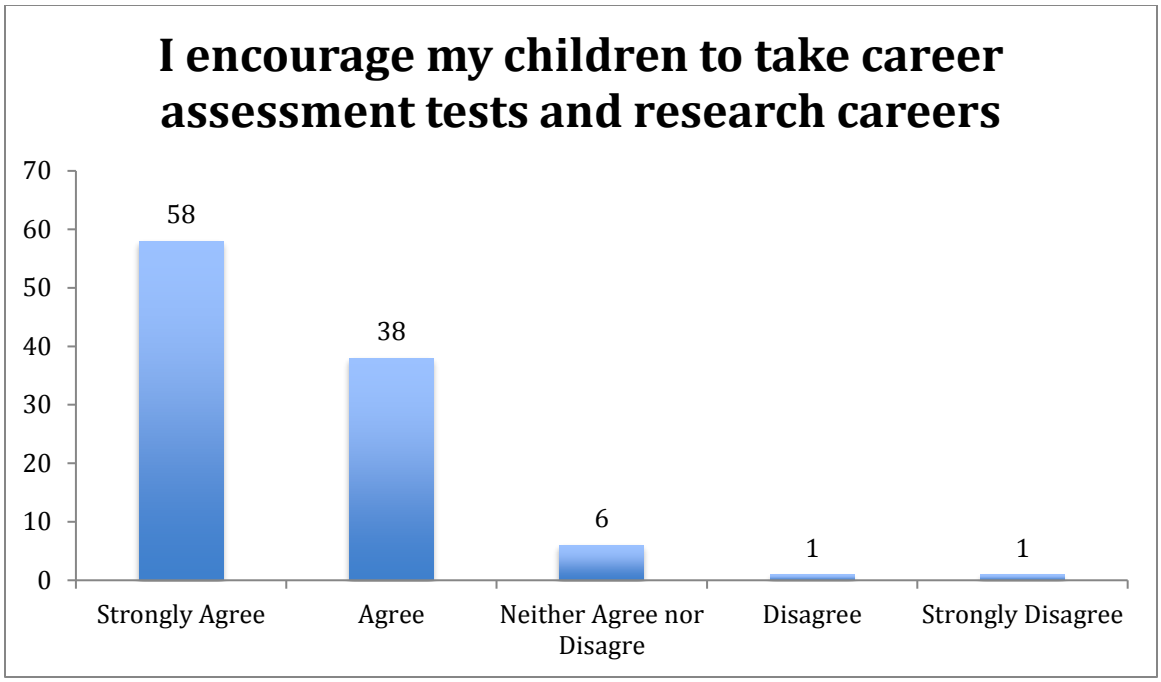

Figure 4. *Survey Results: I encourage my children to take career assessment tests and research careers.*

Moreover, when asked if parents encouraged their children to take self-assessment tests and research careers 96 of the 104 parents showed that they guided their children towards research and self-assessments. It can often be the case that there is a mismatch between the skills and interest that student's display and the careers that they choose. Therefore, when parents encourage their children to assess themselves it provides an opportunity to reflect on their learning and experiences and set accurate career goals. Furthermore, self-assessments facilitate open and honest dialogue between parents and children and increases self confidence in career decision making (Bachman, Nokali, & Votruba-Drzal, 2010).

Among the interviewees it was determined that parents recognized the need for petroleum engineering careers. One of the parents noted that "the country is dependent on oil as income and it is the main source of income in UAE, so children should study technical fields." Another parent stated that "My sons serve their nation and this is their duty, you study for your nation and

not just for yourself, you have a responsibility so do not think only about yourself." Parents as a whole demonstrated that they did possess metacognitive knowledge needed to reflect on choosing petroleum engineering as a career.

Synthesis of Results and Findings of Knowledge Needs

Knowledge Category	Assumed Need	Validated	Not Validated
Factual & Conceptual Knowledge	Parents do not understand the petroleum engineering career or the education involved.		X
Procedural Knowledge	Parents could not identify sources that can help in understanding how to go about a career in petroleum engineering.	X	
Metacognitive Knowledge	Parents are not able to accurately reflect on the need for petroleum engineering.		X

Figure 5. *Survey Results: Assumed knowledge needs*

The analysis from the collected data identified mixed results. In regards to knowledge needs of parents when it comes to career decision-making for Emirati students, the findings revealed that parents of petroleum engineering students are in possession of three of Anderson and Krathwohl's (2001) four dimensions of knowledge. Parents were aware of the basic factual knowledge when it came to petroleum engineering careers. Furthermore, parents were aware of the schooling needed to become a petroleum engineer. Parents also displaced metacognitive knowledge in that they reflected on the need of petroleum engineering for the economical well being and sustainability of the UAE. Parents were not knowledgeable of the purpose of the ADNOC office or the resources available to them. Additionally parents were unaware of the types of scholarships offered and the application process and procedure. Table 5 above summarizes the assumed knowledge needs and if they were validated.

Results and Findings for Motivation Needs

A key facet of this study examines the motivations of parents when it comes to career aspirations for their children. Motivation helps to set goals and guides active engagement in achieving these goals (Clark and Estes,2008). Atkinson introduced the first model of achievement motivation in 1964, in which motivation was based on expectancies and values. Wigfield and Eccles (2000) expanded on Atkinson's model and incorporated the works of other motivation theorists to devise the expectancy value model. In this model, expectancies explain the individual's perception of success or failure in a given task and value denotes the extent of importance that is put on the task. Values are further expanded into four dimensions, intrinsic value (interest) extrinsic value (utility) attainment value (importance) and cost value (benefit). In essence, to be motivated parents must answer yes to two questions "Can I do the task?" and "Do I want to do it" (Wigfield and Eccles, 2000).

Expectancy value models of motivation are widely used as it is a comprehensive motivational framework that combines a multitude of perspectives to explain what motivates individuals and behavior related to achievement. The assumed motivational needs in this study focused on self-efficacy, utility value and intrinsic value,.

Self-Efficacy

In tasks that are difficult or require significant mental effort, self-efficacy of the individual becomes important. Bandura (1997) posits that people with high self-efficacy have greater motivation because they believe that they are competent and expect positive results. Parents who believe they are capable of making a successful career choice for their children display high self-efficacy. It was assumed that Emiratis parents were confident in their abilities to make correct choices for their children. To test this notion parents were asked to respond to

the following two statements using a Likert scale. Parents were asked to respond to the statement: "I feel confident in making career decisions for my children." Of the 104 respondents, 73 agreed while 22 neither agreed nor disagreed, only six disagreed and four strongly disagreed with the statement.

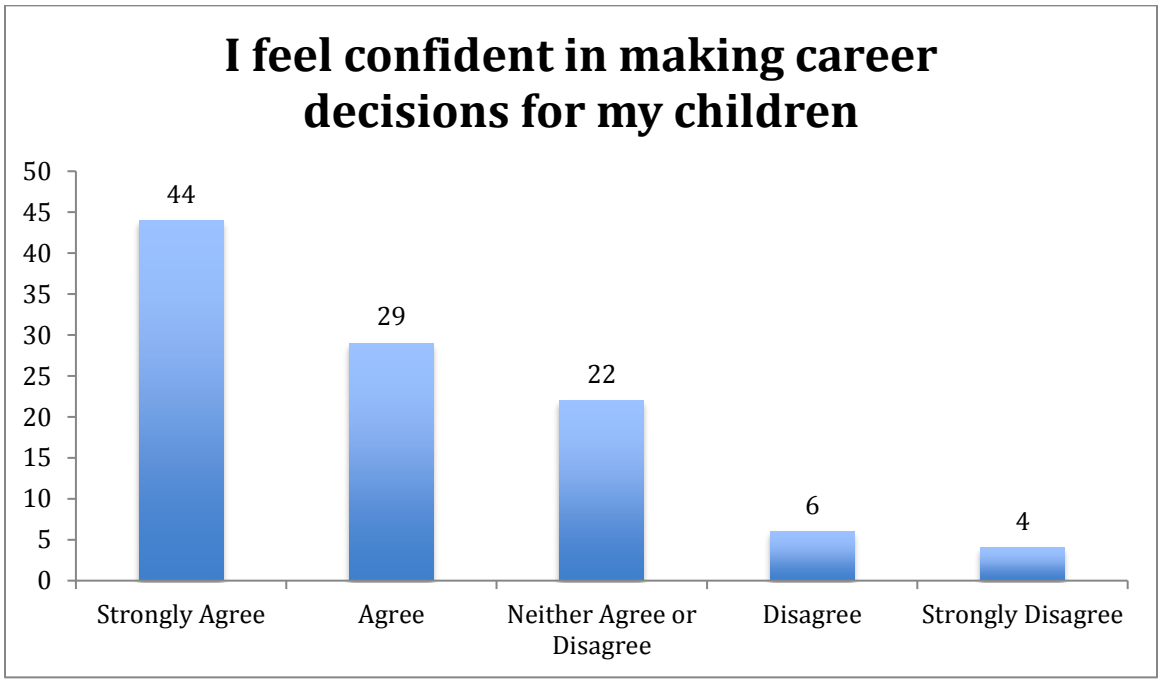

Figure 6. *Survey Results: I feel confident in making career decisions for my children.*

Furthermore, when asked to respond to the statement "I find myself asking family and friends for advice when making career decisions for my children" 38 agreed or strongly agreed whilst 35 neither agreed nor disagreed,19 disagreed and 13 strongly disagreed.

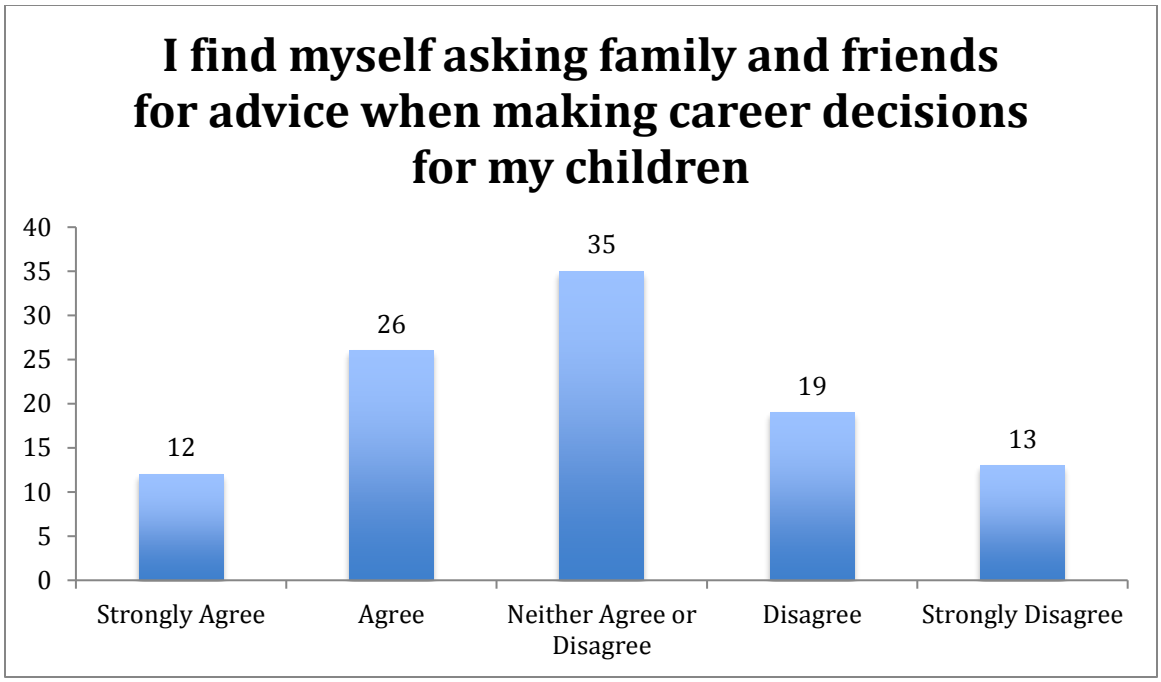

Figure 7. *Survey Results: I find myself asking family and friends for advice when making career decisions for my children*

The results showcase that Emirati parents strongly feel that they are capable and competent in making career choice for their children. It was also discovered that although they feel confident many also seek some advice from family and friends as they decide how to counsel their children. This may come from the collective nature of the UAE, and decisions being a collaborative effort rather than an individual one.

Of the parents interviewed, one parent stated "of course I should know about the path because the student is a child and may not know what is good for him or her and what is needed for him and her in the future. I encourage the child to choose the best and not the easiest." The other five parents shared similar views but also expressed that they do not force their children into a path, but rather guide and counsel them and are available when asked for their opinion. Therefore, the assumed motivation need for self-efficacy was validated.

Intrinsic Value

Pintrich (1989) suggests that when individuals attach a high value to a task, they will exert deeper cognitive and metacognitive strategies to engage in the behavior.

