

"Development and reform of technical and vocational education in the UAE: the role and vision of the UAE leadership".

Volume 1 of 2

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Abstract

The United Arab Emirates is a fast developing country that publishes its Visions for the country's future direction and development. The purpose of this research is to establish whether the Visions of 2021, 2030, 2071 and 2171 are translated into technical and vocational education policy. Specifically, the aim of this research was to examine the role and vision of the UAE leadership in the development and reform of technical and vocational education.

Research Question A: 'Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership's Visions?'

Research Question B: 'Is there an approach in the UAE that can effectively deliver technical and vocational education and training?'

Research Question C: 'Is there a system in the UAE that effectively engages the unemployed in jobs leading to successful occupations?'

These questions were addressed through focus groups and questionnaires involving:

Group 1: Ministers, Undersecretaries and Director Generals

Group 2: Directors, Principals and Heads

Group 3: Teachers

Group 4: Students

Group 5: Parents

Group 6: Industry.

This research has established that to inform and involve participation in the transformation of the country leadership Visions, that have been set out for the next one hundred years, change is necessary. Twentyone findings and ten recommendations resulted in recommendations including: a Ministry or Authority for Technical and Vocational Education necessary to communicate strategic messages from the leadership to the technical and vocational education community, an improved new model of technical and vocational education for the UAE is required and a more inclusive and efficient employment process necessary for employment of Emiratis. This research

indicates that if the ten recommendations are implemented then technical and vocational education will better serve the future economic prosperity of the UAE.

Statement of original authorship

I certify that the idea, research work, results, analyses, and conclusions reported in this thesis are entirely my effort, except where otherwise acknowledged. I also certify that this work has not been previously submitted for a degree or diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

A handwritten signature in blue ink, appearing to be 'S. Leach', is written on a light blue grid background.

Signature of the candidate

Date: 05 October 2020

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List of acronyms

4IR	Fourth Industrial Revolution
ACTVET	Abu Dhabi Center for Technical and Vocational Education and Training
ADEC	Abu Dhabi Education Council
ADRPBF	Abu Dhabi Retirement Pensions and Benefits Fund
ADVETI	Abu Dhabi Vocational Education and Training Institute
AI	Artificial Intelligence
ASP	Advanced Science Programme
ATHS	Applied Technology High Schools
ATI	ADNOC Technical Institute
CE	Continuing Education
CTE	Career-based Technical Education
EA	Etisalat Academy
EIBFS	Emirates Institute for Banking and Financial Studies
EmSaT	Emirates Standardized Test
FCHS	Fatima College for Health Sciences
FNC	Federal National Council
GCC	Gulf Cooperation Council
GPSSA	General Pension and Social Security Authority
HCT	Higher Colleges of Technology
HRA	Human Resource Authority
IAT	Institute of Applied Technology
ICA	Identity and Citizenship Authority
KHDA	Knowledge and Human Development Authority
KUSTAR	Khalifa University of Science Technology and Research
LMX	Leadership-member-exchange
MoE	Ministry of Education
MoHESR	Ministry of Higher Education and Scientific Research
MoHRE	Ministry of Human Resource and Emiratisation
NAPO	National Admission and Placement Office
NEET	Not in Education, Employment or Training

NIVE	National Institute for Vocational Education
NQA	National Qualifications Authority
NQF	National Qualifications Framework
NUD*IST	Non-numerical, Unstructured, Data, Indexing, Searching and Theorising
OJT	On the Job Training
PI	Petroleum Institute
PISA	Programme for International Student Assessment
PPP	Public Private Partnership
SAT	Scholastic Aptitude Test
SEHA	Abu Dhabi Health Services Co.
STEM	Science Technology Engineering and Mathematics
STS	Secondary Technical Schools
TELSUAE	Teacher and Leadership Standards UAE
TIMMSS	Trends in International Mathematics and Science Study
TVET	Technical and Vocational Education and Training
UAE	United Arab Emirates
UAEU	United Arab Emirates University
UNESCO	United Nations Educational, Scientific and Cultural Organization
VEDC	Vocational Education Development Center
VET	Vocational Education and Training
YESToWork	Young Emiratis Start to Work
ZU	Zayed University

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Chapter 1 Introduction to this research

1.0 Introduction

Chapter 1 introduces this research.

1.1 Plan of this chapter

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1.2 Background to the research

Technical and vocational education in the UAE has been in the school system for some years. However, little research has been conducted in the UAE about technical and vocational education. Research in the UAE has been conducted by Looney, in 1992 considered employment factors affecting employment in the Arab Gulf region between 1975 and 1985 and found that the educational system and the hiring practices of government agencies were critical to increasing productivity and non-oil sector income. However, this research is considered out of date. Further research by Looney in 2004 considered employment patterns in Saudi Arabia and found that the country would need to introduce reform to become more competitive. However, this research was based in Saudi Arabia it may not reflect the situation in the UAE.

Gallacher in 2011 studied bilingual education by analysing the macro-factors and contextual variables surrounding the introduction of compulsory bilingual schooling in Abu Dhabi and found that bilingual education is likely to confer linguistic, academic and socioeconomic benefits on future generations of Emirati school leavers. This research

was not about bilingual education and therefore this research was out of this research scope.

Bond, in 2013 studied the effect of school reform on the performance of educational leadership in Abu Dhabi Education Council (ADEC) and found that participants had a shared history of memorization and authoritarian leadership. Similarly, Tabari in 2014 studied education reform in one of the Emirates, Ras Al Khaima and found challenges that impede positive change were due to a lack of consultation with the teachers prior to implementing school reforms. Both reforms were based in the ADEC school system and did not reflect the vocational school system that this research considers. Therefore, Bond's and Tabari's research was not applicable to this research.

Thorne in 2011 researched educational reform and the effect on one school Principal in the ADEC school system and found that there was a need for professional development for principals to be able to cope with the changes of school reform. This research was conducted with one Principal and was cited in Thorne's research as a failing. Therefore, this research was not considered. Those four research studies were more about ADEC schools rather than technical and vocational education schools considered in this research and so were not considered appropriate to this research.

Forstenlechner and Rutledge in 2010 studied the utilising of expatriate labour without taxation, and found that it was the lack of competent skill that prevented Emiratis being employed. A further study by Forstenlechner in 2010, studied the growing unemployment rate in the Gulf Cooperation Council (GCC) countries, and found that the government can no longer employ all graduates and therefore the private sector must contribute to the employment of nationals. The most recent research by Forstenlechner, Madi, Selim and Rutledge (2012) examined the factors which determine recruitment decisions of UAE employers and found that national expectation of entitlement in the private sector was less than that in the public sector resulting in a lack of vocationally motivated nationals. In all cases, the research was considered out of date because of the rapidly changing environment for vocational and technical education.

Research that was more relevant to this study was Al-Ali in 2008 who researched Emiratisation in the private sector and found that the provision of government jobs

for life was irrespective of an individual's holistic employability skills which resulted in Emirati complacency. Another study by Forstenlechner in 2008, on nationalizing the workforce found that the Emirati minority were in need of acculturation to their own country's work environment.

However, although useful, this research is ten years old or more and does not represent the current employment situation in the UAE. Therefore, although there has been research surrounding the problematic area, there has been little recent research that reflects the current technical and vocational education landscape in the UAE. Further, very little has been discussed about the UAE visions of 2021, 2030, 2071, 2117, and UAE strategy for technical and vocational education, delivery approaches for technical and vocational education or employment in the UAE. As a result, more up to date information and references for this study came from local entities such as web pages and several newspapers which have been referenced throughout this report.

1.3 Country profile and background

Figure 1.1 Map of the United Arab Emirates



Source: http://www.emirates.org/the_country.html

The country setting, profile and background is shown in Figure 1.1. The United Arab Emirates (UAE) is located on the Arabian Peninsula at the southern tip of the Arabian Gulf and has three neighbouring countries, namely: the Kingdom of Saudi Arabia, the State of Qatar and the Sultanate of Oman. The UAE consists of seven emirates, which united on December 2nd 1971 as a federation, with the late Sheikh Zayed bin Sultan Al Nahayan elected as the first president of the the UAE. The seven Emirates include: Abu Dhabi, Ajman, Dubai, Fujairah, Sharjah, Umm Al Quwain, and Ras Al Khaimah. Abu Dhabi is the largest Emirate and Abu Dhabi city is the capital of the UAE.

The UAE population is made up of diverse cultures and backgrounds with UAE citizens and Arab and Asian population that includes: Filipinos, Indians, Pakistanis, Sri Lankans, European nationals of diverse ethnicities, Australasians and North Americans. These diverse population groups are collectively known as expatriates, often abbreviated as

expats (Al Afifi, 2016). Expatriates have been attracted and employed to develop the country's infrastructure, education sector and industry, mainly oil and gas. The UAE's rapidly increasing income from oil revenue has resulted in: infrastructure development, expansion of public and private sectors and robust economic growth. In order to support and sustain such growth, and in the wake of a shortage of supply of indigenous labour, the nation continues to rely on a foreign workforce to supply labour. It is worth noting that, in most GCC countries, over 60% of the labour force is foreign (Maloney, 1998; Ruppert, 1998).

The total population, that is both national and expatriates, rose from 4.1 million in 2005 to 9.121 million by the end of 2016 of which 2.8 million were female and 6.2 million were male. However, UAE nationals represent less than one million, that is, 947,947 with the age group of 0 to 14 years, making up 21.01% or 199,163 of the nationals (Government, 2017). These nationals will form the future workforce of the UAE aiming to address the 2021, 2030, 2071, 2117 Vision requirements. The country's net migration rate stands at 21.71%, the world's highest, and by 2020 Emiratis were projected to form only 10% of the population (Shahid, 2012). The reliance on expatriate employees has led to high levels of UAE nationals' unemployment and challenges in terms of capacity-building for nationals.

Research problem and contributions. The research problem centres around the aim of the UAE becoming a knowledge based economy. Leadership in the UAE is driven by Visions and is the application of their leadership in an open participative transformational style. The National Agenda 2021 aims for the country to become a knowledge based economy and aims to achieve the goal with the whole of the UAE focusing on its achievement. 'The UAE focuses on ... transitioning to a knowledge-based economy with a first rate education system' (Vision, 2021, page 1). The Centennial Vision 2071 has four pillars of:

- Future-focused government
- A diversified knowledge economy
- A happy and cohesive society
- Excellent education

The Vision centres on 'Education emphasizing the excellent quality of education, focusing on: delivery technology, teaching and individual talent' (Vision 2071). As a result, the country needs a nation of citizens to be experienced and qualified to enter the workforce for sustained economic growth, expansion and development. However, due to a lack of local skilled labour, the country leadership strongly encourages government agencies to develop human capital through investment in education, youth skills programmes and vocational training to meet future market needs. Very little research has been conducted specifically on technical and vocational education in the UAE because research has concentrated on higher education, school education and English language acquisition.

This thesis addresses technical and vocational education and the main research problematic area is:

Research Problem: *"Development and reform of technical and vocational education in the UAE: the role and vision of the UAE leadership"*.

Essentially, it will be argued that the UAE leadership visions of 2021, 2030, 2071 and 2117 needs to be translated effectively into UAE education policies so that Emiratis are educated to become productive members of the society. Factors supporting the development of a knowledge economy needs identifying to enable Emiratis to be prepared to meet the Vision agenda for the country. Throughout the thesis, issues about the role and impact of leadership styles will be addressed.

Research questions. The first research question considers the leadership approach to communicating its requirements of the Vision agendas of: 2021, 2030, 2071 and 2117.

The Vision agendas aim to communicate to citizens so that they are aware of requirements and duty as a citizen, to contribute to furthering the country and Emiratis economic prosperity. Visions require a population that can meet the technological requirements for those employment solutions. Further, Vision ambitions require the Emirati population to have advance technological skills. However, it is unknown whether the advanced technological skills reside within the UAE population. Therefore, research in those areas are required. This leads to the first research question, Research Question A that addresses the core concept of the strategy for technical and vocational education in the UAE, and is:

Research Question A: 'Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership's Visions?'

The second question is about the delivery of technical and vocational education and training to meet the leadership Vision for 2021, 2030, 2071 and 2117. To achieve a technological advanced skilled population, citizens need to be educated to acquire the technological skills. Schools need to be resourced, and curriculum and assessment strategies developed that leads to the appropriate technological skills in the population. However, it is unknown whether the technological resources required for teaching Emiratis is available in schools. It is unknown whether teachers in schools have the appropriate qualification and teaching standard to teach the skills required for a knowledge economy. Furthermore, it is unknown whether the industry and education work together to develop curriculum and assessment methods to meet industry requirements for a knowledge economy. Additionally, too many students are pursuing the academic choices for post-school education and it is unknown whether students are selecting the most appropriate post-school programmes for their ability and educational attainment. Therefore, research in those areas are required. This leads to the second research question, and is:

Research Question B: 'Is there an approach in the UAE that can effectively deliver technical and vocational education and training?'

The third question addresses employment. To achieve economic prosperity, the country ideally needs to aim for 100% employment of Emiratis in the workforce because the main thrust of the knowledge economy, by the country leadership, is to 'increase the number of Emiratis in the job market and their contribution to the economy' (Vision, 2021). To manage this process well, a system needs to be in place. It is known that various government authorities have data bases of information about Emiratis, but there is no sharing and use of this data. It is known that Emiratis, not in employment but looking for work, can register for employment opportunities with Human Resource Authority in Abu Dhabi. However, it is not known whether those without workforce skills, those that need to be re-trained and upskilled are known to the system. Further, it is known that there is no central point where all vacant positions are advertised for those seeking work or training. Furthermore,

there is no a one stop shop for registering for job vacancies, skilling or education opportunities to assist Emiratis choose the correct career pathways, or find employment through an organised government system of registering for employment opportunities. Vision 2021 aims to increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment. Therefore, can existing services work together to provide Emiratis with a better transition to employment experience? This leads to the third question, and is:

Research Question C: 'Is there a system in the UAE that effectively engages the unemployed in jobs leading to successful occupations?'

1.4 Justification for the research

There are six justifications for the research which are:

- There is a lack of research about the research problem, which is translating leadership visions into educational provision for a knowledge economy in 2021, 2030, 2071 and 2117.
- There is a lack of knowledge about which skills are required for a knowledge economy and whether the skills for advanced technology are available in the UAE population to meet the requirement of the UAE Visions.
- There is a lack of consideration about whether the teacher population is skilled to deliver advanced technology skills and whether they are effective at delivering.
- There is a lack of information on whether students are being channelled in the right direction in post school education.
- There is a lack of a formalised system for Emirati job seekers to find training and upskilling opportunities in the UAE. Further, usefulness of findings will guide future advancements for the UAE and other Gulf States for economic advancement and prosperity.
- The findings from this thesis may provide a way to deliver the right skills, in the right way, for increased employment in a knowledge economy.

1.5 Methodology

Two phases of research were applied in this thesis that is Phase 1 qualitative and Phase 2 quantitative research methods. Three stages of data collection were used, that is, Stage 1 initial focus group, Stage 2 large focus group and Stage 3 questionnaires.

In the first phase, Phase 1, Stage 1 research, qualitative methods were used to conduct an initial focus group, consisting of six educational experts (see Appendix B), who had knowledge of the UAE education landscape. Initial focus group discussion addressed the educational landscape to establish the scope of the research and the research questions. The focus group narrowed the scope of the research, set parameters and defined the thesis topic for the main research question which is: *“Development and reform of technical and vocational education in the UAE: the role and vision of the UAE leadership”*.

Then, the initial focus group discussed the main research question to arrive at three research questions that addressed the research issues A, B and C and further developed 20 questions that addressed the landscape of the main research question (see Appendix B).

The initial focus group also considered the sample groups that would be required to answer the research questions. As a result, six sample groups were selected to give a 360-degree view of the research landscape. Sample groups consisted of:

- Group 1: Ministers, Director Generals, Deputy Director Generals and Managing Directors
- Group 2: Directors, Principals, Head Teachers
- Group 3: Teachers
- Group 4 Students in Grade 12 or 11
- Group 5: Parents of students in Grade 12 or 11
- Group 6: Industry

Stage 2 of the research, that is large focus group discussions, were based on the three research questions, A, B and C. Eighty-eight respondents took part in the focus groups, 46 males and 42 females. Results produced are reported in Chapter 3 and included: Stage 2 results returned 38 issues, 13 issues emerging from Research question A about strategy,

20 issues from Research Question B about delivery and 5 issues from Research Question C about employment.

Phase 2 and Stage 3 of the quantitative research conducted surveys of six sample groups from the community. In excess of 8,900 people were invited to participate in the electronically circulated survey and 4,395 responded. Stage 3 surveys needed to be relatively quick and inexpensive. The same questions were asked of the questionnaire and focus groups sample groups allowing comparison of data. Questionnaires were circulated electronically using Google docs. Due to the nature of the questions, some were not relevant to all sample groups, therefore not all sample groups had exactly the same set of questions. The responses returned from the surveys were directly loaded on to a spread sheet, which saved time and expense and allowed manipulation of data. Emerging from the survey there were 21 main findings: seven emerging from strategy, ten emerging from delivery, four emerging from employment with results reported in Chapter 4.

Next, data were analysed comparing focus group results to questionnaire results to identify differences and similarities. Twenty-one findings emerged, seven emerging from strategy, 10 emerging from delivery and four emerging from employment. Then, findings were discussed and recommendations made. Ten recommendations in total, that is: two for strategy, five for delivery and three for employment. Findings and recommendations were reported in Chapter 5 with implications of the research in relation to the leadership Visions and conclusions about the research in relation to leadership Visions are made in Chapter 6.

1.5 Organisation of this thesis

This thesis is presented in six chapters. Chapter 1 provides an overview of the research and introduces the research problem, questions and justification for the research methodology. Chapter 2 reviews the theories of country leadership, technical and vocational education strategy and delivery and the system for assisting Emiratis to find employment. From this information, the initial conceptual framework for the research and its three related research questions were developed. Chapter 3 describes and justifies the Phase 1 qualitative research using stage 1 and 2 initial focus group and large focus group research and further reports issues from analyses of the focus group issues. Chapter 4 justifies the use of the Phase 2 quantitative surveys and discusses steps taken to collect

and process survey data in Stage 3, using questionnaires, and results and focus group results.

Chapter 5 discusses and identifies the findings from focus group and questionnaires about each of the three research questions and compares findings with Chapter 2 to identify the contributions to knowledge made from this research. The conclusions about the overall research problem are then presented in Chapter 6 and implications are drawn for technical and vocational education in the UAE and for other Gulf countries. Chapter 6 concludes with discussion, implications, limitations of the research and considers further areas of study.

1.6 Definitions

Definitions of the key terms used in this research depend on the purpose and the aim of the research project. In more detail, definitions create boundaries around findings of that research (Perry, 1998) and so key terms are defined to establish the position taken by this research. Key definitions are provided below in alphabetical order.

Artificial intelligence. Artificial intelligence has been defined as wisdom and ability; of human intelligent behaviors, such as perception, memory common emotion, judgement, reasoning, proof, recognition, understanding, communication, design, thinking, learning, forgetting, creating, and so on, which can be realised artificially by machine, system called ma or network (Li and Du, 2017).

Education. The definition of education in the general sense means programmes typically offered in schools or which are college-based.

General education includes educational programmes that are designed to prepare students for entry into technical and vocational education, but do not prepare for employment in a particular occupation or trade, nor lead directly to a labour market relevant qualification (ISCED, 2011).

Knowledge economy. Knowledge economy has been defined as production and services based knowledge-intensive activities that contribute to an accelerated pace of technological and scientific advancement as well as equally rapid obsolescence (Abramovitz and David, 1999).

Qualification. A coherent and cohesive set of learning outcomes obtained, in a form of a certificate, diploma or a degree, only when an awarding/regulatory body determines, following established standards, that an individual has achieved such learning outcomes related to a complete qualification (NQA, 2012).

Technical and vocational education. Those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences, and the acquisition of practical skills, attitudes, understanding and knowledge relating to occupations in various sectors of economic and social life (TVETipedia, 2018). Technical and vocational education is for the preparation for work (ISCED, 2011).

Unemployment. The unemployed comprise all persons of working age who are:

- a) Without work during the reference period, i.e., were not in paid employment or self-employment.
- b) Currently available for work, i.e., were available for paid employment or self-employment during the reference period.
- c) Seeking work, i.e., had taken specific steps in a specified recent period to seek paid employment or self-employment. For purposes of international comparability, the period of job search is often defined as the preceding four weeks, but this varies from country to country (ILO, 2016). In this instance, for this research, the period of searching for employment is defined as four weeks.

1.7 Delimitations of scope and key assumptions, and their justifications

The scope of this research is limited to research in the UAE, UAE 2021, 2030, 2071 and 2117 Visions, the implications for communication, the strategy and delivery of technical and vocational education in the UAE and resulting employment.

1.8 Conclusion

This chapter laid the foundations for the thesis. It introduced the research problem and research issues. Then, the research was justified, definitions were presented, the methodology was briefly described and justified, the thesis was outlined, and the limitations were given. On these foundations, the thesis can proceed with a detailed description of the research.

Chapter 2 Literature review

2.0 Introduction

This chapter reviews the extant literature to identify research questions that will guide data collection and analysis. The chapter is arranged in three main themes of strategy, delivery and employment.

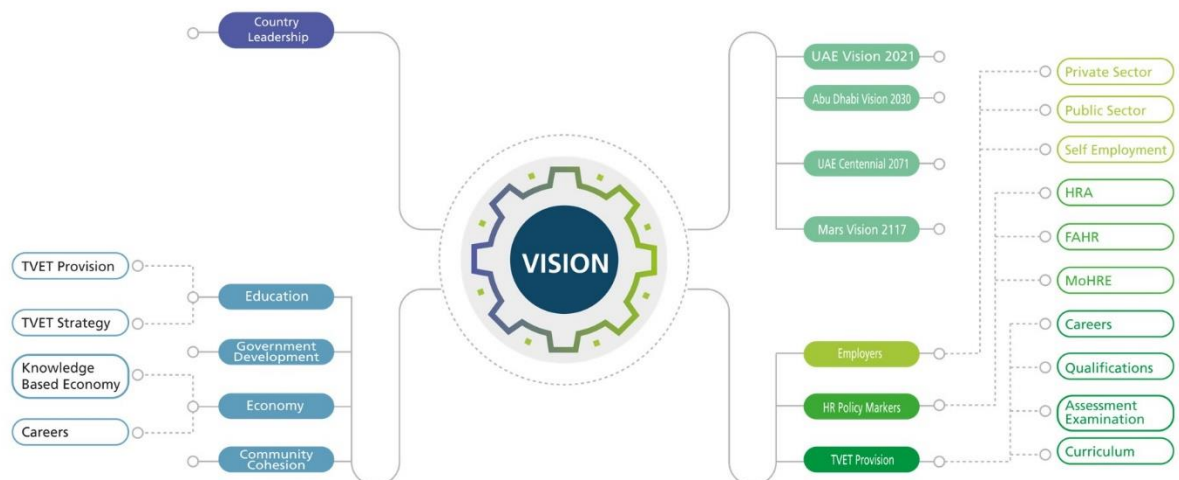
Table 2.1 Plan of this chapter		
2.0		Introduction
2.1		Strategy
	2.1.1	Country leadership
	2.1.2	Communication styles
	2.1.3	Visions
	2.1.4	Knowledge economy
	2.1.5	Artificial intelligence
	2.1.6	Robots
2.2		Delivery
	2.2.1	History of education in the UAE
	2.2.2	UAE School system
	2.2.3	Technical and vocational education
	2.2.4	School systems in South Korea
	2.2.5	School systems in Switzerland
	2.2.6	Comparisons between South Korea, Switzerland and UAE
2.3		Employment
	2.3.1	Skills mismatch
	2.3.2	Careers
	2.3.3	Employment systems in the UAE
	2.3.4	Unemployment system in South Korea
	2.3.5	Unemployment system in Switzerland
	2.3.6	Comparisons between South Korea, Switzerland and UAE
2.4		Conclusion

Definition of core terms. In this research common terms like: education, technical and vocational education, and unemployment are referred to throughout this thesis and their meaning was made explicit at the end of the previous chapter.

2.1 Strategy

In this section several topics are considered such as, Country leadership, communication styles and Visions. This is followed by the skills required for a knowledge economy and artificial intelligence and robotics. To assist in organizing research into manageable portions a mind map of connecting research is presented in Figure 2.1.

Figure 2.1 Research mind map



Source: developed for this research.

2.1.1 Country leadership

Every country has a ruling government to govern the business of the country. Different countries have different government styles. From Anarchy, a total lack of government or political order, Dictatorship where the ruler wields absolute power, Monarchy where the monarch reigns supreme power and finally, Democracy where power is attributed indirectly by elected officials, renewed periodically, as a system of representation for the country (ILO, 2013). The UAE is a democratic country led by the Supreme Council of Rulers, the top policy-making body. The UAE has a parliament known as the Federal

National Council (FNC) that report to the Supreme Council of Rulers that elects the President and the Vice President of the Federation, who are appointed to review and recommend the federal draft laws. Being a country of 48 years, the UAE has come a long way to becoming a major world economic player in many respects. For example, the UAE is in the top ten competitive countries in the world in 2017, according to the World Competitiveness Yearbook, moving up in one year from 15th place to 10th place (Augustine, 2017a). Such results indicate remarkable achievement in a one-year period, and higher than its neighbouring countries of Qatar, ranked 17th and Saudi Arabia ranked 36th place (Augustine, 2017a). Further, UAE also ranked on the Global Competitiveness Index for 2017 to 2018 ranking 3rd in Goods Market Efficiency, 5th both in Institutions and Infrastructure, 11th in Labour Market Efficiency and 13th in Business Sophistication (Augustine, 2017b). It is clear that the country is becoming a major hub for business through the efforts of the country to modernise. Sheikh Mohammed bin Rashid Al Maktoum stated:

"Our future projects must have standards that conform with the UAE's competitiveness and worldwide reputation. They should at the same time, serve to boost the welfare of the citizens" (Augustine, 2017b).

In happiness, UAE ranked 21st, moving up from the previous year (2016) from 28th in the world and 1st in the Middle East. Commenting on the result, His Highness Sheikh Mohamad Bin Rashid Al Maktoum, Vice-President and Prime Minister of the UAE and Ruler of Dubai, stated:

"The UAE came first in the Arab world for the third consecutive year and the Emirati people are ranked 21st as the happiest people in the world. We are also ranked first globally regarding the satisfaction of residents from other countries" (Ahmed, 2017).

These are excellent results, and it can be argued they have been achieved through three leadership theories being applied in the UAE. These are: Transactional leadership, Transformational Leadership and Participative leadership of the country.

Transactional leadership. Management theories, also known as transactional theories, focus on the role of supervision, organization and group performance. Transactional leadership focuses on a system of rewards and penalised, often used in business; when

employees are successful, they are rewarded; when they fail, they are reprimanded or penalised. Transactional leadership is exemplified by leader-member-exchange (LMX) theory a two-way, reciprocal exchange between leader and follower (Wang, et. al., 2005). This is exemplified by expatriates coming to the UAE because they see the benefit of moving for reasons of a jobs, salary and a better life for family. The transaction being, “I come to the UAE to work and I receive a higher salary and package” (Dubai OFW, n.d.). More than half of UAE expatriates say they moved to the country to increase their income and a fifth of them say their salaries doubled when they relocated to the Emirates (Haine, 2018).

Transformational Leadership. Relationship theories, also known as transformational theories, focuses upon the connections formed between leaders and followers. Leaders articulating a compelling vision of the future offering a model consistent with that vision; fostering the acceptance of group goals; providing support, and high performance expectations (Wang, et. al., 2005). In the case of the UAE, the leaders articulate their vision in publications indicating the direction that the country is moving toward. Currently there are three main Visions of 2030, 2071 and 2117. Transformational leaders lead by example and engage followers. Using Transformational leadership helps citizens see the importance and higher good, wanting each person and the country to fulfil his or her potential. They create visions that inspire others and they recognize their efforts and performance. They motivate their followers to greater results than originally planned by promoting creativity and articulating their Vision statements. Citizens of the UAE understand the benefits they gain from the country in terms of: salaries, free health care, first class infrastructures: roads, schools and hospitals and as a result, citizens support the government. For this reason, there a transformational relationship between citizens and the country.

Participative leadership. Participative leadership theories suggest that the ideal leadership style is one that takes the input of others into account. These leaders encourage participation and contributions from group members, but the leader retains the right to allow the input of others and retains the final say over the decision-making process (Wang, et. al., 2005). By encouraging employee feedback and ideas, the management often develops a better understanding of their staff workplace.

Sheikh Mohammad bin Zayed stated:

Our “Home is United” by the love shared among people, and by the exceptional bond between leadership and Emiratis (WAM, 2016).

This approach allows group members to feel engaged in the decision making process. Sheikh Mohamed bin Zayed, the Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces applies a Participative Leadership style, unique to the Emirate of Abu Dhabi, and is worth mentioning. His leadership style is applied during Monday majlis, a Council or meeting, where upwards of 500-800 people visit his majlis every Monday to discuss topics. There are various meetings, some are for the people to visit and talk directly to Sheikh Mohamed, where citizens are permitted to visit the majlis six times a year. Sheikh Mohamed also receives young UAE high academic achievers, sports winners and artists to congratulate them on their performance. Additionally, Sheikh Mohamed receives visitors at his majlis, and visits families across the UAE during social activities such as weddings. He also regularly visits families at their homes to listen to their concerns and needs. Sheikh Mohamed also visits families of UAE martyrs, to show support and empathy. Senior Ministers, Under Secretaries, Director Generals and Managing Directors can attend weekly. By opening his majlis to the people, Sheikh Mohamed is in touch with citizens and the challenges they face. He knows this because he shakes the hand of every attendee and listens to their challenges. All comments are recorded and Sheikh Mohamed has accompanying him senior decision makers who can answer questions or give advice. In addition, every request, or case file that is made by a citizen is investigated and Sheikh Mohamed will make a decision based on the result of the case file investigation. Sheikh Mohamed values the exchange of ideas because it enriches debates and contributes to a deeper understanding of citizen’s challenges. Sheikh Mohamed also uses the meetings to gain knowledge of world events and topics and invites world renowned speakers to address the majlis, based on the belief that knowledge leads to better solutions for the various issues can impact future societies and human life.

‘Selected scientists, thinkers, intellectuals, experts and religious scholars express their perspectives and experiences on general public issues and vital concerns related to the requirements of our age, and explore future prospects in a unique intellectual forum, as dialogue and diverse ideas have become the language of civilization and progress’ (Crown Prince Court, 2018).

This open leadership style of governing the emirate focuses on empowering citizens by listening and responding to their ideas, issues, ways of thinking and approaches. Using an open door policy, decisions are based on careful consideration of ideas, as well as those of others. By adopting an open leadership style, Sheikh Mohamed is always increasing his knowledge and is inspired by new ways of thinking, which greatly benefit the emirate as he employs various approaches to challenges faced (Crown Prince Court, 2018).

2.1.2 Communication style

To achieve the great success of the country the UAE government communicates to its citizens using two unique approaches: social media and Vision Publications.