One of the assumed motivation needs was intrinsic value. Individuals who are intrinsically motivated partake in tasks due to personal enjoyment and interest. It was assumed that parents find petroleum engineering careers to be appealing. Parents were asked to respond to the following statement: "Petroleum engineering is an appealing career." Of the 105 respondents 98 either agreed or strongly agreed five neither agreed nor disagreed, and two disagreed.

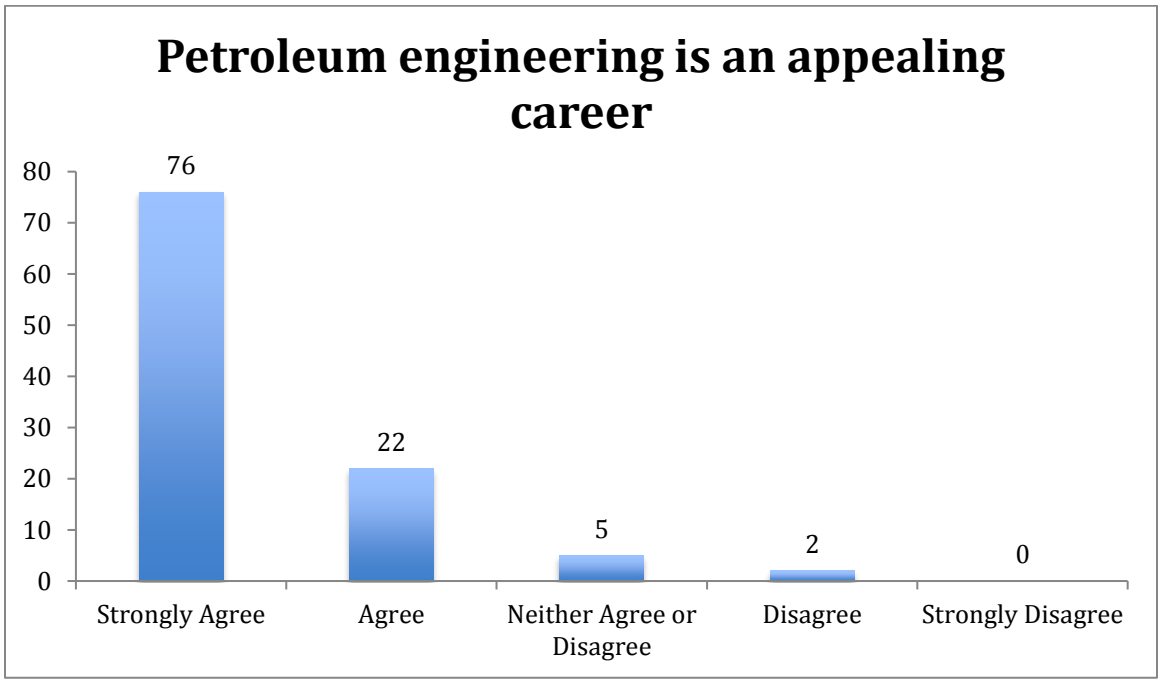

Figure 8. *Survey Results: Petroleum engineering is an appealing career.*

In the interviews parents expressed similar sentiments in that they found that in order for the nation to succeed on a global level their children needed to challenge themselves in careers that have traditionally been outsourced to foreign talent. One parent expressed: "God willing our children will fulfill the needs of this country, to rise to the challenge and to overcome difficulties

for the sake of serving our leaders, our country and our government." Thus, the assumed intrinsic motivation need was validated.

Utility Value

Another assumed need was utility value, which reflects how one perceives value of the task in obtaining external rewards or short term goals and facilitating long term goals. Eccles (1998) qualified extrinsic utility as a means of achieving the end. It was assumed that parents find petroleum engineering careers to be appealing due to the remuneration attached with the career. Parents were asked to respond to the following statement, "High salary is important when it comes to career choice." Of the 105 respondents 88 agreed or strongly agreed, 16 neither agreed nor disagreed and one disagreed.

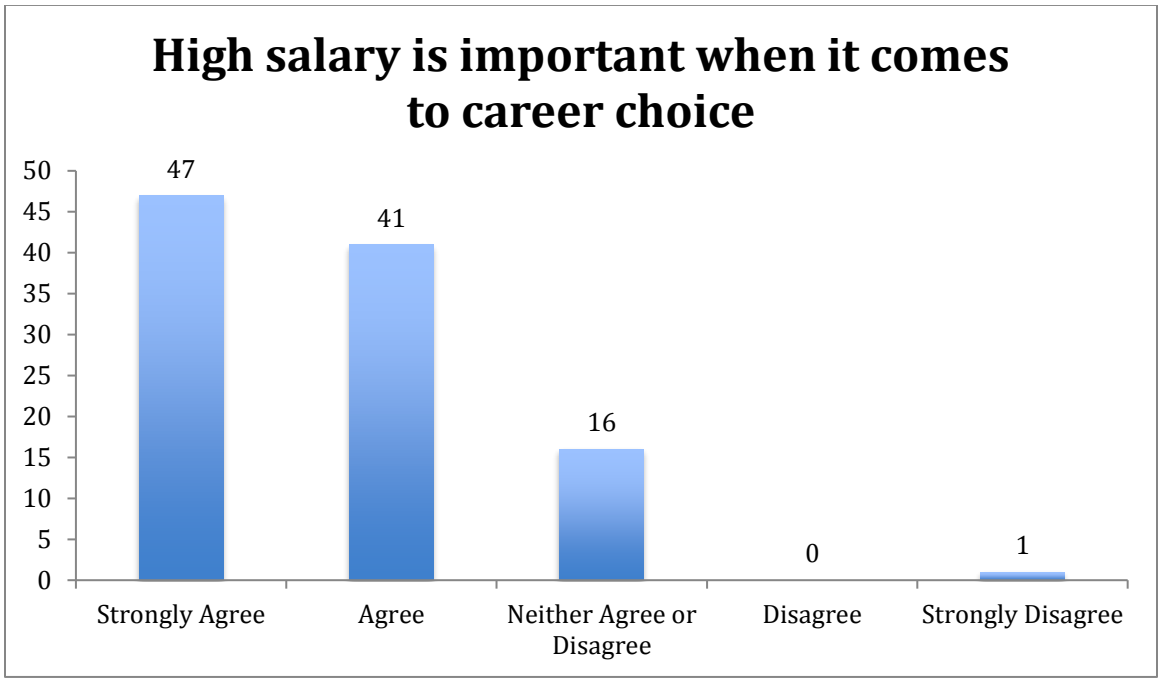

Figure 9. *Survey Results: High salary is important when it comes to career choice*

Moreover, parents were also asked to respond to the following statement, "Salary packages are high for a career in petroleum engineering." Of the 105 respondents 54 either

agreed or strongly agreed whilst 36 neither agreed or disagreed, 10 disagreed and five strongly disagreed. The results indicate that parents are not confident in the compensation packages that are associated with Petroleum Engineers. Some strongly feel that remuneration is not reflective of the time, effort and resources allocated to become a petroleum engineer. In the UAE, the belief remains that public sector jobs such as those offered by ADNOC, should pay high salaries as was the custom after the discovery of oil.

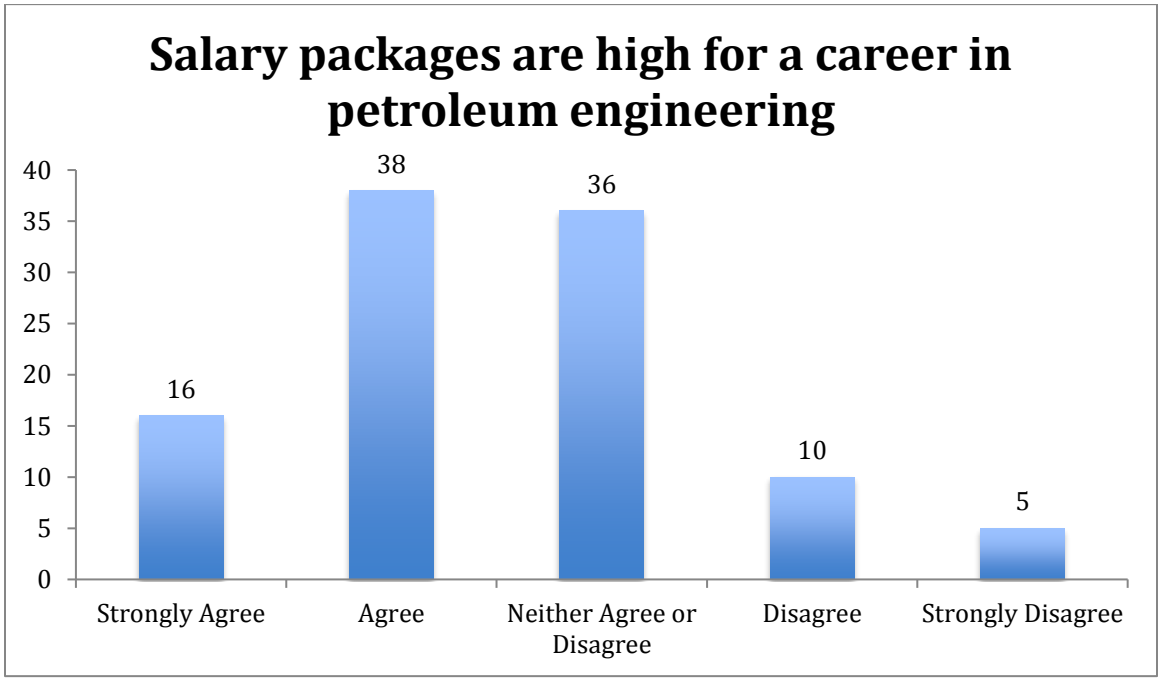

Figure 10. *Survey Results: Salary packages are high for a career in petroleum engineering.*

In the interviews parents concurred that engineering salaries were not as high as they had expected considering the amount of education and hard work that the children had to display. A parent expressed "salary is important especially for male children because they have to go and support their family." Another parent noted "some people with less education make more than what is being offered to engineers". It appears that parents feel that Petroleum Engineering is a

specialized career that requires higher levels of education, as such the compensation packages should be high. There is also a sense of inequality and unfairness as parents do not feel that compensation is tied to value of the career or the education associated with the career.

From the data it can be gauged that parents do think salary is important but a consequential number of them do not think salaries paid by ADNOC are commensurate with the educational attainment the career requires. When benchmarking for engineering salaries with other organizations, it is noted that ADNOC is competitive and matches the industry standard, however there are few sectors that offer more to their engineers than does ADNOC. This could be a reason that is deterring parents from selecting petroleum engineering as a career option. Thus, the assumed utility motivation need was validated.

Synthesis of Results and Findings for Motivation Needs

Motivation Category	Assumed Need	Validated	Not Validated
Self-Efficacy	Parents were confident in their abilities to make correct choices for their children.	X	
Intrinsic Value	Parents find petroleum engineering careers to be appealing.	X	
Utility Value	Parents expect petroleum engineering careers to have high remuneration.	X	

Figure 11. *Survey Results: Assumed motivation needs.*

Researchers have noted that in order to be motivated towards a behavior, value and expectancy play an important role. The data collected for this study verified that the some assumed needs were validated whilst others were not. Parents in the UAE display high self-efficacy and belief that they are best suited to make the decisions for their children. When it came to being intrinsically motivated and parents finding petroleum careers to be appealing, the need was validated as parents were aligned to the development and the success of the nation and

had intrinsic motives towards the career choice. Moreover, the utility need was also validated as parents felt that petroleum engineering career did not pay well. Table 11 above summarizes the assumed motivation needs and if they were validated.

Results and Findings for Organization Needs

Clark and Estes' (2008) highlight that often organizational barriers can be the source of performance gaps. To close these gaps requires identification and analysis of structures, processes and cultural dynamics (Gallimore & Goldenberg, 2001). Quinn and Holland (1987) argue that cognitive schemas acquired in cultural context and behavioral activity intertwine to play a role in how individuals make decisions. Gallimore and Goldenberg (2001) provide two units of analysis that can be utilized to highlight gaps in organizational needs, they are cultural settings and cultural models. Cultural models are shared way of thinking and perceiving (norms, values, practices) and cultural settings are the familiar behaviors of the home and community or the visible aspects (Rueda, 2011). In this study these two concepts were used to illuminate an understanding of the role of culture in career choices that Emirati parents make for their children.

In the UAE, cultural modals and settings are not possible without an understanding of Islam. Religion has gradually developed and transmitted the unique culture that encompasses the UAE and permeates all aspects of life. Cultural perceptions cause the people of the UAE to see life as a means to preserve the past, rather than change the future. These important aspects of cultural context are discussed below in conjunction with the data collected from surveys and interviews.

Cultural Model: Authoritarian Leadership

Religion in the UAE dictates submission to a higher being and that decisions should be made through consultation. Therefore, it was assumed that parents in the UAE have an authoritative parenting style and children must adhere to their decisions. To evaluate this assumption parents were asked to respond to the following statement: "I expect my children to obey my decisions at all times" Of the 105 respondents 46 either agreed or strongly agreed whilst 48 neither agreed or disagreed, eight disagreed and three strongly disagreed.

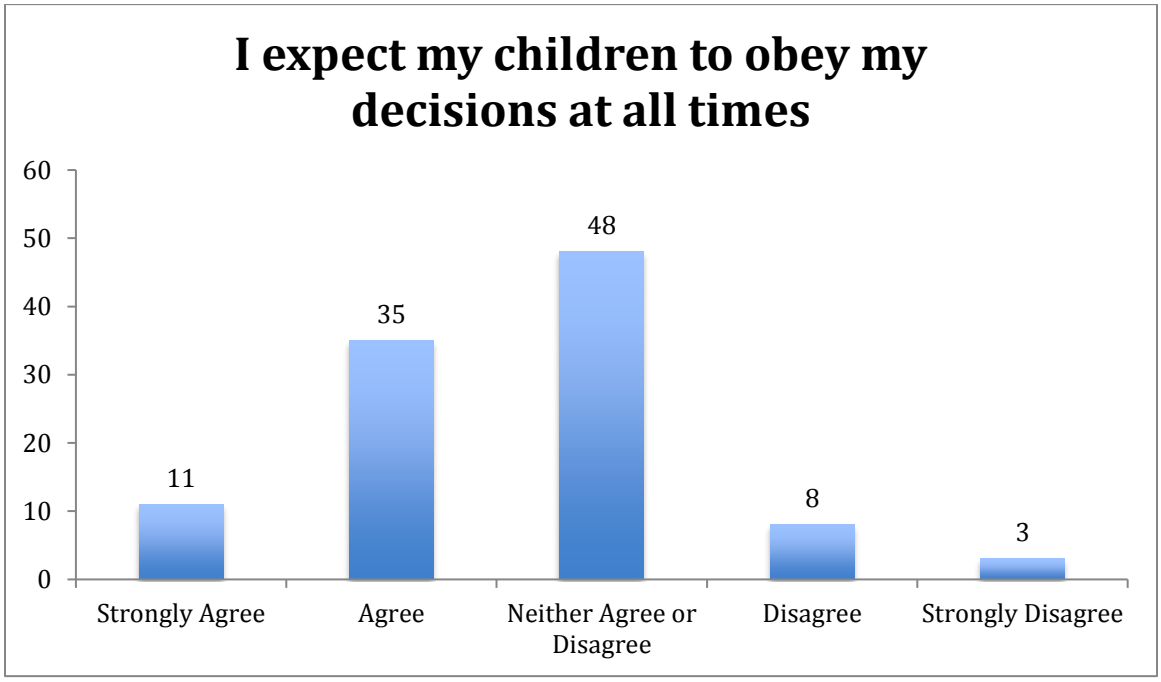

Figure 12. *Survey Results: I expect my children to obey my decisions at all times*

The findings indicate that there is a shift in parenting styles particular to this group of parents In the past parents were authoritarians and there was no exception to the rules and regulations, children were expected to obey order at all times. The new generation of parents still hold authority, however they appear to be more lenient in bending the rules. Parents are now educated and may understand the importance of discussion in decisions making, they may have

also faced the same challenges growing up, as such they are willing to consider their children's feelings and desires when setting expectations.

In the interviews parents also noted that they were always available for consultation and advise, but did not push their children towards a certain career. One parent stated "As a Muslim society we seek guidance in decision making by praying ishtikarah prayer. This is part of our religion so our children must seek our advice to have a decision that is in their interest and benefit." Another parent highlighted "My involvement is more to advising him and putting him in the right track, but overall it is his decision". The other four interviewees agreed that career decisions were that of their children, however the role of the parents as elders was to provide sound advice and counseling. The data did not validate the assumed need.

Cultural Modal: Negative beliefs

Segregation is a way of life for the men and women of the UAE, in the community men and women rarely interact. Celebrations, mourning, feasts and even religious facets are conducted in segregation. It is frowned upon for men and women who are not related to be in close proximity to each other. Thus, it was an assumed need that parents would have negative beliefs in the value of women in petroleum engineering, which entails men and women working together. Parents were asked to respond to the following four statement utilizing a Likert scale: "I am comfortable with men and women working together." Of the 105 respondents 71 either agreed or strongly agreed whilst 22 neither agreed nor disagreed, eight disagreed and four strongly disagreed.

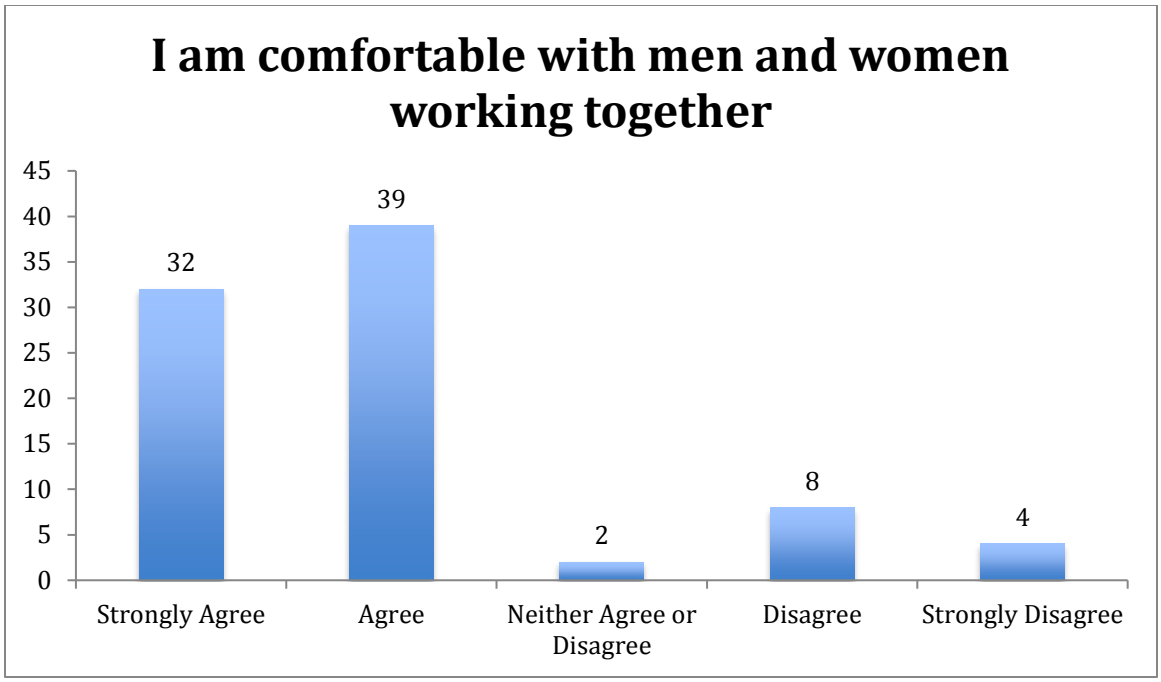

Figure 13. *Survey Results: I am comfortable with men and women working together*

Of the parents who were interviewed there was agreement that times have changed and that we must accept the reality of the nature of our lives. Women are entering higher education at an alarmingly higher rate than men; as such it is waste of talent to not include women in the working economy of the UAE. One male parent commented" There is no problem with men and women working together. What is important is to have discipline in the workplace." A female parent concurred, "times have changed, men and women can work together, it is not like the past where fishing was the only option and it was all men." There was strong agreement between both the male and female interviewees that there were no issues with men and women working together in a professional manner.

Furthermore parents were asked to respond to the statement: "Careers should be based on gender." Of the 105 respondents 50 either agreed or strongly agreed whilst 21 neither agreed nor disagreed, 20 disagreed and 13 strongly disagreed.

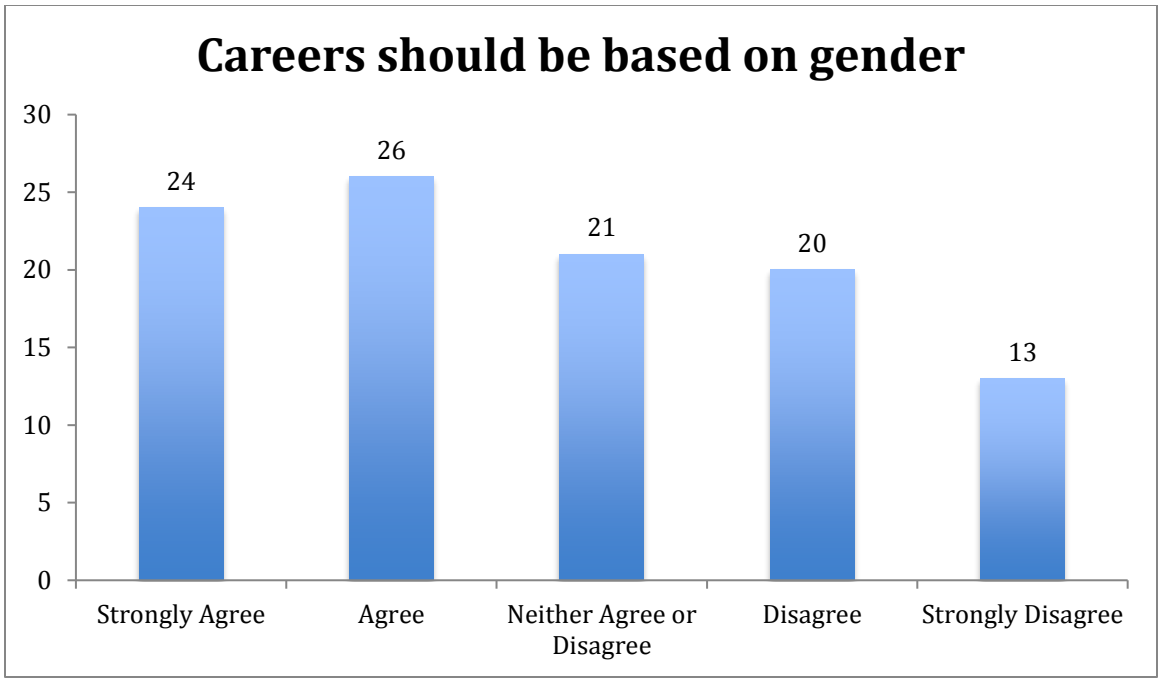

Figure 14. *Survey Results: Careers should be based on gender*

In the interviews, parents expressed an understanding that not all careers were feasible for women. Although they were happy with men and women working together, they wanted more female friendly atmosphere for their daughters. One parent noted, “Men can go out on the rig and stay away for a day or two, a women cannot.” There was consent between both male and female parents that women must protect their honor and the honor of the family. They must not let freedom and modernization tarnish their ethics and morals.

Likewise parents were asked to respond to: “I apply the same thought process in career decision making for male and females.” Of the 105 respondents 81 agreed or strongly agreed 13 neither agreed or disagreed, eight disagreed and three strongly disagreed.

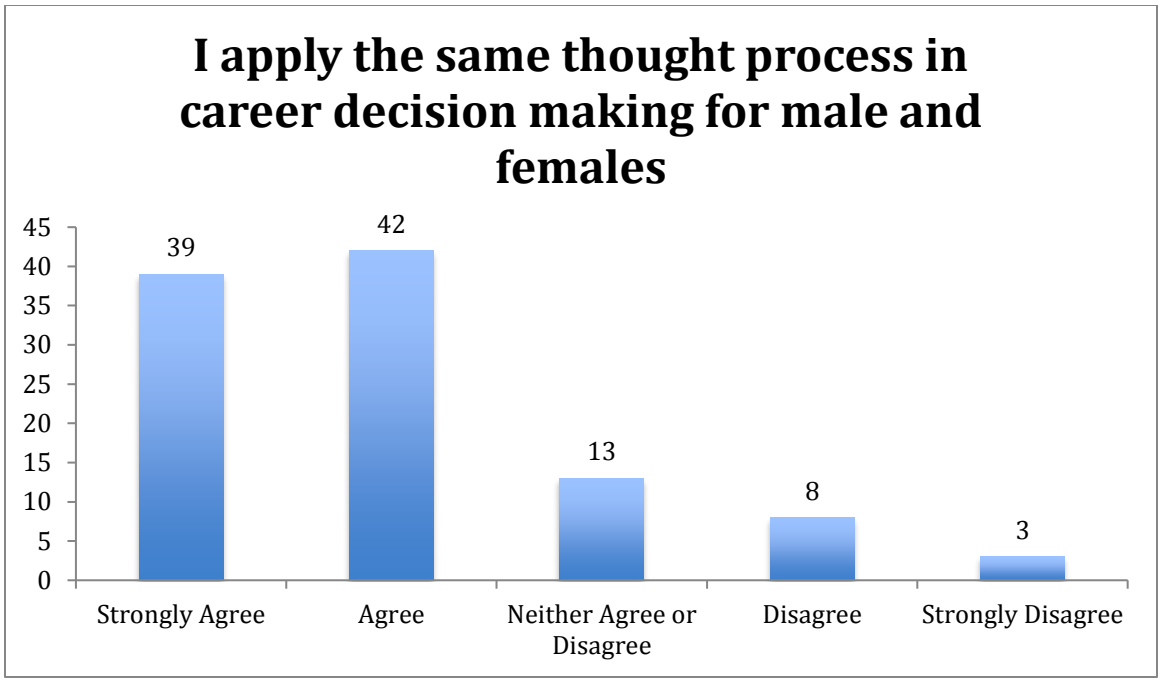

Figure 15. *Survey Results: I apply the same thought process in career decision making for male and females*

In the interviews, parents discussed that they do focus more on male children's career success than they do for females, however an equal opportunity is provided for both genders to attain education. All six parents that were interviewed agreed that having a career is very important for a male child because they will have to support their own families one day.