Social media. Social Media has been defined as “a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content” (Kaplan and Haenlein, 2010 p. 61). Which means platforms are used socially, not individually, and are continuously modified. Using social media, as a platform, as of June 2019, Sheikh Mohammad Bin Rashid Al Maktoum had 9.6 million followers on Twitter using a handle of @HSHMohd, making him the only Arab leader among the world’s top 10. Further, Sheikh Mohammad’s approach to using crowdsourcing, gained 35,000 tweeted new ideas from all around the world. By consulting with his followers he can make vital decisions, (Jabnoun and Sedrani, 2005) using participative leadership. Sheikh Mohammad bin Rashed AlMaktoum stated:

"Today, the UAE has different ambitions, and therefore, it needs different ideas and creative minds to achieve such ambitions to meet expectations, and I am proud of the ideas we shared, and of every creative person and team in the UAE; their vitality and enthusiasm is our path to success. We will always seek ways to improve the living standards and the services offered to our citizens" (The National, 2017).

In an open letter of appreciation, he dedicated the anniversary of his 10th year of accession, Sheikh Mohammad bin Rashid wrote to His Highness Sheikh Mohamed Bin Zayed Al Nahyan, Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces, and received 185 million impressions (WAM, 2018). It is clear that

the UAE embraces social media and a desire to be technologically astute. It is by using social media that the citizens of the UAE are informed of the developments of the country in openness and transparency and their invitation to contribute to the success of the country. Sheikh Mohammad bin Rashed stated in The National that transparent and open discussions generate better ideas for success (The National, 2017). Further, he recognises that constantly looking for innovation and creativity in ideas, generates opportunities for the country to develop.

2.1.3 Visions

The second method of communication is by means of published Visions. To date the UAE has published four main visions: that is: Vision 2021, Abu Dhabi Vision 2030, UAE Centennial 2071 and The Mars Vision 2117. In order to develop the UAE markets and the economy, the UAE plans to grow within a competitive global market, and change is needed to achieve those goals. The UAE leadership recognises that in order to fulfil the vision of the UAE as the high-tech hub of the Middle East and even worldwide, all parts of the community should be valued as potential leaders in the workplace (UNDP, 2009). To communicate the direction and requirements for the development of the country, Visions are developed through a researched, considered approach and disseminated to all government departments and authorities to ensure that all are aware of the requirements of their entity and all need to shape their operations to the requirements. Leaders must understand people's hopes and dreams and bring them together towards common goals that are simultaneously communicated (Bealer and Bhanugopan, 2013). In doing so, the leadership broadens and elevates the interests of followers, generates awareness and acceptance among the followers to the purpose and mission, and motivates followers to go beyond their self-interests for the good of the country. A leader needs to be distinctive to lead his organisation to a leading edge and charismatic to have a positive influence over his followers to enable organisations to succeed (Bealer and Bhanugopan, 2013).

It is also Visions that are published widely in the media and the most recent approach of using social media. Leaders should be able to keep all citizens inspired, motivated to perform well in their workplace despite all cultural differences' (Amagoh, 2009).

UAE Vision 2021. The first Vision published in 2014 included a set of national indicators in the sectors of: education, police, and security, housing, healthcare, infrastructure, economy and government services (Vision, 2021). This 2021 Vision, charts the next stage of the UAE journey leading up until the year 2021 focusing on becoming the economic, touristic and commercial capital by transitioning to a knowledge-based economy, promoting innovation, research and development, strengthening the regulatory framework for key sectors, and encouraging high value-adding sectors.

For education, the Vision is very specific with a set of goals to be achieved by 2021 and these are:

1. UAE students shall be ranked among the top 15 performing countries in Trends in International Mathematics and Science Study (TIMSS) international exams for students in grade four and eight in knowledge and scientific skills, in math and science.
2. UAE students, shall be ranked among the top 20 countries in the Programme for International Student Assessment (PISA) international exam, which measures reading, knowledge and scientific skills in math, science and reading for students at the age of 15 where most students complete the compulsory education.
3. 95% of students between the ages of 3-5 should attend kindergarten education.
4. 90% of the total student population shall successfully complete Grade 12
5. 90% of all grade nine students from both private and public schools studying the Ministry of Education Arabic textbooks, shall achieve high skills in the UAE national exams (UAE NAP) for Arabic language.
6. 100% of schools shall have high-quality teachers.
7. 100% of public schools shall have highly effective leadership.
8. All Grade 12 leavers should not require remedial programmes prior to their assigned places in University (Vision, 2021).

Therefore, Vision 2021 is aiming to educate and improve the country's business environment and increase its attractiveness to foreign investment and place the UAE among the top countries in the world in income per capita and ensure high levels of national participation in the private sector workforce (Zaatari, 2015; Vision, 2030).

The Abu Dhabi Economic Vision 2030. The Abu Dhabi Economic Vision, published in February 2015, took the lead from the UAE 2021 Vision and developed an Abu Dhabi wide 2030 Vision. The 2030 Vision aims to reduce the reliance on oil and to focus on knowledge-based industries with seven priorities of:

1. Building an open, efficient, effective and globally integrated business environment.
2. Adopting a disciplined fiscal policy that is responsive to economic cycles.

3. Establishing a resilient monetary and financial market environment with manageable levels of inflation.
4. Driving significant improvement in the efficiency of the labour market.
5. Developing a sufficient and resilient infrastructure capable of supporting anticipated economic growth.
6. Developing a highly skilled, highly productive work force.
7. Enabling financial markets to become the key financiers of economic sectors and projects (Zaatari, 2015; Vision, 2030).

The government has identified 12 sectors to provide the growth necessary to achieve the Emirate's Vision 2030 agenda of economic diversification, and are:

1. Energy – Oil & Gas
2. Petrochemicals
3. Metals
4. Aviation, Aerospace and Defence
5. Pharmaceuticals, Biotechnology and Life Sciences
6. Tourism
7. Healthcare Equipment and Services
8. Transportation, Trade and Logistics
9. Education
10. Media
11. Financial Services
12. Telecommunication Services (Vision, 2030 p. 113).

Therefore, by setting the Abu Dhabi Economic Vision 2030 strategy, it focused on stimulating economic activity and increasing human productivity via better education and training.

UAE Centennial 2071. The UAE has forecast further to the centennial of the country in 2071. The Vision 2071 published in March 2017, aims to make the UAE the best country in the world by 2071, and to prepare the nation and future generations.

UAE Centennial 2071 is based on four aspects of:

1. Education
2. Economy
3. Government development
4. Community cohesion (Vision, 2071).

Included in the Vision 2071 is the development of education, with a focus on advanced technology and engineering, and instilling an Emirati moral values system in future generations (Vision, 2071). Sheikh Mohammad bin Rashed stated:

‘We want the best government, the best education, the happiest society and the best economy in the world. We aspire to build a global economic powerhouse’ (Gulf News, 2017).

It is clear that the UAE Centennial Vision 2071 is an inclusive plan, in line with the national strategy to strengthen the country’s reputation and soft power, diversify the economy and reduce the dependence on oil. Additionally, the plan focuses on the importance of education with investments in engineering space science, innovation, health sciences, and advanced information technology to prepare the UAE youth for the future. Therefore, institutions are encouraged to become international research centres. Centres are encouraged to teaching languages such as Chinese, Japanese, and Korean and introduce a culture of openness and acceptance by teaching history, civilisations, and culture of other countries (Vision, 2071). The vision of the UAE has centred on technology and future foresight to prepare the country for rapid technological requirements and the UAE has clearly stated its ambitions and been specific on the direction that the country is taking.

The Mars vision 2117. The Vision 2117, is an even more ambitious plan, published in February 2017, it aligns its ambition to have habitation on Mars by 2117.

‘The UAE aims to establish the first inhabitable human settlement in Mars by 2117. The project is a seed that the UAE plants today and expects future generations to reap the benefits, driven by its passion to learn to unveil a new knowledge’ (Vision, 2117).

Therefore, the 100 years' plan aims to setup of Mars' first mini city by 2117. The publication of Visions and the use of social media are some of the techniques used by the leadership of the UAE to transform its economy. Further, developing a change movement is one of the main functions of a transformational leader (Bass and Avolio, 1994; Cameron and Green, 2009; Metcalfe and Mimouni, 2011). The transformation also centred on a knowledge economy, Industry 4.0 and Artificial intelligence, among other initiatives.

'The 100-year plan will involve scientific research programmes to nurture national cadres specialised in space sciences at universities in the UAE. It will also entrench a passion for space in younger generations' (Gulf News, 2017, page 1).

2.1.4 Knowledge economy

UAE is adopting a knowledge economy. Economy is defined as the ability to innovate and create intellectual products which the market knows nothing about. Because economy is open, who owns knowledge is the superior (Salma, 2009; Brinkley, 2014). Another definition of the knowledge economy is production and services based knowledge-intensive activities that contribute to an accelerated pace of technological and scientific advancement as well as equally rapid obsolescence (Abramovitz and David, 1999). The top jobs required for a knowledge economy, in simple terms, are based primarily on the production, distribution, and use of information and ideas (Doyle, 2019). With soft skills, IT skills and hybrid skills, a mix between hard and soft skills, being important. His Highness Sheikh Mohamed bin Zayed Al Nahyan, Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces stated:

"As we seek to remain at the forefront of innovation, it is imperative that we continue to work hard and stay current with the rapid developments around the world in all fields. We should remember that science and knowledge are the pathways to achieving development and progress in all fields."

Further, high importance is placed on education, creativity and innovation being an utmost priority in the strategy for preparing for the post-oil stage and a key criterion for the advancement of nations and societies (WAM, 2016). Therefore, knowledge of a workforce is the greatest value of a country (Doyle, 2019). It is evident from the many

UAE Visions that a knowledge economy is at the heart of the Vision messages. Sheikh Mohammad bin Rashed stated:

“Those who neglect the new will remain at the back of the line; those who wait for luck to make things happen will be disappointed” (Augustine, 2017a).

The key components of a knowledge economy include a greater reliance on intellectual capabilities than on physical inputs or natural resources, combined with efforts to integrate improvements in every stage of the production process, from the research and development lab, the factory floor, to the interface with customers. Additionally, the knowledge economy sees creativity as the foundation stone where attention is given to the thought rather than raw materials and human effort (Connell, 2015). The importance of the knowledge economy is the advanced technology which is generated and produced rapidly in different fields (Khalaf, 2007). Accordingly, it helps in spreading, employing and producing knowledge without limitation. Moreover, it achieves electronic exchange and makes a change in the old jobs, in addition it helps the educational institutions in development and creativity (Hashimi & Azawi, 2010; Safi et al., 2010).

Lifelong learning. Lifelong learning, associated with technical and vocational education, plays an important part of maintaining skills for a knowledge economy as does acquiring the appropriate qualifications. Employers are looking for skills most crucial to the knowledge economy, certification and lifelong learning programs and other means, indicates to an employer competence for the job market (Dolye, 2019). People from all industries are participating in upskilling, to preserve their jobs to develop new skills so that they don't lose their jobs to automation. Knowledge of the workforce is the greatest value to a company and with ever-changing technologies, employees need to constantly stay abreast of the latest information and skills. Therefore, to survive in the fast-paced knowledge economy, people are developing and upgrading the skill sets and have a lifelong learning mind-set (Doyle, 2019).

Generally, the top skills required for a knowledge economy are a mix of soft skills that involve; interacting with others, that is, written and oral communication, to allow workers to convey their innovative ideas, decisions, questions and teamwork.

Information technology skills, such as use of computers, tablets and mobile phones, problem-solving skills and creativity are important for a knowledge economy. These attributes are reflected in the increasing relative share of the gross domestic product that is attributable to “intangible” capital (Bass and Avolio, 1994). Therefore, if the UAE is going to realise its visions they will have to ensure that teachers and students remain abreast of current technology and its use.

Fourth Industrial Revolution (4IR). The effect on the Middle East and in particular the UAE of the 4IR will be impactful. UAE had not been united when the First Industrial Revolution emerged, built on water and steam power to mechanize production, or the Second Industrial Revolution built on mass production. The UAE emerged during the Third Industrial Revolution using electronics and information technology to automate production. This may be why the UAE has embraced The Fourth Industrial Revolution, the digital revolution, for most of the smart development in the UAE. The United Arab Emirates have designed the ‘UAE’s Fourth Industrial Revolution Strategy’, the first of its kind globally, aiming to provide a practical framework for policy makers in support of national initiatives. Further, to “adopt advanced technologies and transform future challenges into opportunities which better serve the country” (MoCAF, 2017, p. 14). The Fourth Industrial Revolution has been making headlines worldwide, with various artificial intelligence projects becoming a main focus for many countries. The World Economic Forum identified 16 skills across three categories for the Fourth Industrial Revolution, as shown in Table 2.2.

Table 2.2 Proposed 16 skills, split across three categories			
Category	Helps students approach.....	Related Skills	
Foundational Literacies	... everyday tasks	1. Literacy 2. Numeracy 3. Scientific Literacy 4. Information 5. Communication	11. Technology Literacy 12. Financial Literacy 13. Cultural and Civic Literacy
Competencies	... complex challenges	6. Critical thinking and problem-solving	14. Communication 15. Collaboration
Character Qualities	... changing environments	7. Curiosity 8. Initiative 9. Persistence/grit 10. Adaptability	16. Leadership, social and cultural awareness
Source: World Economic Forum, (2015).			

Therefore, as a minimum the main skills of foundation literacy, competency and character qualities need to be considered. As part of artificial intelligence development, the UAE is accelerating its efforts to become the world's first hub and open lab for investigating and implementing the Fourth Industrial Revolution's technologies including artificial intelligence.

2.1.5 Artificial Intelligence

As noted earlier, what is called artificial intelligence (or AI) is a variety of human intelligent behaviours, such as perception, memory, emotion, judgment, reasoning, proof, recognition, understanding, communication, design, thinking, learning, forgetting, creating, and so on, which can be realized artificially by machine, system, or network (Li and Du, 2017). However, in educational terms artificial intelligence has been defined as computer systems that have been designed to interact with the world

through capabilities (for example, visual perception and speech recognition) and intelligent behaviours (for example, assessing the available information and then taking the most sensible action to achieve a stated goal) that we would think of as essentially human (Russell, Norvig and Davis, 2005)

To support the development of the knowledge economy, the UAE has a strategy for Artificial Intelligence launched in 2017 and also have appointed a Minister of Artificial Intelligence aiming at boosting government performance and the rate of accomplishing achievement of future programmes. The Artificial Intelligence Strategy outlines nine sectors, one of which is education, the strategy being to cut costs and enhance the desire for education.

Related to education, the UAE AI Strategy has five themes with the third theme of: 'develop capabilities and skills of all staff operating in the field of technology and organise training courses for government officials' related to the education and training sector' (MoAI, 2017, p.1). OECD recommend five principles for responsible stewardship of trustworthy artificial intelligence, namely: inclusive and sustainable growth and well-being, human centred values and fairness, transparency and explainability, robustness and safety, and accountability (OECD, 2019). Statistics show that 17% of students have been found to first access the Internet before the age of six as reported in 2015 and 43% of 15-year-olds spend between two and six hours per day online outside of school (OECD, 2019).

Further, training and upskilling are a must for digital transformation. In Europe 40% of workers have had to learn use of new software or ICT tools. Further, low skilled workers are most in need of digitisation for the workplace (OECD, 2019).

Therefore, education is key to achieving AI. UAE is striving to become a new hub for developing artificial intelligence mechanisms, technologies and legislations and most important, is adopting AI in all government and private sectors. Sheikh Mohammed bin Rashid Al Maktoum stated:

"The next phase requires Emiratis specialised in AI to serve our supreme national interests as the implementation of AI technologies will help develop new sectors and create various opportunities for our national economy" (MoAI, 2017).