Parents also responded to the statement: "women can be as good in technical careers as men" Of the 105 respondents 72 agreed or strongly agreed 14 neither agreed or disagreed and 16 disagreed and three strongly disagreed. In the interviews all six parents agreed that they felt that their daughters were capable of performing as good as their sons.

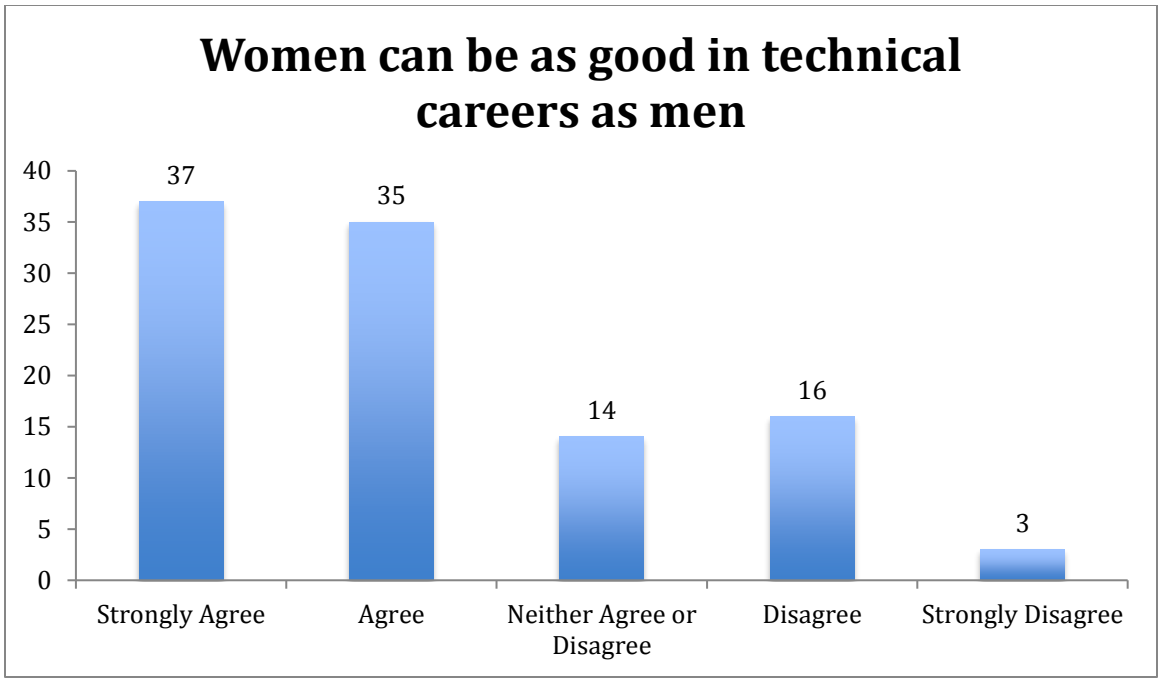

Figure 16. *Survey Results: Women can be as good in technical careers as men*

Although parents expressed that they were comfortable with mixing of genders there was always an underlying condition that interaction between men and women be conducted in a culture appropriate manner. Therefore the assumed need was not validated.

Cultural Model: Resistance to change

It was assumed that traditional Arab values play a role and hinder the changes needed for women in male dominated careers. Parents were asked to respond to the following statement: "Culture plays a role in decision making" Of the 105 respondents 55 strongly agreed 43 agreed whilst six neither agreed or disagreed and one disagreed.

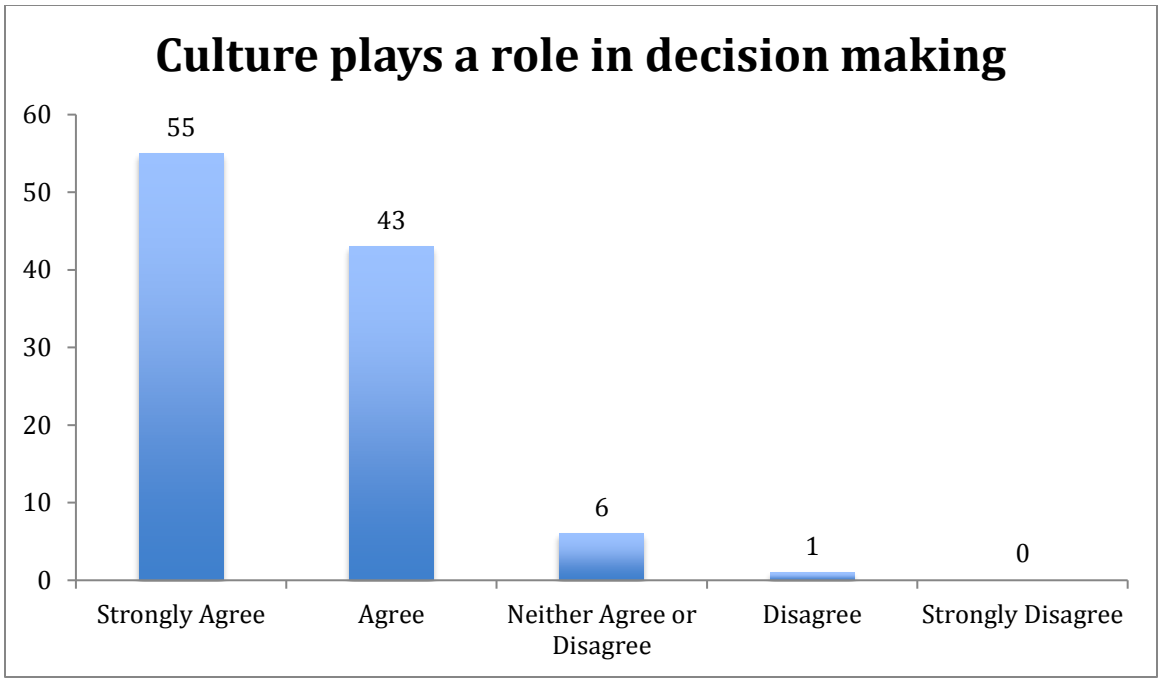

Figure 17. *Survey Results: Culture plays a role in decision making*

Of the parents who were interviewed there was consensus that it is important to preserve the cultural setting and not throw it off balance nor work against it. One parent expressed "of course customs and traditions should not be overlooked no matter how sophisticated we are. Everyone should hold onto his or her traditions and religious beliefs". Parents are in agreement that times have changes and that society must adapt and work with these changes, however changes should not come at the cost of losing valuable aspects of the Emirati culture.

The surveys and interviews displayed that Emirati parents are attempting to break away from the norms and to think about education outside of the cultural framework. However in a small country like the UAE, breaking away from the norm can be detrimental to an individual's place within the society, as such parents are forced to reflect on their decisions from a cultural perspective even when they may not agree with it. These results did not validate the assumed need.

Cultural Setting: Lack of effective role models.

It was assumed that parents did not have female engineers to serve as role models. To assess this need parents were asked to respond to the statement: "we need more women in petroleum careers." Of the 105 respondents 62 agreed or strongly agreed 27 neither agreed nor disagreed, 10 disagreed and five strongly disagreed.

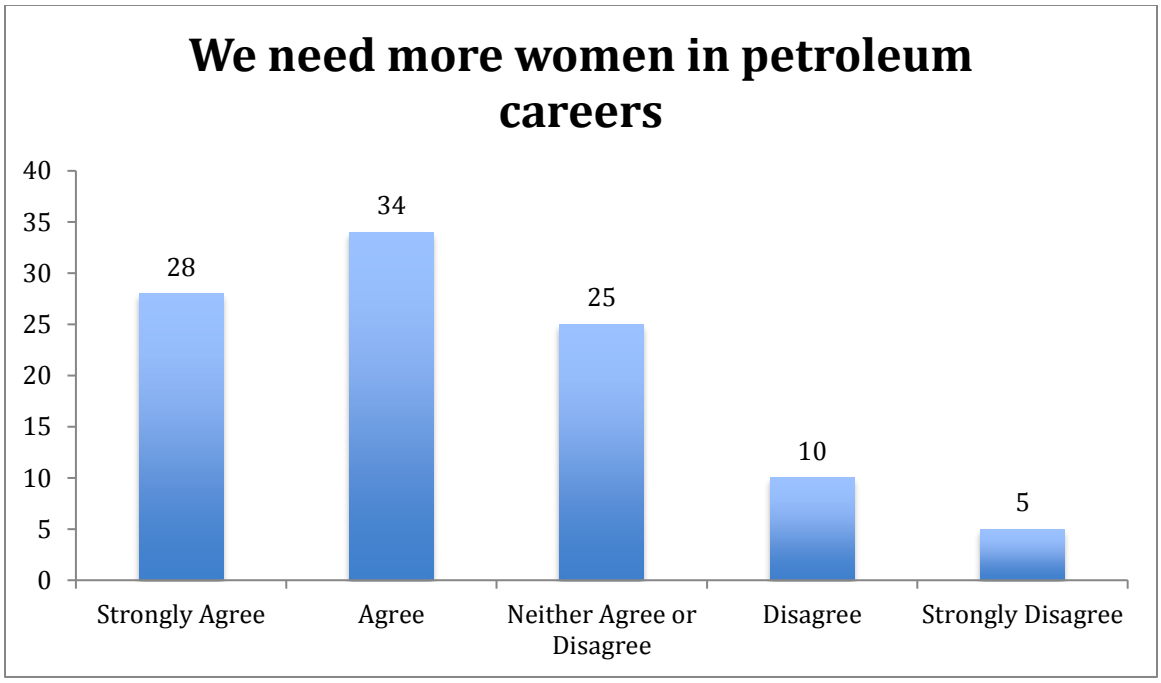

Figure 18. *Survey Results: We need more women in petroleum careers*

In the interviews parents expressed their desire to see women excel and succeed just as much as men, but they added that their needs to be more female leaders and examples of leadership. Parents highlighted that there were many women in the public eye in today's society but that they are either in media, education, or politics, but there are few public figures that are in the hydrocarbon sector. Therefore, the industry remains male dominated and it does not get the exposure that it needs to interest the female population. One parent commented "There is talk that they will have female CEO's in the hydrocarbon industry by 2020, but as of now we do not

have any prominent female figures for our daughters to look up to." The survey and the interview data supported the assumed need and it was validated.

Cultural Setting: Restrictive or unnecessary rules

Women in the UAE have traditionally been brought up with the purpose of upholding a household of their own someday. Therefore, it was assumed that the value of a successful wife is higher than that of a woman in a career. Parents were asked to respond to two statements pertaining to these restrictive rules. First parents responded to: "it is more important for a women to be a successful wife then to be in a successful career. Of the 105 respondents 60 either agreed or strongly agreed whilst 28 neither agreed nor disagreed, 12 disagreed and five strongly disagreed.

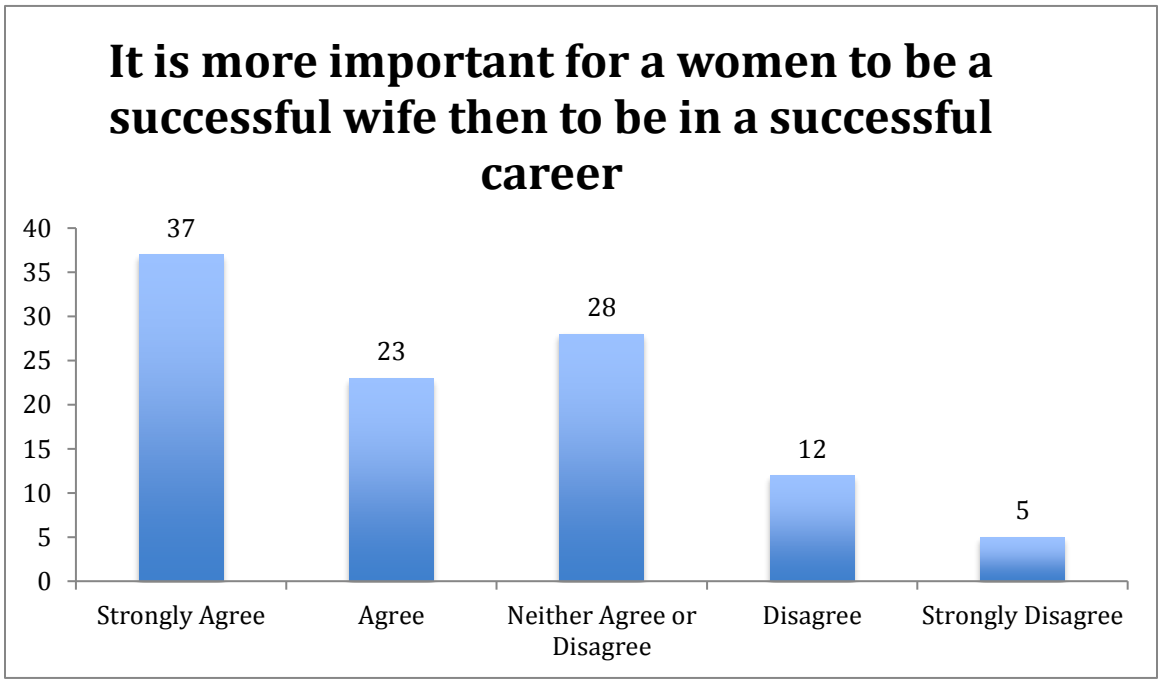

Figure 19. *Survey Results: It is more important for a woman to be a successful wife then to be in a successful career.*

Furthermore, parents were asked "It is acceptable in society to have female engineers."

Of the 105 respondents 96 either agreed or strongly agreed whilst 5 neither agreed or disagreed, two disagreed and two strongly disagreed. The results indicate that parents are not averse to having females work in the engineering discipline. This implies that there is no stigma attached to women getting outside of the house and earning both a degree and serving in that career.

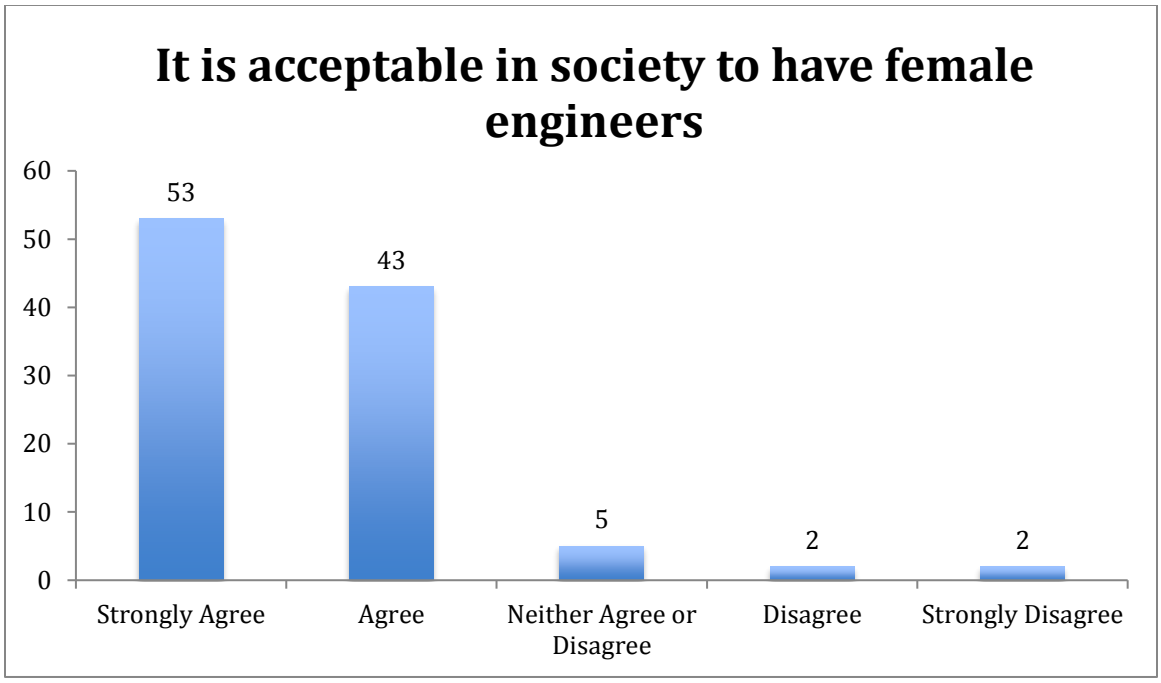

Figure 20. *Survey Results: It is acceptable in society to have female engineers.*

The Emirati society approves of women as engineers, however motherhood is preferred over a career. So if a woman were to start off as an engineer she would be expected to retain her position only until she was to be with a child, at which case she would have to relinquish her career to become a successful mother. The two are not interchangeable and one cannot be both a successful mother and a successful petroleum engineer. According to the World Bank, the percentage of women studying engineering in the Middle East is high, yet few women go into the engineering profession after graduation. The fact that marriage and motherhood is preferred

for women could be a deterring factor to the number of women that enter engineering and the number of women that continue in engineering after graduation. Therefore, the assumed need was validated.

Cultural Setting: Lack of resources

It was assumed that the organizations do not offer the same opportunity to men as they do for women. Parents were asked to respond to: "The government provides equal opportunity for education for men and women." Of the 105 respondents 101 either agreed or strongly agreed whilst three neither agreed nor disagreed, and one strongly disagreed.

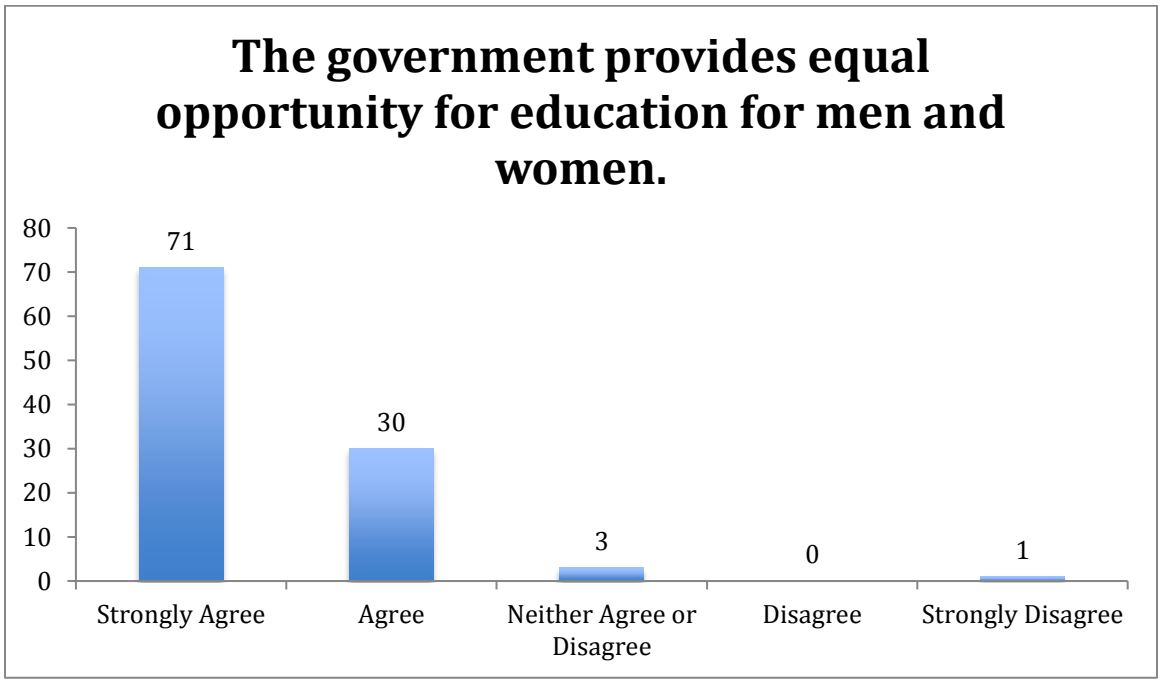

Figure 21. *Survey Results: The government provides equal opportunity for education for men and women.*

Of the parents who were interviewed they expressed gratitude towards the government for investing in its people and providing all the tools necessary for both men and women to succeed. One parent expressed "the government invested a lot of money in this field for the sake of its people and the young men and women. The government relies on the youth." The assumed

need that there is a lack of resources available was not validated.

It is understood that parents agree with the government's stance on gender equality and embrace the opportunities the government provides for their children. It also influences how they interpret education for male and female children. The paradigm of education has changed in the UAE and this change is being led by the governing body so that the people could shed their traditional views on education and gender segregation. Under the UAE constitution men and women are entitled to access to education, professions and employment. Furthermore, the UAE government's policies and strategies support the advancement and participation of women in the economy and the development of the country. Women actively serve in the politics and policy making of the country, cabinet ministers and local councils are reflective of the participation of women. Moreover, the UAE 2030 Vision Strategy clearly outlines the goals for women in the workforce and the importance of not only educating women but integrating them into the economy. In fact, ADNOC has aligned its goals with those of the nation by setting a goal to have a female CEO within its group of companies in the next five years.

Synthesis of Results and Findings for Organization Needs

The complex history, demographics, relatively new existence of the state combined with the fast growth and modernization of the region makes the organization needs of the United Arab Emirates of great relevancy. The rapid need for Emiratis to be educated to relieve the pressure of expat labor dependency has given rise to gaps that must be resolved. The following table summarizes the assumed needs and if they were validated.

Organization Category	Assumed Need	Validated	Not Validated
Cultural Model: Authoritarian Leadership	Parents of petroleum engineering students at PI have an authoritative parenting style		X
Cultural Model: Negative beliefs	Parents may have negative beliefs in the value of women in petroleum engineering and men and women working together.		X
Cultural Model: Resistance to change	Arab values hinder the change needed for women in male dominated careers		X
Cultural Model: Lack of effective role models.	Parents did not have female engineers to serve as role models for their children.	X	
Cultural Setting: Restrictive or unnecessary rules	The value of a successful wife is higher than that of a woman in a career.		X
Cultural Setting: Lack of resources	Organizations do not offer the same opportunity to men as they do for women		X

Figure 22. *Survey Results: Assumed organizational needs*

Organizational culture is an element that plays a part in promoting or impeding progress towards a goals (Rueda, 2011). This data was collecting to understand the culture under which parents make decisions. Four aspects of cultural model and two elements of cultural setting were examined.

The findings revealed that authoritarian leadership, an aspect of cultural model, was not validated. Parents do not expect children to follow their orders into a career, but rather serve as advisors to counsel their children into a suitable path. Additionally cultural model of negative beliefs was not validated. Parents do not have negative beliefs about men and women working together. There is consensus that times have changed and that men and women must both

contribute to the economy of the nation. Another cultural model aspect tested was resistance to change. It was determined that Arab values do play a role and restrict the changes needed for women to penetrate male dominated careers. Furthermore, a cultural model need of lack of effective role models was validated. Parents felt that there were not enough female role models in the hydrocarbon sector.

The two assumed needs under the cultural setting were not validated. The need that there were lack of resources available for women to succeed was not validated. Similarly, the need that restrictive or unnecessary rules dictate that women are better as successful wives then in a career was also not validated.

Summary of Knowledge, Motivation, and Organizational Needs

Knowledge Category	Assumed Need	Validated	Not Validated
Factual & Conceptual Knowledge	Parents do not understand the petroleum engineering career or the education involved.		X
Procedural Knowledge	Parents could not identify sources that can help in understanding how to go about a career in petroleum engineering.	X	
Metacognitive Knowledge	Parents are not able to accurately reflect on the need for petroleum engineering.		X
Motivation Category			
Self Efficacy	Parents were confident in their abilities to make correct choices for their children	X	
Intrinsic Value	Parents find petroleum engineering careers to be appealing	X	
Utility Value	Parents expect petroleum engineering careers to have high remuneration.	X	
Organization Category			
Cultural Model: Authoritarian Leadership	Parents of petroleum engineering students at PI have an authoritative parenting style		X
Cultural Model: Negative beliefs	Parents may have negative beliefs in the value of women in petroleum engineering and men and women working together.		X
Cultural Model: Resistance to change	Arab values hinder the change needed for women in male dominated careers		X
Cultural Model: Lack of effective role models.	Parents did not have female engineers to serve as role models for their children.	X	
Cultural Setting: Restrictive or unnecessary rules	The value of a successful wife is higher than that of a woman in a career.		X
Cultural Setting: Lack of resources	Organizations do not offer the same opportunity to men as they do for women		X

Figure 23. *Survey Results: Assumed knowledge, motivational and organizational needs*

The survey and interview results collected revealed mixed results; multiple assumed

needs were validated. With regards to knowledge, factual and conceptual needs were not validated, as parents did have the factual and conceptual knowledge about petroleum engineering careers. Similarly, metacognitive knowledge needs were also not validated. It was revealed that parents had an understanding of the importance of the petrochemical industry to the UAE. Procedural knowledge needs were validated as parents were not aware of the policies and procedures of the ADNOC scholarship office or the resources that were made available for both parents and students to help in career decision making.

Three motivational needs were explored; Data collected revealed that all three motivational needs were validated. In regards to motivation needs parents displayed high self-efficacy, intrinsic and utility value. Parents were confident in their ability to make decisions but were not opposed to consulting family and friends for the decision. Furthermore, parents felt that salaries should be high for petroleum engineers. According to the data, intrinsic value as a motivational need was also validated. Parents found petroleum engineering to be an intrinsically appealing career as it was directly related to the economy of the nation.