For future success the UAE needs to consider the skills required for a nation to be prepared for artificial intelligence because robotics and artificial intelligence appear to be playing an increasing role in the future (Devlin, 2016). Failure to adapt will see AI trigger the “rise of the useless class” and it is predicted that to have a job will require people to reinvent themselves again and again, and faster and faster (Harari, 2016). Further, the number of jobs worldwide will be simply too small to sustain current employment rates (Ford, 2015). Therefore, worldwide competition will be fierce. What is needed, is the prediction of the jobs that will survive and those that will become obsolete. While there is uncertainty about the speed of changes, it is clear that the types of jobs that are being created by artificial intelligence are not the same as those that are being lost (Ramos, 2018). Foresight about technological innovations that translate to state-of-the-art programmes will allow businesses to remain competitive (Devlin, 2016). Artificial intelligence professionals must learn how to translate highly technical information in ways that others can understand in order to carry out their jobs. Devlin (2016) states, “regurgitating” knowledge does not prepare children for the modern workforce.” Computer skills in schools need to be at a higher level of computer programming and creativity, analytical thought, with the ability to solve problems, and produce cost-effective and efficient solutions (Computerscience, 2018). The use of artificial intelligence in our day-to-day life is increasing ever more rapidly. (Luckin, et. al., 2016). AI will change foundation skills in schools and two types of skills will be required, that is, communication skills and computer skills. However, Aoun sees three literacies of:

1. Technical literacy
2. Data literacy
3. Human literacy (such as teamwork, entrepreneurship, creativity, ethics and cultural agility) (Aoun, 2017).

To meet artificial intelligence requirements for education, computing skills would include:

- Various level of maths, including probability, statistics, algebra, calculus, logic and algorithms
- Bayesian networking or graphical modelling, including neural nets
- Physics, engineering and robotics

- Computer science, programming languages and coding
- Cognitive science theory (Computerscience, 2018).

The effects of determining the artificial intelligence skills is that the curriculum must reflect these skills in schools. First, we must design a curriculum that designs, implements and integrates computing and communication skills to allow learners to develop a creative mindset and mental elasticity. We need students to have the ability to invent, discover and produce original ideas, and engage in global diplomacy and supervise diverse teams of people (Aoun, 2017). It is argued that artificial intelligence will affect educational curriculum in the following way:

1. Artificial intelligence will automate basic activities in education, like grading.
2. Education software will be adapted to student needs.
3. Artificial intelligence will point to places where courses need to improve.
4. Students will get additional support from artificial intelligence tutors.
5. Artificial intelligence driven programmes will give students and educators helpful feedback.
6. Artificial intelligence will alter how we find and interact with information.
7. Artificial intelligence will change the role of the teacher.
8. Artificial intelligence will make trial-and-error learning less intimidating.
9. Data powered by artificial intelligence will change how schools find, teach, and support students.
10. Artificial intelligence will change where students will learn, who teaches them, and how they acquire basic skills (Teachthought, 2014).

However, revising the curriculum will not be enough, students must also gain workplace experience before fully entering the workforce, in order to deepen their understanding beyond “what” into “why” and “how” (Aoun, 2017; Computerscience, 2018). By integrating firsthand experience with intelligent machines and academic work, the students will learn agility and adaptability, and how to continue learning. It is becoming clear that the shelf life of a human education is getting shorter and shorter, and four years of college is too long. Further, college and graduate studies, are not enough to last a lifetime (Aoun, 2017). Therefore, lifelong learning must become central to education

partnered with authentic, sustainable partnerships with industry who will design courses that fill competency gaps that employers need. Thus, providing students with an educational roadmap customised for every walk of life (Aoun, 2017).

2.1.6 Robots

The tasks that AI and robots cannot perform is shrinking rapidly. New automated technologies are rapidly changing people's jobs and lives. Robots will likely change many of the existing jobs, requiring workers and companies to adjust. Some jobs may become entirely redundant, although the extent of automation is not yet known. Job destruction by automation and digitisation are leading to mass technological unemployment as many jobs become automated. Further, young people entering the workplace at entry level positions have a higher risk of automation. About 40% of workers in Europe participated in job-related training (OECD, 2018). However, the risk of automation is not distributed equally among workers because low skilled workers and youth are amongst those most at risk, more so than jobs held by older workers. Further, automation declines as educational attainment and skill levels rise. Occupations with the lowest risk of automation all require professional training and/or tertiary education. Nevertheless, well targeted adult learning opportunities for reskilling and upskilling workers is needed along with prequalification accompanied by reinforced help from labour market and social policies. (OECD, 2018).

To conclude, the country requires technological skills to achieve the ambitious goals as defined in the Vision agenda. Further, the country has to ensure the skills are available in the population to achieve the goals. Therefore, there needs to be a country strategy for technical and vocational education that supports technological skills to meet the country's ambition. This leads to the first Research Question A of:

'Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership's Visions?'

2.2 Delivery

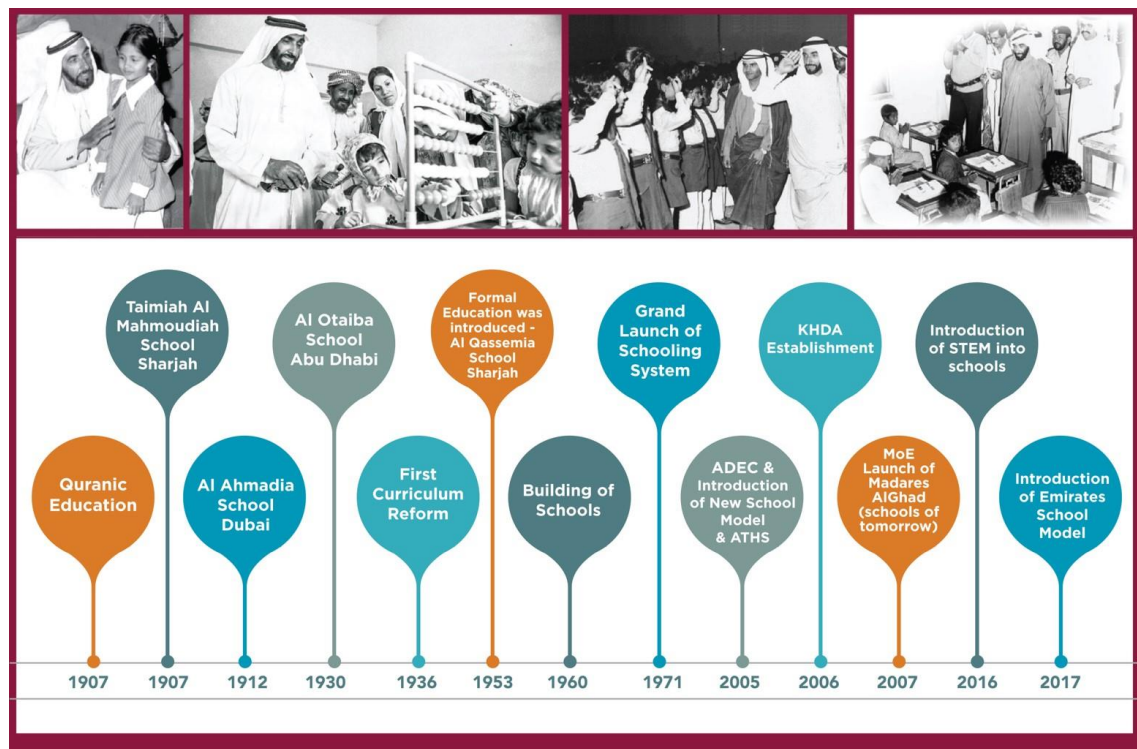
Next, this section looks at the delivery of education, considering the history and development of education within the UAE. Further, this section looks at the teachers, English language, industry, upskilling, redundant skills, technical and vocational

education, and comparisons between UAE South Korea and Switzerland. This section starts with a brief history of education in the UAE

2.2.1 The history of education in the UAE

The history of education in the UAE is discussed in a logical timeline, as shown in Figure 2.2.

Figure 2.2 UAE school establishment timeline



Source: developed for this research.

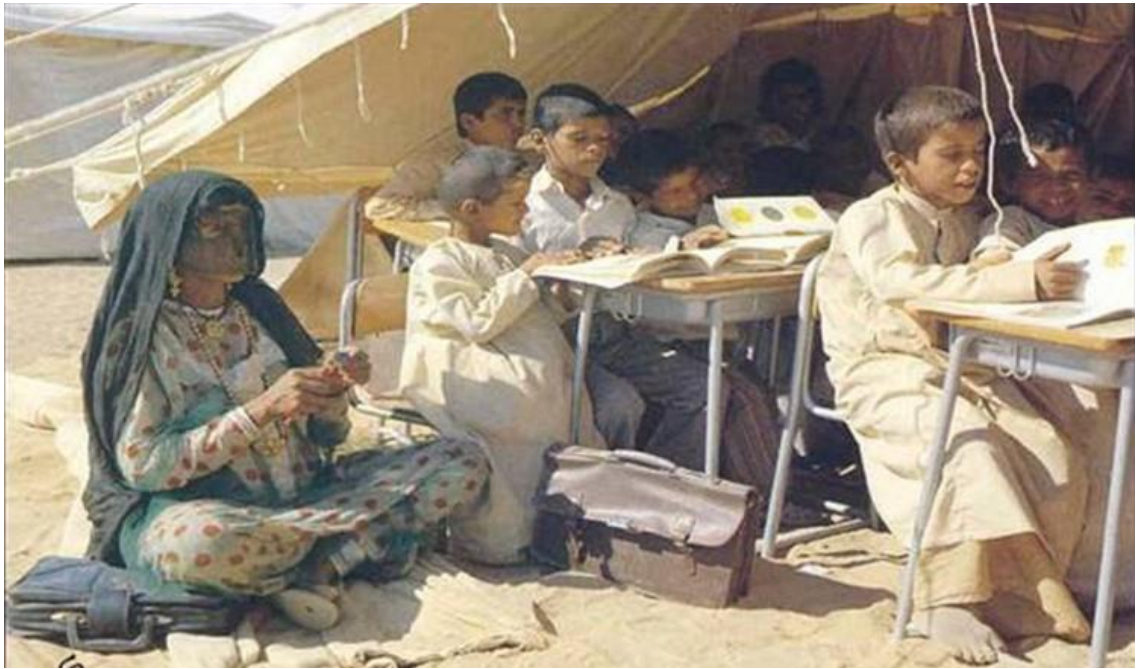
Six phases of the development of education in the UAE that have occurred since pre-1907 are discussed below.

Phase 1. Historically, Koranic theology education was the first phase of development that was a common method of education in most parts of the Arabian Peninsula. Senior religious scholars, teachers or “mutawwa’s” handled the teaching of all subjects to the children of the neighbourhood. The Mutawwa usually taught young boys and girls how to write, do mathematics and read the Quran, the Hadith of the Prophet Mohammed, and relied on memorising the Holy Quran and the Islamic rituals and duties. Most of the education was delivered in mosques or in a private room in the house of the scholar. At

that time, religious education was the only source of knowledge for the community and education (Alhebsi et. al., 2015).

Phase 2. In the second cycle of schooling, schools were limited. During this phase, from 1907 to 1936, classrooms were made out of tents, students sat on the ground or shared the few available desks and chairs, as shown in Figure 2.3.

Figure 2.3 Early schooling in UAE



Source: unknown.

Teachers were heavily dependent on memorizing words and lessons as most classrooms were without the required pedagogy tools. Pearl merchants (tawaweesh) were opening ‘enlightening’ schools in cities and brought scholars to run, manage, and supervise education. One of the first developed schools in 1907 in Sharjah, was the Taimiah Al Mahmoudiah School, founded by Sheikh Ali Almahmoud, who was recognized as a visionary leader and who introduced free education to the population (Alhebsi et. al., 2015). Later, Sheikh Abdulkareem was entrusted with the school and he introduced and adopted portions of the Egyptian school curriculum. Dubai followed with the Al Ahmadia School in 1912. In 1930 Abu Dhabi gained its first school, Al Otaiba School.

Phase 3. However, it was not until 1936 that progressive education began to reform schooling. It was in 1936 that the first school with a distinctive reformed curriculum was founded in Sharjah. Evolutionary education continued until the end of the forties, where factors such as the commercial recession and Second World War led them to suspend their operations (Alhebsi, et. al., 2015).

Figure 2.4 Early schooling



Source: National Center for Documentation & Research

Phase 4. The fourth phase around 1953-1954 in Sharjah, the Al Qassemia School, marked the first academic year in the UAE of formal education. However, during 1950s, there were very few formal schools in the Emirate and most of them were exclusively open to boys. Access to education was extremely limited but when oil was discovered in the 1960s, the government took positive measures. Schools had furnished classes, proper curriculum, evaluation and testing standards as well as certification for the students at the end of each academic year (Alhebsi, et. al., 2015). With the introduction of the fourth phase, steps were taken to eradicate illiteracy. The first structured school, Al Nahyania, was opened in Al Ain, Abu Dhabi Emirate in November 1st, 1960, as shown

in Figure 2.4. The current president H.H. Sheikh Khalifa bin Zayed Al Nahyan attended this school. (Al Bayan, 2001).

Phase 5. It was on December 2, 1971, that the grand launch of the schooling system took place that marked the declaration of the Federation of the seven Emirates. The Federal Ministry of Education and Youth took charge. Many public schools were built to modern standards and were equipped with the required tools and instruments. Teachers were hired from different Arab countries to contribute to the development of education. However, schooling did not include post school education and students keen to pursue higher education had to attend universities outside the country in the UK, the USA, Egypt, or Lebanon (Alhebsi, et. al., 2015). The United Arab Emirates University was the first public university that was opened in 1976. Recognizing that the education system was important for a modern country the late Sheikh Zayed Bin Sultan Al Nahyan stated:

“The prosperity that we have witnessed has taught us to build our country with education and knowledge and nurture generations of educated men and women” (SCO, 2018).

As a result, free education was introduced for all, at all levels of education, that had the effect of the illiteracy rate dropping from 54% in 1975 to 7% in 2015 (World Bank, 2015). However, despite the UAE education system having been identified as one of the most rapidly improving education systems in the world, students still performed well below the expected levels of an advanced economy, a country’s predictor of wealth and social outcomes (OECD, 2015). Employers were still seeing university graduates who were unable to work competently with skills and knowledge required by the job market. The Minister of Labour, Saqr Ghobash stated ‘The issue of incompatibility between education outcomes and the labour market, needs to improve because without restructuring the work ready labour in the region will remain insufficient for the economy’ (Naeem, 2010, p1). Conversely, universities were accusing high schools of graduating students who lacked rigorous academic qualifications required for entry into universities. General education outputs did not correspond to the requirements of higher education, especially in light of the inability of the curricula and teachers to improve educational outcomes and provide students with skills (Al-Jammu, 2010, p1). Therefore, drastic measures were required to address the education system.