Data collected on organizational needs pertained to two elements cultural model and cultural setting. Four aspects of the cultural model were examined with the surveys and interviews. It was revealed that one of these aspects of the cultural model was validated in that parents felt that there was a lack of role models for females to follow. When it came to the remaining three aspects, parents did not display authoritative leadership and expect children to obey their order. Parents also did not have negative beliefs about men and women working together. Likewise parents did not feel that old Arab values held women back from entering male dominated careers.

Within the cultural setting element, two aspects were tested, that of lack of resources and

restrictive or unnecessary rules. It was determined that parents felt that being a successful wife was more important than having a career; the assumed need of restrictive or unnecessary rules was validated. Furthermore, parents expressed that the government provided equal resources for both men and women to succeed so the assumed need of lack of resources was not validated.

Based on the findings the following chapter will provide solutions on closing the performance gap. Recommendations for implementation and evaluation plan will also be discussed.

CHAPTER 5

SOLUTIONS, IMPLEMNTATION, EVALUATION

The purpose of this chapter is to propose solutions for the validated knowledge, motivation and organization causes presented in Chapter 4. The question, "what are the knowledge, motivation and organization solutions needed to help increase the number of students applying for a career in petroleum engineering?" will be addressed in this section.

Four sections serve as the organizational structure for this chapter. The first section presents the validated needs and the selection for the key validated causes. The second section provides empirical evidence for the solutions. The third section outlines an implementation plan that must be place in order to address the key validated knowledge, motivation, and organizational needs. The fourth section presents direction for implementing and evaluating the recommended solutions.

Validated Needs

Following the Clark and Estes (2008) Gap Analysis Process Model surveys and interviews were utilized to highlight the gaps in current performance and desired outcomes. Data presented in Chapter 4 revealed that a total of five assumed knowledge motivation and organization needs were validated. The type of validated needs along with its appropriate category is presented in Figure 23. There are a total of five validated needs: one validated knowledge need, three validated motivation needs, and one validated organization needs. In a full gap analysis solutions must address all validated causes, thus recommendations and proposed solutions were developed for all five validated causes.

Solutions

	Knowledge	Motivation	Organization
Causes	**Procedural Knowledge:** Parents could not identify resources that can help in understanding how to go about a career in petroleum engineering.	**Self Efficacy** Emirati parents were confident in their abilities to make correct choices for their children **Intrinsic Value** Parents find petroleum engineering careers to be appealing. **Utility Value** Parents feel salaries are important when it comes to careers and do not feel salaries are high in petroleum engineering	**Cultural Model: Lack of effective role models.** Parents did not have female engineers to serve as role models for their children. **Cultural Setting: Restrictive or unnecessary rules** The value of a successful wife is higher than that of a woman in a career.
Solutions	**Solution One:** Launch an information campaign that creates awareness about policy and procedures, the full range of services that the ADNOC scholarship office has available to students.	**Solution Two:** Review salary packages for petroleum engineers and consider revisions in ADNOC packages. To Help parent's value the package it is important to highlight the perks that come with working for ADNOC and to highlight how petroleum engineers are important to the stability of the Nation.	**Solution Three:** Establish a strong mentorship program particularly for female students and their families. The program will provide opportunities for female students to interact with female engineering role models.

Figure 24. *Validated knowledge, motivational and organizational causes with solutions*

Based on the validated knowledge, motivation, and organization needs, there are three solutions for ADNOC Scholarship. Solution one is to have a dedicated information campaign

that targets parents and students alike and presents facts about the Scholarship Program and clarifies any misinformation and misunderstanding that exists. Solution two is to review salary packages for petroleum engineers and to have parents value the importance of the career to the economic well-being of the nation. Solution three is to establish a strong mentorship program in the organization for females and their families to enable more women to participate in the scholarship program and eventually be employed by the sector.

Solution One: Information Campaign

MacKillop (2008) noted that students who habitually changed their college majors had families who were not knowledgeable concerning majors. Donovan and McKelfresh (2008) postulate that parental involvement in student's careers can lead to persistence and achievement. Emirati parents are not aware of how to help their children explore and assess careers that are made available to them. Without parental involvement many Emirati students can enter majors without clear direction, this can lead to significant wastage of time, finances and increased frustration. If parents are made aware of the resources available to them then the value of career planning will increase.

The ADNOC scholarship office was designed for this purpose; to help both parents and students by providing resources to empower and motivate them in exploring careers in the hydrocarbon sector. Unfortunately, parents are not aware of ADNOC Scholarship office's commitment to have parents play an active role in student's career planning. To inform parents of the abundance of resources available to them a rigorous information campaign needs to be taken which should be inclusive of redesign of the website, parent orientation sessions, creation of dedicated informational hotline, a parental support group and conducting information sessions at middle and high school level.

ADNOC Website

In an age where media plays a huge role the importance of a well-designed and informative website cannot be understated. In today's world the web is the crucial point of contact during the student life cycle. It is a place for prospective students, current students, parents and alumni to all interact. The current ADNOC website is in need of an overhaul both information and design wise. Vassiliadis (2002) indicates interface design guides the success or failure of information seeking via a computer. Therefore, it is imperative that the website be sleekly designed, interactive, and easy to navigate. The website also has to be user-friendly, convey value to all the different personas accessing it and guide visitors to other parts of the site.

Mechitov (2001) raises the importance of utilizing customer needs when developing Web site design. Taking into account that many parents may not be versed in the English language, the website should be bilingual and available in English and Arabic. Furthermore, to accommodate all visitors the website should have a responsive design so that it can be accessed by desktop, tablets, and smartphones. The website should also provide current and prospective students and parents with detailed scholarship information, rules and regulations, majors offered, admission criteria, counselor and advisors information and upcoming dates and events. Detailed and current information can enable parents to connect with professionals and receive assistance with the career planning process.

Parental Orientation Days

Students typically engage in some form of college orientation; these have long been focused solely on the student. Murphy, (2014) found that parent inclusion in orientation programs could be a positive predictor of student retention. Organizations with high interest from students are generally those that are perceived as providing students with the resources,

services and support systems needed to successfully obtain a degree. Coburn and Woodward (2001) postulate that parent orientation is a valuable asset and that by educating parents institutions can have an ally in parents to encourage students toward career choices.

ADNOC must introduce orientation programs specifically for parents of Emiratis students that are interested in scholarships with ADNOC. Educating the parents of college-bound children about careers in petroleum engineering could be a solution for assuring more Emiratis enter the Petroleum Engineering field. Designing a parent-centered orientation program that provides parents with tools and real-world examples to help them have career discussions with their children will be very beneficial to the ADNOC Scholarship office. Parent participation in orientation provides an opportunity for the office to showcase the multitude of services being offered to both parents and student and can help reaffirm parents trust in the ADNOC Scholarship office. Essentially, the parent orientation program should incorporate theories to better educate and prepare parents about the various career options as well as the psychological challenges that they may encounter. The intent of the parent orientation should also be to welcome parents to the organization, ease fears and highlight resources (Coburn & Woodward, 2001).

The planned orientation sessions should be held at the ADNOC Scholarship office periodically during the year. This will allow for parents to become familiar with the location and have a glimpse of the office that will play a defining role in their child's life for the next four years. Becoming familiar with the scholarship office, the culture and the staff will also make it easier for parents to have informed conversations with counselors and advisors in regards to career opportunities, academic major, and career pathway choices. Parents require current and effective methods of approaching careers that they may not be familiar with, such as petroleum

engineering. One way to source information about the difficulties that parents face could be the use of focus groups and questionnaires during the orientation sessions.

Dougherty et al. (2009) found that parent involvement impacts students' academic success as well as the success of the community. The parent orientation sessions can be a great opportunity for parents to learn about the scholarship rules, criteria, procedures, careers and resources available. The role of the academic advisor can also be explained in detail here. At the same time the orientation will allow for parents to meet other parents in the same predicament and provide a sense of community, as well as the potential for friendships.

Parents of ADNOC Scholarship Students Association

A great way to get parents involved and informed about the Scholarship Office is through the creation of an ADNOC Scholarship Student Parent Association (ASSPA) or group, this can be a part of the website or an Instagram page, that allows for parents of ADNOC Scholarship students to get together, gauge information and interact with other parents facing the same situation. By joining ASSPA, parents can stay informed of important dates and events that impact their children. Additionally, parents can have a platform to seek assistance and voice their concerns.

ADNOC Advice Line

Customer service is important to all organizations, as it is often the only contact a customer has with a company. ADNOC Scholarship's customers are the Emirati community, which are vital to the success of the department. Scholarship students and their parents put their trust in the Scholarship program consequently; when they have a question they expect the Scholarship Department to resolve their issues. Having a dedicated 800 number that is in service 24 hours will ensure that ADNOC provides excellent customer service to parents seeking advice

or clarity. Making the organization available to the public can be a source of promotion for ADNOC and its scholarships. Trained staff members can assist the caller in inquiries, resolve issues and explore career options. The dedicated 800 number can also be a source to provide guidance and resource referrals.

High School Visits

Coburn & Woodward (2001) recognize that there is a dearth of information on college major selection and potential careers available to parents, whilst their children are still in middle and high school. Many parents unknowingly assume that the schools will take care of higher education and career planning. Unfortunately, the ratio of guidance counselors to students is generally low and even when counselors are available students are not required to utilize their services. Career choice decisions are an area of great stress for parents and students alike as there are hundreds of majors to choose from. This complexity raises a demand for resources that provide aid in making career decisions.

Early years are important in the formation of ideas and perceptions. During middle school and high school children are dependent on others to provide learning opportunities. Involved parents start in early stages to source out career paths for their children. ADNOC Scholarship office can intercept at earlier stages of education and work with schools to deeply engage parents and students in exploring hydrocarbon careers and provide an avenue for career awareness, and development of career planning skills. Gordon, (1984) addresses that children spend a great deal of time with families during school years, having information sessions at schools will provide parents with accurate information in preparation for higher education and more specifically choice of major.

When parents are knowledgeable at early stages, they will become active participants in

the career decisions of their children. Parents will encourage their children to set goals, consider alternatives, and plan a road map to meet their goals. If ADNOC can provide information on Petroleum Engineering early on then parents can help their children make effective career decisions. Knowledge about occupations in the hydrocarbon sector gained through information sessions will build a foundation for knowledge based career choices.

Solution Two: Reevaluating Salary Packages for Petroleum Engineers and Creating Value in the Career

Compensation is an important aspect of career selection. In the UAE remuneration plays a big part in career decisions. Parents expressed that salaries were not reflective of the value, time and education required to become a petroleum engineer. Additional they felt that the career should provide more financial security.

In order for ADNOC to increase the number of applicants for petroleum engineering scholarship, the current salary packages offered to petroleum engineers need to be reviewed. Matters of compensation require that consideration be given to the role that the position serves within the organization. Moreover, careful analysis between the organizational needs and individual considerations should be conducted to arrive at an ideal compensation structure. In order to be competitive, ADNOC needs to perform job evaluation internally and externally and to review the pay structures. Benchmarking with employers in the same sector can help ADNOC to compare compensation practices including salaries, allowances, bonuses and benefits against other organizations in in the same labor market. Benchmarking can also provide access to information that will allow ADNOC to build a matrix that identifies the value of skills and competencies in determining compensation. This process will ensure that petroleum engineers are compensated fairly and justifiably.

Compensation includes more than just an annual salary; compensation includes allowances, bonuses good health insurance, tuition benefits, and annual leave. The package at ADNOC must have a perfect balance among these to attract students. According to the World Economic Forum 2016, unconscious bias by managers and lack of work place balance were rated as the top factors that keep women from the industry. Therefore, ADNOC must take additional steps to make the workplace hospitable for female engineers. Flexible work schedules, child care provisions and female friendly accommodations on site could help. Furthermore, diversity and inclusiveness training will help to increase workplace effectively and will help employees develop value and respect. Introduction of hiring quotas and reviewing broad range of candidates for positions could also resolve the gender imbalance.

Even when organizations have this balance they may find that problems with compensation still persist this is simply because of the lack of communication in regards to compensation. Upon the completion of the analysis it may come out that ADNOC's packages are in fact competitive, however features of the package are not being explained or highlighted to the parents. Making parents aware of the compensation package and ensuring that they understand it can lead to confidence in the organization, which can improve motivation to enter the field.

Furthermore, it is important that ADNOC create value for the petroleum engineering career. Values are what give the job a purpose; it is the reason that parents would direct their children towards an engineering field. Along with the material benefits, ADNOC must highlight the prestige that comes with the career and the fact that the petroleum engineering is directly related to advancement of the nation. Parents must gain satisfaction with knowing that their choice of career for their children is contributing to vision of the UAE leadership's directive.