Phase 6. New School Model. In 2005 the then Minister of Education, H.E. Sheikh Nahyan bin Mubarak Al Nahyan, announced eleven major challenges in the nation's education system (Al-Ittihad Daily, 2005). Forty-six billion AED (13 billion US dollars) was to be spent rectifying school problems over the next 10 years. Reforms would include the modernisation of the curriculum, new salary scales and long term contracts. The decision to introduce school reform was based on extensive research in the UAE with the reform agenda adopted in 2006 and put into practice and centred on:

1. Unsuitable curriculum. It was seen as fractional, repetitious, fragmented and redundant, disconnected from the community and from national need.
2. Ineffective teaching methods. Rote learning prevented the need to develop the research, analysis and communication skills required for higher learning.
3. Inappropriate assessment methods. Memory was being tested rather than skills and understanding. Therefore, ability was not being taken into account. Further tests encouraged the proliferation of private tuition outside of school.
4. Little ICT. Few schools used modern teaching and learning technologies. Computers tended to be old, unused, or used only for non-teaching purposes.
5. Poor libraries and learning support. Libraries were poorly stocked, textbooks too rigid and unrelated to learning processes. Laboratories were badly maintained.
6. Short school days and a short year. Students in the UAE spent about half as long learning compared to students in the other countries.
7. Ineffective school attitude. Discipline was weak and truancy high, especially among male students. Healthy meals were not available. The learning environment was unattractive.
8. Poor facilities. Many school buildings were aged, poorly designed, badly equipped and maintained few facilities for sport and cultural activities.
9. Low levels of professionalism. Teachers had low level skills, relying on traditional didactic teaching methods and did not use computers, libraries or other information resources. Teachers were not interested in professional development and showed little loyalty to their students or school. The system did not provide training, evaluation or incentives and discouraged creativity. Qualifications, pay and status were low.

10. Ineffective school system. The ministry was highly centralised, had no clear vision and suffered from job inflation. School principals needed intensive training and continuous follow-up support if they were to lead the reforms. The education departments in each geographic zone were, in general, dysfunctional.
11. Inadequate budgets. The budget was about one third of that in comparable international systems. The largest part of the budget went to salaries with little allocation for support, activities or development programmes (Al Ittihad Daily, 2005).

With the school system being described as below par, the minister announced five specific strategies for an improved education system and were to:

1. Clarify educational policy to stress the development of understanding, character formation and community values to prepare students for an active role in a modern knowledge society. Mobilise social and political support for investment in education in order to achieve national prosperity and development.
2. Set internationally benchmarked performance expectations in all aspects and levels of education to reflect the nature and need of the UAE's community in a global context.
3. Launch a national ten year reconstruction plan to bring all school facilities, curricula, pedagogy and outcomes up to international standards.
4. Restructure educational management to have the ministry focus on improving performance levels. Replace education departments with Regional Support Centres. Further, merge small schools to raise their viability and quality, and boost leadership capacities in school communities.
5. Mobilise appropriate resources and support to achieve all of the above (Macpherson et. al., 2007).

2.2.2 UAE School System

The reform objectives stressed the requirements for use of ICT, a knowledge system displaying international characteristics and a strong diverse economy. As a result, the government judged that action was required. In response to the criticism of the education system by the then Minister of Education, in 2005 Abu Dhabi Education

Council (ADEC) was established developing in 2006 a Public Private Partnership (PPP) approach utilising international education companies. Dubai Emirate also responded in 2006 by establishing The Knowledge and Human Development Authority (KHDA). A year later, in 2007 the Ministry of Education launched the Madares AlGhad (schools of tomorrow) in 50 MoE public schools. The aim being to improve the education system, not only the teaching but the educational attainment, particularly the English language level of school graduates, because graduates were not at the level required by the universities in UAE (Selama, 2010).

In further efforts to improve school and student outcomes, The Ministry of Education (MoE) in 2007 decentralised schools' management to ADEC and in 2008 to KHDA (Al Shammaa, 2008). The actions taken by the Minister in 2005 were still an issue, demonstrated in the results of the 2009 in the Programme for International Student Assessment (PISA) examinations. UAE scored around 25% worse than the average PISA participant (Westley, 2017). Further, in 2010 83% of students joining Zayed University required foundation programmes (Westley, 2017). In 2011 KHDA agreed that the Ministry of Education would be responsible for all public schools. However, despite the efforts to reform the education system in the UAE there was a recognition by His Highness Sheikh Mohammad bin Rashid Al Maktoum, UAE Vice-President and Prime Minister and Ruler of Dubai that the education system could not continue in the same way. In 2012, the PISA examinations results showed very significant improvement seen as exceptional among all other countries in the world ranking 48th in Mathematics, 44th in Reading and 46th in Science (Westley, 2017). However, the bottom line was that in 2012, UAE continued to perform below expectations despite the improvement. In 2014 at the fourth Education Conference in Dubai the Undersecretary of State for Education, Marwan Al Suwaleh, stated "the schools outcomes were rather discouraging." In 2015, results from the Programme for International Student Assessment (PISA) examinations indicated that the UAE was 47th in Mathematics and had dropped two places to 46th in reading, dropping overall from 46th in 2015 to 48th out of 65 (Westley, 2017). Results were still disappointing. In response two initiatives were introduced: the first in 2016, two Ministers of State, for Education and Higher Education were appointed to support the Minister of Education, the aim being to bring government schools closer to meeting the National Agenda's Vision 2021 targets for a first-rate education system.

The UAE governments have set very high PISA targets as part of their UAE Vision 2021 goals. The aim is to rank in the top 20 of all countries in the world by 2021 (Vision, 2021; Westley, 2017).

As a result of the lack of attainment by students, in 2016, National Policy on Education called for a revision in education to meet the changing dynamics of the population's requirement. Introduction included; quality education, innovation, critical thinking, teamwork skills, and programming to eliminate the shortage of manpower in science, space, energy, technology, academics and industry (Twitter@HHSkMohd, 2016). Further, as a result of continued criticism of the education system, in 2016 the Ministry of Education and the Ministry of Higher Education and Scientific Research merged as Ministry of Education to try to bridge the gaps between school and university education including: poor teaching methods, inadequate curriculum, poorly trained school leadership, weak student performance (Litz and Scott, 2016, pp. 567-568). Litz and Scott termed it an education crisis (Litz and Scott, 2016, pp. 567-568). Dr. Al Yahyaei, Director of Curriculum, MoE stated:

“We need to make sure that 100 per cent of the students, by 2018-2019, can get into college without a foundation year” (Pennington, 2016).

At the Khalifa Award for Education International Conference in October 2016, the Minister of Education, Hussain Al Hammadi, expressed his concerns of the outcome gaps in mathematics, English, and Arabic. He expressed the importance of merging all education to have a “thinking culture” and to promote greater cooperation (Pennington, 2016). Still drastic measures were needed and in 2017 it was announced that all schools following the Ministry of Education curriculum would follow the Emirati School Model. It is clear that concerted efforts have and are being made to improve the UAE education system. However, the challenge still remains and despite some of the best educational facilities in the world, the output from the UAE education system is below the OECD average.

Ministry of Education. In response, the Ministry of Education has recently reformed the education system from a ten subject curriculum including: Arabic, Islamic Studies, Mathematics, English Language, Physics, Social Science, Chemistry, History, Geography and Economics to a new Science, Technology, Engineering and Mathematics (STEM)

based curriculum. The new strategy for 2017-2021 is to develop an innovative education system for building a knowledgeable and globally competitive society able to meet future labour market demand.

Emirati School Model. The new strategy is encompassed in the Emirati School Model was launched on the 1st September 2017 and has been introduced, across all emirates, to improve the educational attainment of students. Education is being standardized to produce a high performing education sector. The new Emirati School Model aims to meet the objectives of the National Agenda by achieving the UAE Vision 2021. As a result, all curriculum, assessments and examinations will be common for public and private schools and is an inclusive strategy to obtain high quality learning outcomes needed for national development. The new curriculum is based on:

- A Kindergarten to Grade 12 English language curriculum
- Kindergarten to Grade 5, English, Math and Science taught in English.
- Grades 6 to 11 students follow the ministry's curriculum.
- Grades 1, 2, 3 and 12 receive a Technology, Design and Innovation curriculum.
- Kindergarten to Grade 12 receive Arabic Language, Islamic Studies and Social Studies curriculum with standardized examination.
- Curriculum is available in the electronic library.
- Application of a standardisation teacher training model.
- Academic Quality Improvement Officers to monitor all schools for compliance with laws, regulations and policies (Zaman, 2017).

One noticeable feature of the Emirati School Model is the attention and application given to the English language from kindergarten through to 12 Grade, not only important for the education sector but also international communication in business. Sheikh Mohammed bin Rashid Al Maktoum stated:

"It is essential to achieve a supportive and well-informed education system capable of keeping up with future changes and developments" (WAM, 2017).

The new Emirati School Model aims to increase efficiency and deliver an education system based on the highest standards of quality. As stated by Sheikh Mohammed bin Rashid Al Maktoum;

"The UAE has made many significant achievements in education and the next stage requires us to build on them in preparation for comprehensive development capable of delivering national objectives guided by the vision of the President His Highness Sheikh Khalifa bin Zayed Al Nahyan" (Augustine, 2017b)

It is clear that there has been a recognition that the curriculum needed to be revised to keep abreast of change. The success of the schooling system not only impacts on the economy, but also the coming technological environment, necessary to achieve space exploration and habitation.

English language. Education in the UAE is delivered in English and Arabic in the public school system, the rationale being that the country collaborates internationally in business. Secondly, the country wishes to produce students capable of reaching world class standards for competitiveness in the job market (Pennington, 2017). Therefore, it is determined that English language is essential for the UAE's economy. As a result, entry into further and higher education is based on Grade 12 achievements in addition to an Emirates Standard Test (EmSaT), in the year 2017/2018. Additionally, an EmSaT score of 800 is required for entry into a Higher College of Technology, with a foundation programme required before being allowed to progress with studies. Furthermore, an EmSaT score of 1100 is required for entry into university. Both Zayed University and Higher College of Technology have added additional English language classes to lift student's language attainment. About 65% of students attended foundation year in university at significant cost to the country, constituting approximately one third of the post-school budget (Pennington, 2017). However, between 2014 and 2017 there has been a 20% improvement (Al Nowais, 2017). Further, new targets have been set for 2021 to reduce the number of students requiring foundation year (Pennington, 2017). Therefore, the country aims to improve English language in the school system to avoid the unnecessary burden of post school English language costs.

2.2.3 Technical and vocational education in the UAE

The UAE over time has invested in technical and vocational education as it values the human capital and the prosperity it can bring to the country and benefits to the citizens. However, to understand the meaning of technical and vocational education we must define various terms. Before defining, meanings are not consistent across countries, so what one country calls technical and vocational education may be very different from that of another (Hanushek, 2011).

That is why it is important to define what is meant by three terms:

1. Vocational education
2. Vocational training
3. Technical education and training.

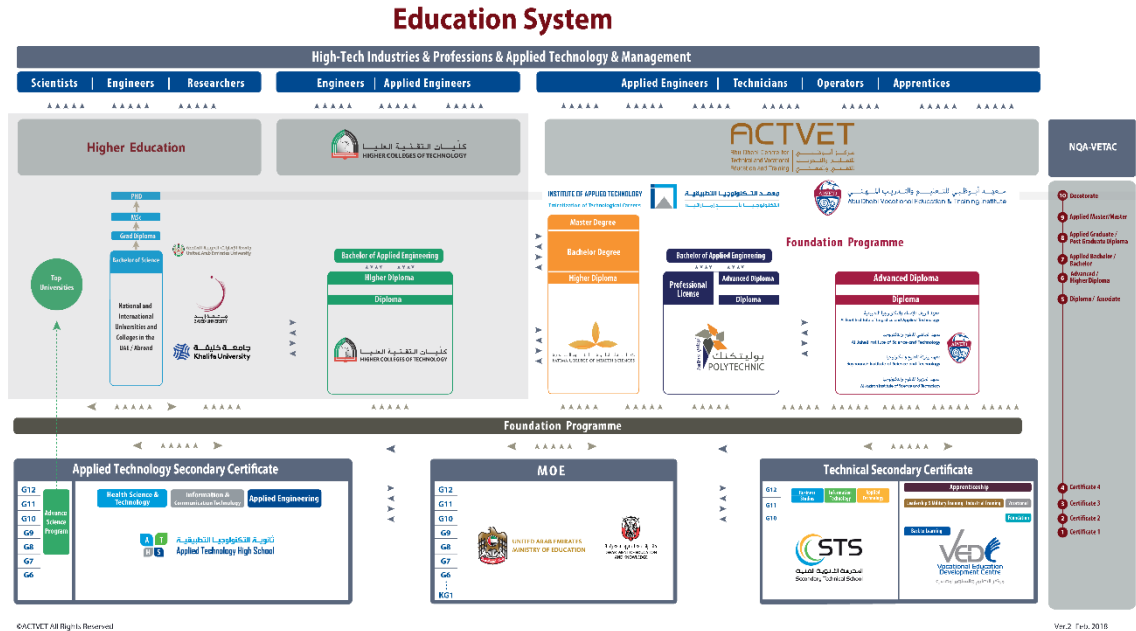
Vocational Education. Where vocational education prepares students for specific job-related skills, that is, they know the theoretical concepts and have been prepared to use those concepts in the workplace, it does not mean that they are competent to perform in the workplace. Typical qualifications would include UK vocationally relevant qualifications (UNESCO, 2018).

Vocational Training. On the other hand, vocational training develops competency in specific occupational skills; without these skills they are unable to enter the workplace or are able to perform in the work place. UNESCO, (2018) defines training as: ‘interventions specifically aimed to achieve mastery of performance in specified roles or tasks’. A typical qualification would be a UK National Vocational Qualification or an apprenticeship.

Technical and Vocational Education. Technical and vocational education on the other hand has been defined by UNESCO as ‘The study of technologies and related sciences, and the acquisition of practical skills, and knowledge related to occupations in various sectors of economic and social life’ (UNESCO, 2018). Technical and vocational education is what in this thesis is defined as preparation in STEM for technical and vocational education in areas of: industry 4.0 and Artificial Intelligence requirements. It became evident that there were not enough skilled graduates from the institutes in UAE in technical skills for industry and engineering fields (Wilkins and Molster, 2002). Further,

developments were established in Abu Dhabi and Dubai to address the various needs of technical and vocational education (www.hct.ac.ae). Next, the education system in the UAE, is shown in Figure 2.5.

Figure 2.5 UAE Education System



Source: ACTVET Corporate Booklet (2018).

The school system in the UAE is divided into two, public education and private education. The public education system is provided for in three main schooling systems, each developed for different emphasis and are: Applied Technology High Schools, the Secondary Technical Schools and Ministry of Education Schools, all are levelled at Level 4 of the National Qualifications Framework. Students graduating from school with acceptable grades can then enter further education systems and higher education.

Higher Education. Universities are considered higher education in the UAE. Students with high scores in all subjects including English language are allowed to enter directly to university where studies can be at degree level progressing to Master level and on to doctoral level. A provision that sits at a level between school and university is Higher Colleges of Technology.

Higher Colleges of Technology (HCT). HCT was established in 1988 with four colleges that has since expanded to 17 colleges across the UAE, the aim being to prepare young UAE nationals for the workforce. HCT offer Diploma programmes that allow students to

progress onto degree programmes after successful completion of their Diploma programme and successfully attaining the required English Language scores.

“The purpose of the system is to train and prepare nationals in order to provide technologically skilled personnel and to meet the country’s requirements within its general policy framework” (HCT, 2018).

Fatima College for Health Sciences (FCHS). A further degree college is Fatima College for Health Sciences, established in 2006 to provide competent healthcare professionals for the health sector. Starting with one Bachelor Degree in Nursing in 2006, it has expanded to offer more than 10 degree programmes including Nursing, Pharmacy, Physiotherapy, Radiography and Medical Imaging and Health Emergency (www.fchs.ac.ae).

Abu Dhabi Polytechnic (ADP). ADP is also considered higher education. Established in 2010, ADP offers dual educational-professional training system, including multiple high tech specialisations aiming to produce technologists and engineers to serve the UAE industrial growth in nuclear industry. Among other programmes, ADP focuses on the job training and work experience in South Korea. Other specializations are also offered in Advanced Energy Engineering Technology, Electromechanical Engineering Technology, Information Security Engineering Technology, Petroleum Engineering Technology, and Aircraft Engineering Technology, in line with Abu Dhabi Economic Vision 2030 (www.adpoly.ac.ae). ADP therefore is technologically geared for meeting the Visions of the country. Institutes offering Advanced Diplomas and Diplomas include: and Abu Dhabi Vocational Education and Training Institute and the National Institute for Vocational Education (NIVE) in Dubai.