A compensation communication strategy should be developed by the ADNOC scholarship office and delivered to the parents and the community. There should be transparency within the organization and parents should be clearly advised of the salary, allowances, perks, job prospects and the basis for progression in the field. Communication of the complete compensation package should also entail the values attached with the jobs. This can be done through formats such as student handbooks, presentations during orientation, workshops and consistent interactions with the Scholarship office. The importance of giving parents access to compensation plan that is concise and clear can be an excellent tool to attract students into the Petroleum-Engineering field.

Solution Three: Mentorship Program

Since the establishment of the first institution in the UAE, gender equality has been on the forefront of the nations agenda. Despite the increase in the number of women attending higher education, the percentage of women entering the workforce in non-traditional careers such as petroleum engineering is disproportionate.

The oil and gas industry is a prime example of gender dynamics. Historically men have dominated the industry; as a result, men have more opportunity to acquire the knowledge needed to enter the industry and access scholarships. Williams, Kilanski, & Muller, (2014) found that among the largest oil and gas corporations women only comprised 13% of the total number of corporate officers. Research also suggests that women may not have the same access or exposure to the industry. Furthermore, women may not pursue careers in male dominated fields due to the opinions of families and the traditions and cultural pressures of the communities in which they reside. This holds true for the UAE, as parents expressed that a lack of understanding in this field

and the absence of female role models deterred them from pursing this avenue for their daughters.

In order for ADNOC to increase gender diversity in petroleum engineering, diversity programs such as mentoring programs must be introduced into the organization. ADNOC Scholarship must design and introduce a formal mentoring program for females. This program should be intended to increase women and their families understanding of the industry. Allowing women to network and make connections with other women will allow for exchange of crucial knowledge, experience and skills required to succeed in the industry. Access to women in the oil and gas industry can also provide crucial technical and career advise for aspiring women and their families. In addition mentorship can provide information on achieving work–family balance. Through mentoring, females and their families may gain the understanding of obstacles and appreciate the importance of the role that women serve in the oil and gas industry.

Women that have gone through the ADNOC scholarship program must encourage each other and build on mutual successes. Maxwell (1995) argued that leaders must pass on knowledge and have successors. Females in the oil and gas industry have a duty to prepare the next generation of females; this can be accomplished through mentorship. Brown, (2005) implies that mentorships among females facilitate the climb up the career ladder and is an invaluable resource for the recruitment and preparation of women in male dominated careers.

It is crucial that the mentorship program be inclusive of parents, as these individuals have valuable input into the choices that female in the UAE make. Life altering choices such as the selection of a career require careful consideration of the wishes of the family and respecting traditions. Tang, Fouad, & Smith (1999) found that cultural values contribute to career selection as particular careers are more desired and respected than others. For the most part parents that

participated in the interviews placed high value on tradition and maintaining cultural expectations especially when it came to females. Gardella and Haynes (2004) also found that families were a source of strength for women entering non-traditional roles.

Designing The Mentoring Program

An impactful mentoring program is built upon careful design and sustained commitment. The first step to designing is to understand the motivations of the target audience and to understand the outcome that is desired from the program. The purpose of the mentorship program at ADNOC will be for women and families to be able to successfully navigate within the specialized career. The program will be designed with approval from management and the use of a specialized external consultancy firm that will work with the scholarship department to develop a mentoring program that takes into consideration key design aspects as such enrollment, mentoring style and type as well as duration of the program. The consultancy firm will also help to initiate the program, create marketing so that participants and mentors could be sourced and help mentoring relationships to be forged.

The mentoring program will work to first educate both women and families about the oil and gas sector and to create a roadmap for women from start of scholarship to their job placement. This road map should also entail counseling and mentoring from female engineers that have come up from the scholarship program and currently serve as engineers on the field. Establishing strong mentoring programs for females and support for the families would enable them to not be fearful of the industry

Mentorship program may not thrive without direction and focus. As such the ADNOC program should entail a solid structure and guidance. A program workflow diagram can be utilized to explain timeframe, key milestones, resources and the criteria for moving from one

phase to the next. Providing goals and action plans will help keep momentum and add an aspect of accountability to the program. Having checkpoints during mentoring will also help to track progress.

The mentoring relationships can be long term; however there should be a closure to the experience. This will give an opportunity for both mentors and mentee to give their feedback and reflect on the benefits of the program. The creation of a mentoring program will be a big investment on ADNOC's part as such it is essential to articulate the impact of the program. The closure of mentoring experience should also have a phase that measures the effectiveness of the program. This will identify if the expectation of the program were achieved and highlight both trouble spots as well as opportunities.

Proposed Solutions to Implement

Based on the findings from Chapter 4 and the proposed solutions presented above to the KMO needs identified, this section discusses the implementation of the proposed solutions. Solution one is to create awareness about the ADNOC Scholarship Office policies and procedures as well as the full range of services the scholarship office has available to students. Solution two is to review salary packages for petroleum engineers and consider revisions in ADNOC packages. Solution three is to establish a strong mentorship program in the organization for females and their families to enable more women to participate in the scholarship program and eventually be hired into the sector.

Organizational Environment for Implementation

For any policy to find success, it is important to take into consideration both the internal and external factors that may affect the successful implementation of a policy. The United Arab Emirates (UAE) is a nation that has been forced to develop rapidly to keep a competitive edge on

the global market. Educating the national population has always been a priority for the UAE government but as a nation the UAE has been unable to focus attention on sciences. At the ADNOC Scholarship Department, there is a struggle to intake students in the petroleum-engineering field to meet future manpower needs. There are many circumstances that result in low numbers of students applying for a scholarship in the petroleum engineering filed. One significant reason is that the UAE is bound by its culture and religious beliefs.

The oil and gas industry has historically been a male dominated world, and this barrier is exacerbated by the staunch opinions within the industry about women in the field. Gender stereotyping continues to play a significant part in the low numbers of petroleum engineers in the UAE. Even when women have equal opportunity to pursue technical careers, culture and family settings force them to opt out. The belief that women should be good housewives is prevalent in the UAE and the idea of men and women working in close proximity is still frowned upon. Parents are less likely to take the risk of encouraging their daughters to pursue male dominated careers.

When it comes to internal aspects the organization has particular characteristic to consider. ADNOC has always been goal oriented and has aligned its missions to those of the Nation. The solutions that are implemented must result in outcomes that are tied to the needs of the Nation. Moreover, solutions must provide tangible results. In addition, it is important to understand the culture of the organization. ADNOC has a very traditional culture, which fosters dialogue and collaboration; however, decision-making is centralized at the top. As such it will be of importance to get the support of higher management in order to bring any solution to life.

Furthermore, it is important to assess barriers such as technology, knowledge and organizational structure. At ADNOC there can be multiple groups that may work on the same

project and multiple approvals may be needed before a project is launched. In order to avoid redundancy and conflict, it would be advisable to bring in outside consultancy to aid in the development and implantation stages. An external source would work with the identified groups within ADNOC to provide expertise in specialized arenas such as developing mentoring programs and successful orientation and seminars. ADNOC groups will be the central drivers of the solutions whilst the external consultants will provide training and support where necessary.

Implementation Action Steps

To implement the proposed solutions to create awareness about the ADNOC Scholarship Office, to review salary packages for petroleum engineers at ADNOC and to create a mentoring program for females and their families the following action steps as highlighted in Table 21 are required

Solutions	Implementation Action Steps
Create awareness about the ADNOC Scholarship Office policies and procedures as well as the full range of services the scholarship office has available to students.	○ Hold orientation for parents at the ADNOC office to familiarize parents with types of scholarships, criteria, procedures and resources available. ○ Develop a scholarship call center (800 number) ○ Create a ADNOC Scholarship Student Parent Association (ASSPA) ○ Develop the website to be informative ○ Starting information sessions for students and parents at junior and middle schools
Review salary packages for petroleum engineers and consider revisions in ADNOC packages.	○ Identify other scholarship providers and employers for petroleum engineering ○ Conduct benchmarking/ market research with other providers ○ Reformat ADNOC packages to be competitive and attractive.
Establish a strong mentorship program in the organization for females and their families to enable	○ Reach out to female engineering alumni and formulate a list of female alumni that would be willing to serve as mentors. ○ Develop a platform by which female engineers can

more women to participate in the scholarship program and eventually be hired into the sector.	collaborate with other professionals and provide mentoring for young adults. o Host the first Female engineers of ANOC conference to provide guidance, training and support for those hoping to become engineers and their families

Table 25: Validated Causes, Solutions, and Implementation Action Steps

Building Capacity to Implement

Prior to considering moving forward with the creation of a mentorship program, it is important to explore aspects of the organization and human resources that could have implications on design and the implementation of the solution. Currently there is strong push from top management and the leaders of the nation for women empowerment and advancement in the petrochemical industry; therefore support is readily available for a program that benefits women's entrance and advancement into the field. The value placed on mentoring young females will be higher now that management is pushing for greater diversity and gender equality.

A potential capacity barrier to implementing the proposed solutions that is worth considering is the capacity of the human resources available to design and implement the mentorship program. Currently, ADNOC Scholarship Department does not have a mentoring program in the entire organization; as such there is no prior experience or knowledge to guide the Scholarship office. In order to have a successful design, outside expertise must be brought in. For this to happen, a request for a tender to an outside agency specializing in the formation of mentorship programs will be established. This will need to be accessed by the communications department and approved by management. Once a tender is given, the agency will come in and train an already established support team within the scholarship office. The support team is currently dedicated to event planning, and they will work with the outside agency to design and develop a program that fits the needs of the female mentoring that the Scholarship office seeks.

Aside from the outside agency that will serve as advisors, there will be no need for new recruits. The internal support team will be utilized to go through the archives and produce a database of female graduates from the ADNOC Scholarship program who are currently successfully serving roles within the petrochemical industry. These individuals will be contacted for their interest in being involved in a mentorship program. Once a list of potential mentors is established, a platform with the help of the outside agency must be created by which females can collaborate with other professionals and provide mentoring for young adults.

The crucial players in this will be top management, the outside agency contracted for the development of the program and the staff of the Scholarship office that will implement and maintain the success of the program. Training will be provided to both scholarship staff and the mentors to ensure that there is success within the program.

As this is an initiative that will be welcomed by management, financial resources in designing the program, holding conferences and providing space for mentoring to take place will not be an obstacle.

Timeline

The following table (Table 26) illustrates the proposed timeline for the recommended policy solution, creating awareness about ADNOC Scholarship office, policies and resources

Proposed Solution(s)	Action Steps	Timeframe
Create awareness about the ADNOC Scholarship Office policies and procedures as well as the full range of services the scholarship office has available to students.	Develop the website to be informative	9/17-10/17(1 month)
	Create a ADNOC Scholarship Student Parent Association (ASSPA)	10/17-11/17 (1 month)
	Develop a parental orientation program inclusive of take away materials, such as student handbook, leaflets, and induction material. Hold orientation at the ADNOC office to familiarize parents with types of scholarships, criteria, procedures and resources available.	12/17- 01/18 (2 months)
	Starting information sessions for students and parents at junior and middle schools	11/17-01/18 (3 months)

Table 26: Timeframe for creating awareness of ADNOC Office

The following table (Table 27) illustrates the proposed timeline for the recommended policy solution, examining the salary packages for petroleum engineers at ADNOC.

Proposed Solution(s)	Action Steps	Timeframe
Review salary packages for petroleum engineers and consider revisions in ADNOC packages.	Identify other scholarship providers and employers for petroleum engineering	9/17-10/17(1 month)
	Conduct benchmarking/ market research with other providers	10/17-12/17 (2 months)
	Present Findings to Management.	01/18 (1 month)
	Gain approval to make changes where necessary	01/18 – 2/18 (1 months)
	Reformat ADNOC packages to be competitive and attractive.	3/18- 6/18 (4 months)
	Work with HR to formulate a communication of compensation package strategy	5/18 – 7/18 (3months)
	Communicate new packages to parents and students.	08/18- 12/18 (4 months)

Table 27: Timeframe for reviewing ADNOC salary package

The following table (Table 28) illustrates the proposed timeline for the recommended policy solution, creating a mentoring program for females and their families.

Proposed Solution(s)	Action Steps	Timeframe
Establish a strong mentorship program at the Scholarship office for females and their families to enable more women to participate	Prepare a proposal for management and gain approval for the program	9/17-10/17(1 month)
	Conduct research for companies specializing in mentoring programs.	10/17-11/17 (1 month)
	Secure a tender for an outside agency.	12/17- 01/18 (2 months)
	Formulate a list of mentors	11/17-01/18 (2 months)
	Design a mentoring program with the agency	2/18-05/18 (4 months)
	Provide training for mentors and scholarship office	06/18-07/18 (1 months)
	Conduct a pilot program	08/18 – 10/18 (2 months)
	Evaluate the success of the program, highlight challenges and implement changes.	08/18-11/18 (3 months)
	Organize an open house for networking of females and their families with females in the industry.	12/18

Table 28: Timeframe for establishing a mentoring program for females.