Abu Dhabi Vocational Education and Training Institutes (ADVETI). Established in 2007 with initially three institutions covering three regions of Abu Dhabi: Al Jazirah Institute of Science and Technology in Abu Dhabi, Al Jaheli Institute of Science and Technology in Al Ain, Baynounah Institute of Science and Technology in Western Region (recently named AlDhafra). Further campuses were opened including Al Reef Institute of Logistics and Applied Technology and Sharjah Institute of Science & Technology in Sharjah (www.adveti.ac.ae). ADVETI institutes offer applied Certificates and Diplomas in

- Business
- Information Technology
- Travel & Tourism, Design
- Environment studies
- Industrial Technology and Logistics
- Engineering.

National Institute for Vocational Education (NIVE). Similarly in Dubai, NIVE was established in 2006 to serve the needs of Dubai to create an educational environment providing an alternative vocational education route and specific job training geared to enhancing their employability (www.nive.gov.ae).

In addition, specialised institutes were established to meet the early requirements of the booming oil and gas industry and include: ADNOC Technical Institute (ATI), Emirates Institute for Banking and Financial Studies (EIBFS) Etisalat Academy (EA) and the Petroleum Institute (PI).

ADNOC Technical Institute (ATI). ATI was established in 1978 to train entry-level technicians for the various oil production installations around the country. The training programmes began with a Foundation Programme, followed by 2 years of intensive technical training in four selected specializations:

- Process Operator
- Electrical Technician
- Instrument Technician
- Mechanical Technician

Upon graduation from ATI, graduates were placed in on-the-job training programmes at one of the Operating Companies from ADNOC Group, where they developed their required experience to work as skilled technicians in the Oil and Gas Industry (www.ati.ac.ae).

Emirates Institute for Banking and Financial Studies (EIBFS). EIBFS was established in 1983, to serve the needs of the banking sector and financial services sector. EIBFS is globally integrated with different leading universities and institutes worldwide, and

offers Diploma and BSc programmes in Banking and Finance related programmes and courses in the UAE (www.eibfs.ae).

Etisalat Academy (EA). Established in 1989, EA was launched to serve the telecommunication needs of the country. EA focus was to provide training and human capital development to Etisalat (Emirates Telecommunication Group Company) staff and to train young Emiratis in telecommunication fields (www.ea.ae).

The Petroleum Institute (PI). The Petroleum Institute (PI). PI was established in 2000 as an engineering university to offer a variety of engineering degrees for the oil and gas industry in the UAE. In October 2016 the PI and Masdar University were merged into Khalifa University with the goal of creating one of the best universities in the world.

Three TVET schooling systems are available in Abu Dhabi that is Applied Technology High Schools, Secondary Technical Schools and Vocational Education Development Centre.

Applied Technology High Schools (ATHS). ATHS was established in 2005 and is a pioneer in the field of academic and technical education. Aiming to build a generation of technicians, engineers and scientists needed for a knowledge economy. The system provides a solid, high standard Science and Mathematics curriculum that supports the development of scientists, engineers and technologists. ATHS promotes two programmes of study that build on the capacity of Emirati students:

- ATHS Core Programme
- Advanced Science Programme.

The ATHS Core Program offers students' academic core subjects in combination with customised cluster-based courses, matching their interests and academic performance. The Advanced Science Stream offers STEM education with more challenging curriculum. The aim being to produce students to enter into highly technical education to meet the needs of the knowledge economy (www.iat.ac.ae).

Secondary Technical Schools (STS). The first STS school was launched in Abu Dhabi in 2010 for male students as a pilot programme. The STS system was designed to build on students' competencies, identify and improve their talents through the technical and

vocational training courses and apprenticeship programmes. In 2011/2012 three more male schools were opened in Al Ain, Ras Al Khaimah and Fujairah. The growing demand for technical and vocational education has led to more schools in 2012/2013 two male schools were added in Ajman and Dubai and three girls' schools were opened in Ajman, Al Ain and Abu Dhabi. Recently two more schools were opened in Sharjah and Dalma Island (www.sts.ac.ae).

Vocational Education Development Centre (VEDC). VEDC is a boarding institute that was established in 2006 for Emiratis who have disengaged from the formal education system. VEDC focuses on technical and vocational studies rather than mainstream academic education with programmes tailored to industry-based requirements. All students sign employment contracts prior to their graduation, to enable them to become active citizens (www.vedc.ac.ae).

Abu Dhabi Centre for Technical and Vocational Education and Training (ACTVET) was created in 2010 to regulate the increased technical and vocational education sector, in Abu Dhabi Emirate and to establish policies and standards. ACTVET is mandated to:

- improve the management, quality and direction of technical and vocational education
- increase the number of skilled Emirati youth in rewarding careers
- foster life-long learning that prepares learners for the labour market.

ACTVET is also responsible for the licensing of institutes both public and private, and was the first Awarding Body appointed by the National Qualifications Authority.

National qualifications (NQA). In 2010, the National Qualification Authority was set up to regulate and quality assure qualifications in the three sectors of:

- General Education Council for schools
- Higher Education through the Commission for Academic Accreditation (CAA)
- Vocational Education and Training Awards Council (VETAC)

All programmes offered by the above schools, technical and vocational, further and higher education entities are currently in development and/or delivering National Qualifications.

Further, the National Qualifications Authority work with industry through Recognised National Development Committees to develop national occupational standards.

There are two types of technical and vocational qualification possible in the UAE both carrying the National Qualification certification. Knowledge and skill National Qualifications are shorter in credits and notional hours, aiming to prepare students to work in the workplace. Whereas, knowledge, skill and application National Qualifications are longer and prepares students to be competent in occupational requirements for the workplace (NQA, 2012).

To consider fully technical and vocational education worldwide, literature reviewing different countries' provision was researched and several countries were visited to consider their education systems. To compare, a set of determinants were used to measure effectiveness because 'key determinants or independent variables either hinder or enable implementation outcomes' (Viennet & Pont, 2017 p.5). Caves, Baumann Renold, 019) suggest five main key determinants or 5C's of: Content, Context, Commitment, Capacity and Clients, with 30 sub determinants 'designed to be considered as a helpful framework' (Caves, et. al., 2019 p. 5).

In conclusion to their research, Caves et. al. identified six areas of importance: implementation, characteristics of reform, unclear determinants, interconnected determinants, linked determinants and level of client involvement (Caves, et. al., 2019 pp. 20-21). Caves et.al.'s (2019) most important factor was implementation of the VET Reform strategy, which was classified as; 'Capacity' and 'Client' or personnel, resources available and involved or the stakeholders in the process. As the strategy in the UAE is only being developed, the implementation cannot be measured and so this aspect has been postponed for this research. Caves et. al.'s (2019) determinants that influenced characteristics of reform were 'Content', 'Context' and 'Commitment' or 'fitness for purpose,' of the strategy, the degree of bureaucracy and political will. This research is in line with the Visions of the UAE, has been approved by the government and will be presented to the government on completion. Therefore, Content', 'Context' and 'Commitment' are aspects of this research.

Caves et. al.'s (2019) findings regarding unclear determinants were: 'Context' and 'Content' or the scope, foreign assistance, decentralisation, pace of introduction and whether the strategy was bottom up or top down. This research did not have any foreign assistance, the scope of research was clearly delineated to VET strategy and when introduced would be centralised from the top down. Therefore, in terms of this research, there is no lack of clarity.

Caves et.al. (2019) also found that certain interconnected determinants worked better together and these were: 'Client' and 'Capacity' or strategy and the resources. Further, Caves et.al., (2019) also found that certain linked determinants of education and employment were 'Content' and 'Capacity' that is, the strategy and resources. However, career education or guidance has not been selected as a determinant but is a feature of this research. In this context, once the strategy has been approved for implementation by the government, resources shall be made available. Caves et.al., (2019) also found that the determinant level of client involvement the 'Client' was important. Whilst stakeholders at a local level, 'initially appear unimportant but is strongly interconnect to other determinants' (Caves et.al., p.6). In this research, the level of client commitment is at all levels, low in terms of operations and high in terms of strategy, applied at the national level. As this research considers TVET at the national strategic level, the client is high level, and this aspect is included in this research.

Viennet and Pont (2017) embedded some of Caves et. al.'s (2019) determinants in their research and proposed its use for advisors or policymakers intervening at the national or regional level in policy implementation. The determinants were designed as four dimensions and were: smart policy design, inclusive stakeholder engagement, conducive institutional policy and societal context and coherent implementation strategy (Viennet and Pont, 2017). From analysis of different frameworks, Viennet and Pont (2017) found an apparent gap between theory and practice. It is important to bridge this, because some academic literature may not necessarily reach policy makers or educational leaders. Additionally, Viennet and Pont (2017) ascertained that a 'one-size-fits-all model of implementation is not feasible given the political nature of reforms, the context, the actors and the recognition that a more systematic approach to implementation could flexibly adapt to local contexts' (Viennet and Pont, 2017 p. 44).

Therefore, this research in the UAE, has adopted three main determinants of strategy, delivery and employment as follows:

Strategy: aspect of this research sits with Caves et. al., 'Context' that is the Visions of the country, and 'Capacity' or communication of strategy and the strength of leadership (Caves et. al., 2019).

Delivery: aspect of this research sit with 'Capacity' of the teaching staff involved and the digital resources available and 'Clients' the stakeholders at all levels from Ministers to students involved in this research (Caves et. al., 2019). Additionally, a measure used in this research, is the outcome of the quality of VET education, measured by the average medal points table results from WorldSkills competition 2017 (WorldSkills, 2017).

Employment: although Caves et. al., (2019) mentioned a link between education and employment; it was not specified and has not been addressed by either Caves et. al., (2019) or Viennet and Pont, (2017) and is considered a serious omission where VET is concerned as this is the bridge between education and employment.

The main determinants of strategy, delivery and employment have been applied to various international countries.

Belgium, in terms of strategy, compulsory education is mandatory up to the age of 18 years with students opting for vocational education from the age of 16 years. In terms of delivery, despite education spending in Belgium being among the highest in the European Union, educational outcomes are comparatively low (EU, 2019). Further, the vocational education system showed 12.4% of students did not complete secondary qualifications and had little opportunities for upward progression between secondary tracks (OECD, 2015). Furthermore, in the WorldSkills 2017 competition, Belgium only ranked 29th in the average medal point table (WorldSkills, 2017). In terms of employment, overall unemployment has been recorded as 5.5% in 2020 (Trading, 2020). Therefore, there is room for increased efficiency and effectiveness (EU, 2019). As a result, the Belgium system was not considered.

The Malaysian strategy for education is that schooling is compulsory from the age of six until 15 years of age. In terms of delivery, vocational education starts at lower secondary school from 13 years of age and lasts three years with an option to carry on further for

a two to three year programme (Cheong and Lee, 2016). Unfortunately, despite heavy financial allocation for education, the quality of education leaves much to be desired (Cheong and Lee, 2016). This is reflected in the Malaysian ranking of 20th equal in the average medal point table at WorldSkills 2017 (WorldSkills, 2017). However, technical and vocational education and training is an important part of the education system, but has played a minor role that has missed the opportunity for workforce development (Cheong and Lee, 2016). The Ministry of Education in Malaysia stated that TVET plays a subordinate role to academic education and as a result, faces high youth unemployment (Cheong and Lee, 2016). In terms of employment, the unemployment rate is 4.9% in 2020 (Trading, 2020). Further, the Malaysian Industrial Development Finance (MIDF) stated that unemployment rate remains high due to skills mismatch (Dhanhayaa, 2018). Therefore, due to high rates of unemployment, Malaysia was not considered.

In terms of strategy, the German's Dual Vocational Training is strong and recognized world-wide as being very successful (Haasler, 2020). In terms of delivery, compulsory education is up to the age of 15 years of age and students at 16 years of age can enter into the Dual Vocational Training programmes (Haasler, 2020). However, some students were recorded as leaving compulsory education with weak core academic skills. Therefore, the German system was not considered (OECD, 2015). Further, in the WorldSkills 2017 competition, Germany ranked only 20th equal in the average medal point table (WorldSkills, 2017) indicating that the level of skill accomplished is average. In terms of employment, the overall unemployment rate in Germany is 5.2% (Trading, 2020). However, in Germany, a growing number of disadvantaged youths between the ages of 15 and 24 have limited access to the labour market and are in the "transitional system" between school and work. Furthermore, this system has been frequently criticised for being costly and ineffective (Schinz, Garanin, Sticher, and Kratz, 2014). Therefore, the German system was not considered.

The strategy for the Singaporean education system requires compulsory education from the age of 6 years to 15 years of age. In terms of delivery, 25% of graduates are accepted into the Institute of Technical Education. On the surface, vocational education in Singapore has been considered a success story. However, it has suffered with social stigma and there is an overrepresentation of Malay students, increased stratification and

gendering of schools. As a result, the image of vocational education is less prestigious (Chong, 2014). Further, the education system was in change, therefore, education in Singapore was not considered (Chong, 2014). Additionally, Singapore ranked 11th in the average medal point table at WorldSkills 2017 competition (WorldSkills, 2017). In terms of employment, one in four graduates in Singapore's private universities were unemployed or were in part-time and temporary employment. Since March 2020, government funds to assist graduates from Singapore's six universities has been provided with free training and courses upon graduation. Additionally, traineeship opportunities have also been extended to Institute of Technical Education (ITE) and polytechnic graduates indicating retraining for skills match. Overall, unemployment currently stands at 3.5% (Hirschmann, 2020). Therefore, the Singaporean system of education was not considered.

Two other countries visited that had the highest average medal points in the WorldSkills 2017 competition were: South Korea and Switzerland. Switzerland ranked second in the average points medal table and South Korea ranked third in the average medal points table at WorldSkills 2017 (WorldSkills, 2017). Therefore, it was decided to further investigate the technical and vocational education systems in the countries of South Korea and Switzerland.

2.2.4 The School system in South Korea

Next, on a national basis, systems of education in South Korea will be discussed. The Republic of Korea, known as South Korea is a Northeast Asia country situated in the South China Sea, which up until the 1960's was an agricultural, poor country with one of the world's lowest standard of living. In 1954, after the Korean War, because educational levels were very poor, literacy education was introduced to reduce the 14% illiteracy rate (Small, 2015). By 1958, in a relatively short time, the illiteracy rate was down to 4.1%. Later, the Korean school system was structured on six years in elementary schools, three years in middle schools and three years in high schools. Education was only compulsory for the first nine years. In 1980, as a result of only 27.2% of students progressing to college education, the South Korea applied a policy to facilitate high school graduates into higher education institutes. Institutes were allowed to increase student numbers and restrictions in establishing 2 and 4 year colleges was relaxed. By 2014, 70.9% of high school students progressed to Colleges and university

(Lee Ji-Yeon, 2014). South Korea's zeal for education and its students' desires to get into a prestigious university is one of the highest in the world, because the entrance into a top tier higher educational institution leads to a prestigious, secure and well-paid white collar job with the government, banks, or a major South Korean conglomerate such as Samsung, Hyundai or LG Electronics (Lee Ji-Yeon, 2014).

In the early 1950's Korea had no industry and a technical and vocational training system was established to meet the requirements of the Five Year Economic Development Plan, as shown in Table 2.3.

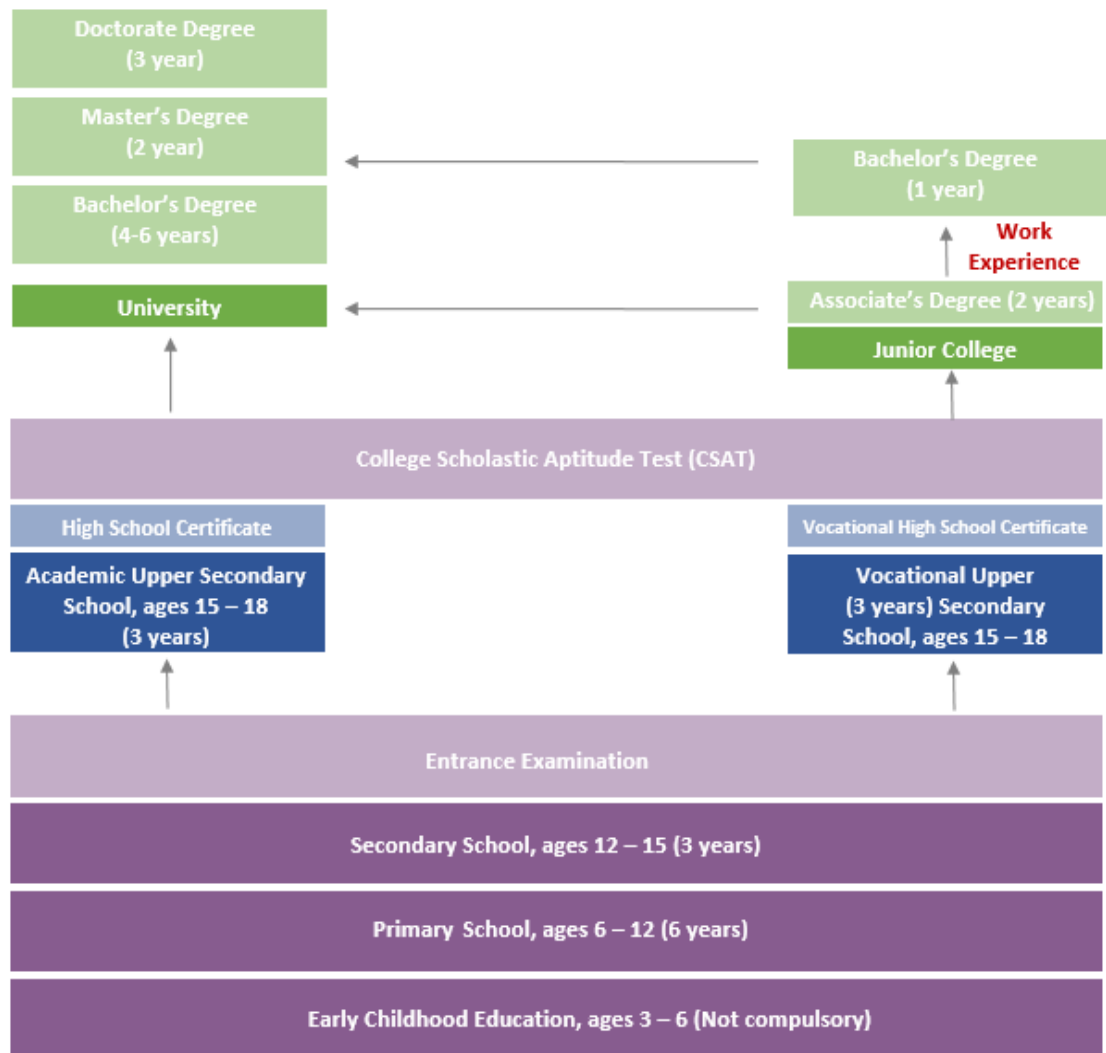
Table: 2.3 South Korea Comparison of Vocational Education and Vocational Training at Early Stage of Industrialization		
	Vocational Education	Vocational Training
Purpose	<ol style="list-style-type: none"> 1. To cultivate sound citizens and develop living abilities 2. To acquire basic, general and procedural knowledge 	<ol style="list-style-type: none"> 3. To train skilled workers according to demand in each occupational area 4. To develop adaptability to production circumstances
Target group	<ol style="list-style-type: none"> 1. Students (unemployed) 	<ol style="list-style-type: none"> 2. Incumbent workers and job seekers 3. People wounded in action and people with disabilities
Stage of Industrialization		
Characteristics	<ol style="list-style-type: none"> 1. Non-business facilities 2. Not business-conscious 3. Theory-oriented 4. Short-term measure 	<ol style="list-style-type: none"> 5. Using business facilities 6. Directly related to business consciousness 7. Practice-oriented 8. Continuous guidance

Stage of Industrialization		
Characteristics	9. Non-business facilities 10. Not business-conscious 11. Theory-oriented 12. Short-term measure	13. Using business facilities 14. Directly related to business consciousness 15. Practice-oriented 16. Continuous guidance
Effects	1. Long-term investment 2. Heavy cost burden 3. Mismatch between supply and demand	4. Short-term investment combined with production 5. Reduced cost burden 6. Short-term adjustment between supply and demand (quantity-quality)
Source : Office of Labour South Korea (1967, p. 25).		

The purpose of introducing technical and vocational training was to train workers for occupational demand, to be adaptable and to use transferable skills for increased productivity. Previously technical and vocational education had been about living abilities and procedural knowledge (Lee Ji-Yeon, 2014). The target group for the technical and vocational training was existing workers and people with disabilities, many of whom were injured in the Korean War as opposed to technical and vocational education, for unemployed students. The characteristics of technical and vocational training was very much business orientated supported by continual guidance as opposed to theory-based non-business functions (Lee Ji-Yeon, 2014). The effects of the change, produced by technical and vocational education, was short term to reduce costs and to increase productivity and balance the requirement for supply and demand. Whereas, technical and vocational education was seen as a long term investment with a heavy cost that was producing skills mismatch in the country. The country therefore recognised that technical and vocational training was the best route for short-term solution to meeting the Five Year Economic Development Plan (Lee, 2017). In 1967, the government introduced the Vocational Training Act allowing students to specialise in academic or vocational education after their three Middle School years. In 1980 the graduation rate of vocational high school students was in the 90%'s but by 2010 it had dropped to 20% (Lee Ji-Yeon, 2014). Since 2008, vocational education was re-categorised into three types of vocational schooling of: Specialised High Schools,

Meister High Schools, and Comprehensive Vocational High Schools as shown in Figure 2.6.

Figure 2.6 South Korea



Source: Small (2015).

Specialised High School. In Specialised High Schools the curriculum consists of: agriculture, manufacturing, IT, business, ocean/fisheries and home economy. In addition, articulation between school and college on a two plus two year bases was introduced and Specialised High Schools were promoted. Additionally, vocational school graduates, having worked three years, were able to go directly into college. Furthermore, Specialised High School graduates, with increased scholarships, could enter universities.

With all these efforts, in 2010 the employment rate from the vocational school graduates had risen. The government put high priority on the full-fledged incorporation

of vocational education into high school curriculums as part of its policies to develop vocational education. Consequently, the employment rate of vocational high school graduates has rebounded since. In 2011, the Global Field Training Programme was promoted to allow graduates from the Specialised High School system to work in companies abroad, with advanced technology, for three months to increase technical manpower (ICDK, 2014).

Meister High Schools. Meister High Schools are recognised by the South Korea as providing vocational education. Meister High Schools were developed to actively deal with the imbalance between the supply and demand of manpower with the curriculum tailored to industrial needs, based on agreements with specific industries. As an outcome, graduates from Meister High Schools are required to get a job, adhering to 'Employment First, College Later', the policy being to produce highly competent technical manpower which satisfies the needs of specific industry (Small, 2015). Over a period of four years the South Korea has opened 16 Meister High Schools. Therefore, the growing policy is to encourage vocational education for employment. To further develop vocational schooling to meet the demands of industry, a 'Work-learning Dual System' has recently been introduced, the aim being to work with the National Occupational Standards and the Korean Skill Standards in the schooling system (Lee, 2016). Students undertake an apprenticeship programme over a period of one to four years and graduate with a National Certificate. However, there have been challenges due to a mismatch of skills, caused by a lack of high quality jobs because 85% of high school students are enrolled in academic high schools while 15% are at vocational and alternative schools. Further with 97% of academic High School students graduating, there are now challenges. Sixty percent of The South Korean's ages 25 to 34 have higher education due to high school students attending college, but the jobs that require college education are now in short supply. Further, 40 % of college graduates last year could not find work even at entry-level positions, despite a healthy economy. Therefore, there are too many educated graduates and not enough jobs to occupy this growing number. It is predicted that if the challenge is not adequately addressed unemployment could increase by 2% in the next decade because college graduates cannot continue to get degrees, only to become unemployed in the end (Small, 2016). As a result, South Korea recognises it needs more vocationally educated students (Lee Ji-Yeon, 2014).

Lessons learnt. Lessons learnt from the South Korean school and vocational education system shows that:

- Too many students are following the academic schooling route.
- As a consequence, too many graduates from the academic stream are unemployed.
- Work-learning Dual System produces better skilled workers.
- Students undergo occupational skills training resulting in a national qualification.
- Partnerships with industry is strong.
- Most of the cost of vocational training is borne by the employer.
- The 'Employment First, College Later' strategy ensures that students are trained for specific work skills and provide the necessary manpower.

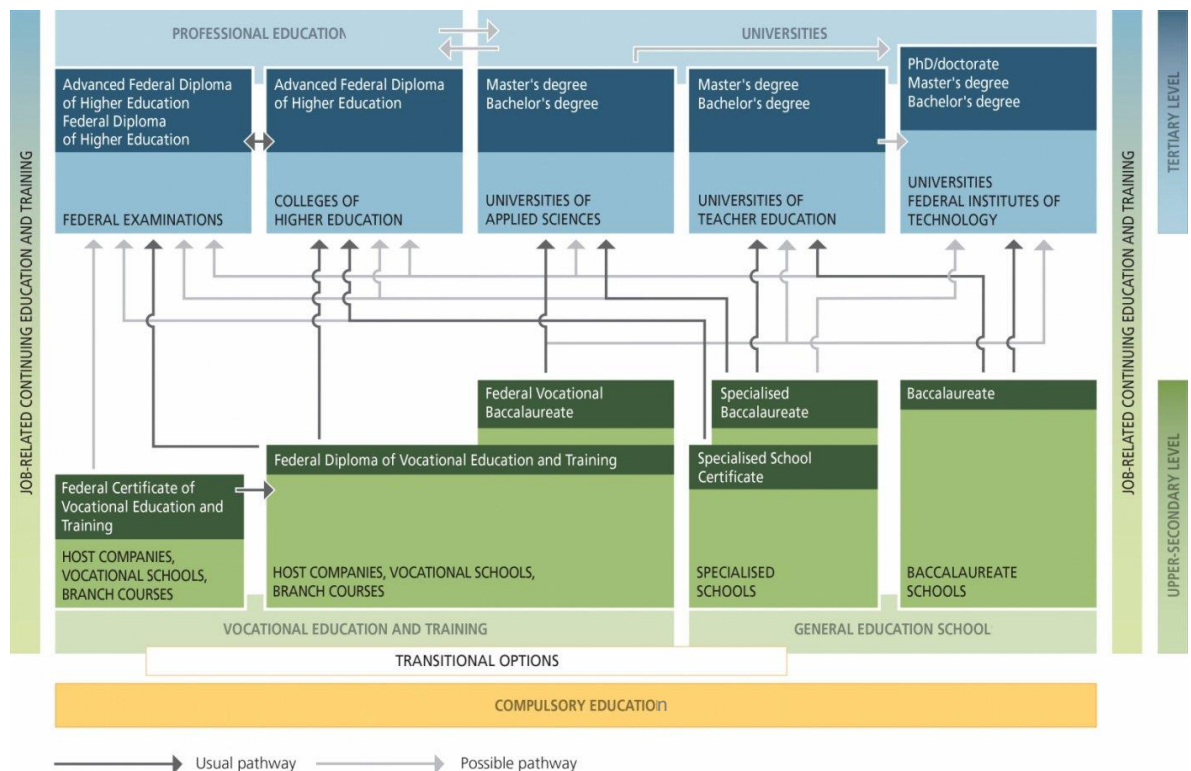
2.2.5 School systems in Switzerland

Next, the school system in Switzerland is considered. Switzerland is a central European, landlocked, neutral country with a population of approximately 8.4 million. Switzerland had a tradition of farming, watch making and weaving fabrics up until the Second World War, and thereafter banking, finance and insurance started to become a prominent provider of employment. The Swiss call this sector the commercial sector (Jenzer, n. d.). In terms of schooling, the first schooling in Switzerland was 'Volksschule' in 1874, free schooling, compulsory for nine years. It was not until the 1930's that the "Federal Law on Vocational Training" was established which combined apprentice training (dual-track system) and all-day school (Latin Switzerland) (Pilz, 2007). The first apprenticeships were introduced in the 1930's and now there are 260 different apprenticeship programmes in Switzerland (Pilz, 2007). As a result of the Sputnik space programme in 1957 there was a realisation that scientific, technological and industrial development was required. At that time mathematics, languages and programmed instruction, were introduced to the curriculum (Jenzer, n. d.).

In 1972 three systems came into force, as shown in Figure 2.7. The Specialised Middle School, a lower secondary school lasting three to five years post primary, (not compulsory education). Two other streams are the academic Matura (Maturitätsschulen) in year 12 or 13. Ninety percent of Matura students achieve the

Matura level at around the age of 18 to 19 and the second stream is Vocational Education (Berufsfachschulen) (Pilz, 2007).

Figure 2.7 Switzerland schooling system



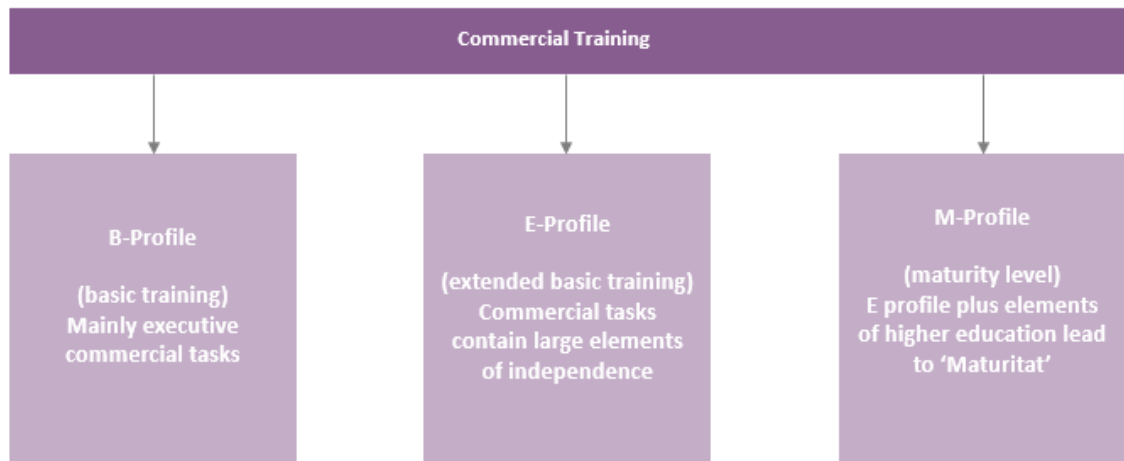
Source: <https://www.2imangement.ch/en/wwwformationch/swiss-education-system>

In the 1980's there was a call to return to the basics of education of: reading, writing and fundamental skills to improve quality in education due to economic developments, worldwide mergers, high technology and social change. As a result, three school types, that is, Matura, Specialised Middle School and Vocational Education follow four common core subjects, as follows:

- Company and sector specific knowledge: for example, Terms of Trade, collection proceedings or order management.
- Economy and Society: for example, accounting, international trade, macro and micro economics.
- Information Technology and Communication and Administration: for example, using computers or writing correct company correspondence.
- Mother tongue and foreign language (Pilz, 2007).