In order to integrate the solutions successfully into the organization, a concrete timeframe needs to be developed. The awareness campaign will be a four month process that will come into fruition in February of 2018. Once the program has been developed the information campaigns will be a regular occurrences through out the academic calendar. For solution two, ADNOC will have to dedicate 14 months as the salary packages will have to be benchmarked against other providers, the findings will have to be presented to management and there will be discussion with legal and Human resources in enhancing or reformatting the packages. The communication of the reformatted package will commence in August of 2018. Similarly, solution three will also

require 14 months before the initiative is successfully launched. The development of the mentorship program and subsequent pilot program requires a great deal of time and patience to maneuver. As such ADNOC will be able to launch the mentoring program by the end of 2018.

Evaluation Plan

In order to determine if the solutions implemented are effective in closing the identified gaps an evaluation plan is necessary. Kirkpatrick and Kirkpatrick (2006) posit that effectiveness of policies and procedures can be evaluated through a sequence of four steps: reaction, learning, behavior and results. In level one of the, reaction measures the thoughts people have in regards to the process. The second step refers to the learning that takes place and the increase in knowledge from the experience. The third step is the behavioral change that occurs as a result of the program. The fourth step identifies the impact that the results have had on organization. Each level of the process requires a different evaluation approach to determine the success of the program. Table 29 summarizes how evaluation will take place at each level of the Kirkpatrick model.

Levels	**Evaluation Plan**
Level One: Reaction	○ Reaction sheet distributed to parents during the information sessions and the mentoring program. ○ Placement of a Smiley face poll on the website to determine if the users found the website to be useful and informative ○ Observation of parents during orientation days at ADNOC.
Level Two: Learning	○ Pre – Post awareness of scholarship programs ○ Checklist to evaluate understanding of scholarship program rules and regulations. ○ Focus groups to identify the success of the programs and to receive feedback.
Level Three: Behavior	○ Observations, informal interviews to review the extent to which parents have understood and accepted the program.
Level Four: Results	○ Evidence of acceptance and understanding of the ADNOC Scholarship program. (use of controlled focus groups) ○ Evidence in data/reports of the number of students applying for petroleum engineering

Table 29: Evaluation Plan

Level One: Reaction

The first, and perhaps the easiest aspect of the Kirkpatrick model is to measure the participants reaction to the changes implemented. It is of importance to ADNOC Scholarship Department that parents, students, administrators and management be accepting of the changes and react favorably towards them. Motivation to retain knowledge from the program is tied to satisfaction, if parents find the changes to be engaging, they will be more likely to give attention to the information and learn. ADNOC scholarship department could utilize reaction surveys to

measure the immediate perceptions of the quality and usefulness of the programs that have been implemented.

For the new website, ADNOC could also make use of polls to determine if the users found the website to be useful and informative and allow for feedback as to what could be done to improve the website. Placement of a poll in a prominent location on the homepage is an excellent opportunity to engage the user immediately and generate important insights about the effectiveness of the website. Similarly satisfaction surveys can be administered at the end of parent orientation sessions and mentoring programs to measure how parents felt in regards to the relevancy of the information, whether the program objectives were clearly defined, and if the presenter was knowledgeable and able to facilitate the program in an effective manner allowing for participation and questions.

Another reaction tool that can be utilized is to watch for body language during the awareness and mentoring sessions and get informal verbal feedback during interactions with the parents. If done effectively reaction sheets can be a strategic tool to collect information about the needs, opinions and attitudes of the participants to measure satisfaction, to gauge return on the investment, add credibility to the program and devise plans to improve the program.

Level Two: Learning

Learning is the second level of the process and it essentially tests to determine how much learning was transferred. According to Kirkpatrick and Kirkpatrick (2006) learning is a crucial step as no change in behavior can occur unless learning has taken place. ADNOC scholarship can assess learning at various stages through pre and post survey in regards to their knowledge. By comparing initial responses to those after going through the mentoring and awareness sessions ADNOC Scholarship department can determine if learning has taken place and an

improvement in parents knowledge motivation and attitude is present. Surveys will assess how confident parents feel in career decision-making in the petroleum engineering field, as well as their attitude and commitment for the major.

Moreover use of focus groups will allow measuring of skills, knowledge and changes in attitudes of the parents as a result of the programs. ADNOC Scholarship department may also conduct follow-up evaluations in three to six months to check for retention of information.

Level Three: Behavior

At the behavioral level participants must showcase a degree of change in behavior. Kirkpatrick and Kirkpatrick (2006) highlight that it is important to measure what is learned, but if the knowledge that has been acquired is not applied then the process will not exhibit the desired results. Measuring change in behavior effectively can be challenging and requires long term commitment. Changes in behavior are not immediate and should only be assessed when enough time has lapsed to see a change (Kirkpatrick and Kirkpatrick, 2006). When the performance issue is quantifiable then a simple comparison of the before and after can be conducted. When the situation is not quantifiable, close observation and analysis is required. Clark & Estes (2008) state that the best evaluations of knowledge transfer are done by those that work closely with the learner.

Multiple viewpoints and multiple methods for collecting data are essential to evaluate behavioral change. One of the best ways to measure behavior change for ADNOC will be to conduct observations and interviews with parents over time. Observations of parents that come into the ADNOC offices and through social media feeds can be a means of evaluating the perception that parents hold about careers with ADNOC and petroleum engineering in particular. Additionally conducting informal interviews with parents will allow for parents to share their

understanding and learning from the programs. Face- to- face and telephone interviews can both generate detailed information and allow for change to be probed in depth enable behavior change to be explored in more depth. The interviews will highlight how knowledge and skills gained through the programs have changes parents attitudes and aided in career decision making process.

Level Four: Results

Level four of the evaluation plan examines the results with the objectives of the program. This can be a difficult process as concrete results are hard to come by. Kirkpatrick and Kirkpatrick (2006) posit six steps in evaluating results: the use of a control group where applicable, allocating time for results to be accessed, obtaining data before and after implementation of the solution, repeating measurements if necessary, keeping costs and benefits in minds and being satisfied with the impact of the evidence.

The biggest challenge at this level is to design an effective method to measure outcomes and define the outcomes that have come as a direct result of implementation solutions. Understanding the impact of results is important when measuring results. Once ADNOC Scholarship Department has garnered an understanding of the impact then a control group can be identified. Comparing results of a group that went through the program with a control group of non trained parents can be an appropriate approach. Additionally having the ability to compare results of parents before the solutions were implemented and after can also give credibility to the results than examining only post solution data.

Future Research

ADNOC Scholarship can benefit from future research on other hydrocarbon careers and the low number of applicants. In particular there is a shortage of Emiratis that apply for the

seafarer program at ADNOC. This program is directed at manning the ADNOC marine vessels with qualified and trained personnel.

Furthermore the study can also be extended to examine the retention of scholarship students in ADNOC and its group companies. It has been noted that there is poor transition from school to the job market. Many graduates serve their required time at ADNOC, but ultimately leave the organization. It would serve ADNOC to understand why this happens and how to curb this from happening.

Conclusion

This study was conducted to assess gaps that may exist in the knowledge, motivation and organizational resources influencing ADNOC scholarship office in attracting Emirati students to apply for petroleum engineering scholarships. The UAE is a nation that is in a transformative stage, whilst it attempts to move away from an oil dependent economy into one that is knowledge based. Great emphasis is thus placed on fostering achievements in the field of education. As a scholarship provider for Emiratis, ADNOC plays a crucial role in this National Vision. Low numbers of applicants for scholarship in the petroleum engineering field signifies a failure of the program to successfully prepare and integrate Emiratis into high skilled positions within the economy.

The results from surveys and interviews conducted with Emirati parents reflect that there are knowledge motivational and organizational gaps. In regards to knowledge results support that parents did not have the procedural knowledge in making career decisions for their children. Emirati parents were unable to identify the ADNOC resources available to help them and the methods of acquiring these resources. For motivation, Emirati parents displayed high self efficacy. Parents were confident and capable to handle career decision making. Validation of

motivational needs also suggested that parents place high regards in expectancy and utility value. Emirati parents lean towards careers that would give their children and themselves prestige within the community whilst also provide high compensation packages. In regards to organizational needs, it was found that Emirati parents exhibited aspects of the cultural model and cultural setting. In terms of cultural model, parents voiced that there were lack of effective role models for females aspiring to enter the field of petroleum engineering. Similarly for cultural setting parents expressed restrictive or unnecessary rules that places higher value on housewife than one who had a career.

The solutions recommended in this study address al the validated needs: (1) create awareness about the ADNOC Scholarship resources so that parents can avail them; (2) review the compensation structure for petroleum engineers at ADNOC; (3) Establish a strong mentorship program at the Scholarship office for females and their families. By implementing these solutions ADNOC scholarship office can close the gaps between the current state of affairs and the desires results.

Success of the ADNOC Scholarship program can have a great impact in accomplishing the vision of the UAE. With qualified petroleum engineers, dependency on foreign labor can be diminished and efforts to nationalize key areas of the economy can be accomplished.

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APPENDIX A

SURVEY

Career Choice for Emirati Students (الاماراتيين للطلاب المهنية الخيارات)

1. Parent (الأمر ولي)

- Male (ذكر)
- Female(أنثى)

2. Child at PI (البترولي المعهد في أبنتك\ ابنك)

- Male (ذكر)
- Female (أنثى)

3. Education Level of Parent (الأمر لولي التعليمي المستوى)

- Some Schooling (العامة الثانوية عن أقل)
- High School (عامة ثانوية)
- Bachelors (بكالوريوس)
- Post Graduate (عليا دراسات)

4. If you would agree to participate in an interview please provide email address:

هل ترغب بالمشاركة في مقابلتنا بعد تعبئة الاستبيان ، يرجى منك إضافة بريدك الالكتروني

5. Please indicate to what extent you agree or disagree with the following statements.

التالية العبارات مع توافق لا أو توافق مدى أي إلى الاشارة يرجى

	Strongly Agree بشدة أوافق	Agree أوافق	Neither Agree nor Disagree ولا أوافق لا أرفض	Disagree أرفض	Strongly Disagree بشدة أرفض
I have significant influence on my children career decision قرارات على ملحوظ تأثير امتلك. الوظيفة بشأن أولادي					
I feel confident in making career decisions for my children قرارات اتخاذي عند بالثقة أشعر. أولادي تخص وظيفية					
I find myself asking family and friends for advice when making career decisions for my children الأهل نصيحة أطلب نفسي أجد. الوظيفية القرارات في والأصدقاء بأولادي الخاصة					
I understand the schooling needed to become a petroleum engineer المطلوبة الدراسية المتطلبات أتفهم. المستقبل في بترول مهندس لأكون					
I encourage my children to					

explore technical careers الأعمال اكتشاف على اولادي اشجع. الفنية					
Petroleum engineering is an appealing career مرموقة مهنة البترولية الهندسة.					
I encourage my children to take career assessment tests and research careers اختبارات اتخاذ على أولادي شجع الوظائف عن والبحث الوظيفي التقييم					
I would support a career in engineering with ADNOC الهندسة مجال على العمل اشجع أنا) الوطنية أبوظبي بترول شركة في أدنوك)					
The government provides equal opportunity for education for men and women متساوية تعليم فرص الحكومة توفر. والاناث للذكور					
I apply the same thought process in career decisions making for male and female children قرارات اتخاذ في الافكار نفس اطبق. والاناث الذكور من لأولادي العمل					
Women can be as good in technical careers as men. الفنية الأعمال تمارس ان للمرأة يمكن كالرجل تماما جيد بشكل					
It is important for women to be a successful wife than to be in a successful career. ناجحة زوجة المرأة تكون أن المهم من ناجحة وظيفة تمتلك أن من أكثر					

It is acceptable in society to have female engineers. مهندسات وجود مجتمعياً المقبول من سيدات					
Careers should be based on genders. النوع على الوظائف تستند ان يجب أنثى أو ذكر الجنس					
We need more women in petroleum careers. في النساء من المزيد إلى بحاجة نحن البترول هندسة وظائف					
Salary packages are high for a career in petroleum engineering. بوظائف الخاصة المالية المخصصات مرتفعة البترول					
High salary is important when it comes to career choice. اتخاذ عند مهمة المرتفعة المرتبات بالوظيفة المتعلقة القرارات					
Personal beliefs interfere with my decision-making. صنع في الشخصية القناعات تتدخل قراراتي					
Culture plays a role in decision-making. القرارات صنع في دوراً الثقافة تلعب					
I am comfortable with men and women working together. والمرأة الرجل عمل حيال امانع لأ سوياً					
I expect my children to obey my decisions at all times.					

في لقراراتي أولادي يمتثل أن أتوقع الأوقات كل					
I have visited or visit ADNOC offices. قبل من ادنوك شركة مكاتب زرت					

APPENDIX B

INTERVIEW PROTOCOL

Would you consider Petroleum Engineering an appealing career option for your children?

How familiar are you with the petroleum engineering profession and what is your impression of the career?

To what extent are you involved in career decision making for your children?

How confident are you in making career decisions for your children?

What specific cultural values and beliefs do you face as a parent that may influence your decision making?

What are your opinions on men and women working together?

How does society affect the decisions you make?

How does the government aid in your decision-making?