Tracks leave 20% to 40% of the track open for individual school training objectives in order to meet the needs of the region specialisation. Similarly, the vocational dual system of schooling has three tracks of: E-profile, B-profile and M-profile (Pilz, 2007), as shown in Figure 2.8.

Figure 2.8 New structure of apprenticeships in the commercial sector in Switzerland



Source: Pilz, (2007).

Vocational education is common in Switzerland with 65% of students enrolled in vocational education with 93% of those, enrolled in combined vocational and work based programmes (Diebolt, n.d.). The philosophy behind the Swiss vocational education is that training is workplace-led and predominantly practical. Stressed is the importance of the work experience during the training period, in accordance with skill requirements, defined around the workplace ‘training culture,’ and is based on the notion that vocational training should be interpreted not only as a contractual duty but also as an educational process (Pilz, 2007). Trainees sign a contract with the company on a private basis and learning of the occupational and specific competences is the company’s responsibility (Diebolt, n. d.). In 2003 the Swiss apprenticeship system was in need of reform and the reform affected employers and vocational schools, not only in terms of new learning content or curriculum, but also through new methods of learning and testing (Pilz, 2007). As a result, the vocational education track follows a sector specific training plan called the ‘model training course’ that is developed in conjunction with trade associations that provide detailed knowledge of the trade. Much of the vocational education happens in the workplace and the employer is the investor

in the individual's skill. Each track contains three sets of skills, that is, technical, social and method-related skills as follows:

- Technical skills: technical knowledge and abilities acquired in their professional field.
- Social skills: to handle themselves in a responsible manner.
- Method-related skills: include skills such as presentation or sales techniques. (Pilz, 2007).

For technical skills, during the apprenticeship, the trainee completes three technical training courses inside the company called process units (Prozesseinheiten), Process units allow the student to understand the company and its processes of production, administration and other areas in the company (Jiaxin, 2018). Additionally, during process units, method related skills are considered on the basis of predetermined questions. Lastly, for social skills, the trainee maintains a course journal, and reflects on their own positive and negative experiences, review their thinking stages and write down suggestions for improving their own behaviour. From this reflection, students can draw conclusions on the basis of the knowledge obtained, thus promoting reflection on learning (learning to learn).

Whilst in company, students are graded by the work supervisor, for performance against six predefined assessment criteria and the result forms one part of the final exam. This is accompanied by a written and an oral final exam constituting 50% of the final mark. The other 50% of the final mark is carried out as continuous assessments by teachers in the second and third year of the apprenticeship. The outcome of the vocational examination system is the Certificate of Qualification of the Swiss Federation (Diebolt, n. d.; Jiaxin, 2018).

Lessons learnt. Lessons learnt from the Swiss vocational educations system is that:

- The majority of students attend vocational education schools.
- Education is mainly practical workplace lead training.
- There is an emphasis on work placement.
- Industry is heavily involved in training and costs.
- Industry is involved in developing the curriculum.
- In company training accounts for 50% of the final mark.

2.2.6 Comparisons between South Korea, Switzerland and UAE

To judge the strength and quality of performance of vocational education, it is worth considering the performance at WorldSkills 2017 in Abu Dhabi. The medals achieved in the WorldSkills 2017 Abu Dhabi competition held in Abu Dhabi in October 2017 organized by ACTVET, is shown in Table 2.4.

Table 2.4 Worldskills Comparison by total medal points							
Position	Country	Total medal points	Number of competitors	Gold	Silver	Bronze	Medal of Excellence
2	South Korea	88	42	8	8	8	16
3	Switzerland	81	36	11	6	3	13
37	UAE	3	29	0	0	0	3
Source: Burke (2017).							

South Korea. South Korea, ranked second top of the medal points league with 8 gold, 8 silver, and 8 bronze and 16 medallions of excellence. However, from a country with a population of 49.3 million (2014) it did not do as well as Switzerland.

Switzerland. Switzerland ranked top of the medal points league with 11 gold, 6 silver, and 3 bronze and 13 medallions of excellence. The performance by Switzerland for such a small country with a population of 8.4 million indicates higher quality vocational education than South Korea or the UAE.

UAE. UAE ranked 37th of the medal points league with three medallions of excellence. UAE were ranked above 12 teams that failed to secure a single medal or medallion of excellence (Burke, 2017).

Similarities exist between the three countries of UAE, South Korea and Switzerland. UAE and Switzerland have roughly the same size of population of around nine or ten million whereas, South Korea has the largest with 49.3 million. Therefore, the scale of provision differs with South Korea having a larger economy to manage. UAE and South Korea have also shared massive development in a short period of time, moving economies to an advanced stage of competitiveness. Similarly, South Korea is one of the most successful economies in the world and UAE is one of the fastest successful growth countries in the world. Further, UAE and South Korea also share family values, with

the family being the most important factor and the eldest son being responsible for all family members. South Korea and UAE have large family businesses that provide employment such as Samsung, Hyundai or LG Electronics in South Korea and Al Futtaim, AlGhurair, and Al Masood in the UAE. In terms of academic education, both UAE and South Korea have traditionally followed the rote learning approach. Further, in UAE and South Korea, more students graduate from academic high schools than vocational schools. Further, the tradition in UAE and South Korea has been to gain academic qualifications, seeing that academic qualifications leading to better paying jobs and prestige. However, in both countries it has contributed to a mismatches of skill and unemployment.

All three countries have in worldwide comparison, low rates of unemployment with UAE at 4.3%, Switzerland at 3.33% (Swissinfo, 2018) and South Korea at 3.5% (Hirschmann, 2020). In terms of vocational education, South Korea and Switzerland follow the dual-system apprenticeship system of vocational education, working in partnership and sharing the cost of training with industry. This approach successfully leads to employment of graduates. However, the UAE does not have apprenticeship training schemes but has in-company training with companies such as ADNOC. Additionally, UAE and South Korea both work on national skill standards and both countries aim to achieve National Certification on graduation, giving students occupational competency and qualifications. Similarly, students in the UAE are required to produce portfolios of work which is similar to the Swiss system of journaling and reflection. Both aim to record the students learning journey and is used as a final assessment strategy.

Teachers. Next teaching is considered. There is recognition that teachers need support to educate students to a higher standard of achievement. In terms of the new Emirati School Model, some teachers were not prepared for the change. News of the new curriculum was welcomed, but caught teachers by surprise because they had prepared lessons for this academic year against the old curriculum months before (Zaman, 2017). Further, Teachers and Head teachers agreed that teacher professional development was required but generally change was good for the schools (Zaman, 2017).

Teacher and knowledge economy. The top jobs required for a knowledge economy are based on the production, distribution, and use of information and ideas. Further, lifelong learning plays an important part of maintaining skills for a knowledge economy,

as does acquiring the appropriate qualifications. Employers are looking for skills most crucial to the knowledge economy, certification and lifelong learning programmes and other means, indicating to an employer competence for the job market (Dolye, 2019). People from all industries participate in upskilling, to preserve their jobs, to develop new IT skills so that they don't lose their jobs to automation (Dolye, 2019). To meet the needs of a knowledge economy Sabbah et. al. (2016) suggested five requirements for Teachers and Principals:

- Principals and teachers become involved in seminars and workshops to develop their performance and increase their cognitive account of knowledge economy.
- Principal motivates teachers to update their roles for a knowledge economy.
- The Principal determines the criteria used in evaluating the teachers' knowledge of a knowledge economy.
- They should carry out studies and similar research concerning the knowledge economy
- Ministry of Education constructs appropriate programmes to develop and train teachers in the roles of teaching within a knowledge economy (Sabbah, et. al., 2016).

Teaching and artificial intelligence. New technologies, will change how students learn, what they learn, how staff work, how collaboration works, and how communication works in light of new technology (Luckin, et. al., 2016). Teachers who are the decision makers will be empowered to decide how best to use the resources at their disposal. Increased introduction of artificial intelligence powered tools will serve as a catalyst for the transformation of the role of the teacher.

Changes will be in three areas of:

- what is needed for artificial intelligence
- How artificial intelligence connects to teaching and learning
- Apply AI at the system level (Luckin, et. al., 2016).

Three key models are at the centre of AI:

- Pedagogical model: knowledge and expertise of teaching
- Domain model: knowledge of the subject being learned (domain expertise)
- Learner model: knowledge of the learner (Luckin, et. al., 2016).

As transformation takes place, teachers will need to develop new skills to:

- Understand what artificial intelligence systems are available, how to evaluate and make judgements about new AI products.
- Develop research skills, be able to interpret data provided by artificial intelligence technologies, and to explain to students what the data analysis is telling them (for instance, using Open Learner models).
- Learn new team working and management skills to work with artificial intelligence and manage resources effectively (Barber, 2016).

Artificial intelligence will also significantly influence what we teach and learn, as well as how we do it (Barber, 2016).

Further, there needs to be specific support and investment in technological resources, curriculum, delivery and assessment. Additionally, it is clear that changes in curriculum and teaching style required teachers to change and develop new skills. Teacher standards for teaching artificial intelligence need to be developed. In 2016 there was a drive to change teacher standards in the UAE and the Teacher and Leadership Standards UAE (TELSUAE) were developed. This was later enhanced with the introduction of the Teachers Licensing Pilot Project developed to ensure that teachers were qualified to teach in the UAE schools. However, due to the rapid development of artificial intelligence, these standards did not consider artificial intelligence at the time and now an added standard for the teaching of artificial intelligence is required.

Current thinking does not see a future where artificial intelligence replaces teachers. However, the role of the teacher will continue to evolve and transform to one where time is used more effectively and efficiently, and expertise is better deployed, leveraged, and augmented (Luckin, et. al., 2016). For example, the algorithms and models that comprise artificial intelligence offers learning that is more personalised,

flexible, inclusive, and engaging (Luckin, et. al., 2016). More importantly, artificial intelligence can help learners develop the knowledge and skills that employers are seeking (Luckin, et. al., 2016). Therefore, the curriculum delivery and assessment needs to be current to reflect the artificial intelligence requirements.

Teacher and mathematics for artificial intelligence. Mathematics is being forced to change in content and teaching approach because of Artificial Intelligence (Rossie, 2019). Interdisciplinary Math and real-life related themes show students that Math is meaningful. Generally, Math lessons are more routine computation exercises without real life connection and can be disconnected from real life.

Three basic keys have been suggested for motivating student's interest for Maths and are:

- Talk and debate
- Have positive experiences
- Have fun (Rossie, 2019).

However, Parbhakar (2018) has determined a list of skills for mathematics for artificial intelligence as shown in Table 2.5 below:

Table 2.5 Essential topics in mathematics for artificial intelligence	
Lineay Algebra	
Vectors	
	Matrices
	Eigenvalues & eigenvectors
	Principle component analysis
	Singular value decomposition
Calculus	
	Functions
	Scalar derivative
	Gradient
	Vector and matrix calculus
	Gradient algorithms
Probability	Basic rules and axioms
	Random variables
	Bayes' Theorem, MAP, MLE
	Popular distributions
	Conjugate priors
Miscellaneous	Information theory
	Markov Chain
Source: Parbhakar, (2018).	

Recent suggestions are that artificial intelligence should be adopted as a core subject within school curriculums, similar to other regular fields, such as Math, Science and History (Nasir, 2017a). One school in Dubai has already introduced coding as one of their core subjects (Nasir, 2017a). As a result, the content and quality of instruction in mathematics becomes more progressive and challenging.

Teacher and robots. It has been said that coding is the new literacy, with literacy defined as ‘the ability to read and write,’ more broadly, it means the ability to communicate using a symbolic system. Therefore, being literate in computer languages and computational thinking will be essential competencies with those who can’t read and write are left out of power structures (Wonder Works, 2018).

The role of education will be to prepare the next generation for handling the challenges they will face. It’s not enough just to be able to use technology; to solve the problems of the future, it requires children become producers, not only consumers (Bers, 2018).

Wonder Works (2018) sees five literacies as important for robotics, and they are:

- Coding literacy
- Coding for digital transformation
- Robotics
- Coding with robotics
- design thinking principles (Wonder Works, 2018).

Teachers and internet use. School development in most countries has long been characterised by an increasing effort to integrate information and communication technology (ICT) in all teaching and learning (Wikan and Molster, 2011). Further, Wikan and Molster state that conducting ICT training as an integral part of the professional development in a school is a support for teachers. Modern curriculum indicates five basic skills that teachers should be able to do and are:

- Use digital skills
- Express verbally
- Express in writing
- To read to count
- Use ICT all academic subjects (Wikan and Molster, 2011, p. 1).

Therefore, compared to previous curricula, a greater emphasis is placed on ICT in schools.

Ferdi and Koch (1996) in his article written some time ago but still is relevant, “Why teachers use the internet”, ten main reasons were given as follows:

- To find low-cost or free materials
- To help teachers manage time more efficiently
- To expand opportunities for ‘tele-mentoring’
- To help teachers communicate and share experience and ideas with other teachers
- To help teachers spread good news about what's happening in their classrooms
- To "rejuvenate" teachers' professional lives
- To motivate students
- To give students opportunities to learn by doing
- To connect the classroom to the larger world
- To help bring the school and the community closer together (Ferdinand Koch, 1996).

Therefore, internet use by teachers is an important and viable use for enhancing student learning.

Guskey Teacher Change Model. For teacher change and improvement, one important model, the Guskey Teacher Change Model, developed by Thomas Guskey in 1985, suggests that a four phase change model for the teaching profession is required. The four phases are:

- Provision of professional development
- Change in classroom practice
- Change in student learning
- Change in attitude and belief of the teacher (Guskey, 2002, p. 2).

The model of Teacher Change assumes that teachers need to change their education narrative (beliefs and attitudes) before they can change educational practices (Guskey, 2002). In the case of the UAE, teachers require professional development which is

extensively being offered to all teachers to support the new school model. The belief that change will be beneficial is an important factor. However, Guskey's model reverses this approach, stating that once student achievement is evident, the belief and attitude to change is reinforced and becomes stronger.

'The crucial point is that it is not the professional development *per se*, but the experience of successful implementation that changes teacher attitudes and beliefs. They believe it (the new strategy) works because they have seen it work and that experience shapes their attitude and beliefs' (Guskey, 1997, p. 383).

Guskey admitted that his Teacher Change Model could be improved and refined, and so developed three new categories of relationships. These are:

- Content characteristics: - the 'what'. Changes in practice that were needed for best practice to occur.
- Context characteristics: - the who, where and why. Determined by 'who' needed development, 'where' it would occur and 'why' it was needed.
- Process variables: - the how. Determining 'how' the change would be brought about.
-

Extensive professional development with teachers in the UAE is aimed at making substantial improvement to teachers teaching and student attainment.

Student performance. Student attainment needs to improve for the students in the UAE to meet average performance scores in international examinations such as PISA and TIMMS. Further, teaching and learning needs to change to support these tests and reflect the new digital age. Behaviorism, Cognitivism, Constructivism and Humanistic are the four broad learning theories, usually applied to instructional environments defined as follows:

- Behaviorism: believes that learners are passive and respond to stimuli.
- Cognitivism: believe that learners process, store and retrieve information for later use by assimilating information.
- Humanistic: believes the learner is active and determine their own learning by their own choices.

- Constructivism: believes that the learner is active in constructing new ideas based on their current knowledge (Siemans, 2005).

However, Behaviorism, Cognitivism, and Humanistic were not developed in a time when learning was impacted through advanced technology (Siemans, 2005). Therefore, for a digital age, and to meet the Visions of the UAE, the new theory of connectivism is considered in response to the rapid growth of knowledge. Gonzalez (2004) describes the challenges of rapidly diminishing knowledge life:

“One of the most persuasive factors is the shrinking half-life of knowledge. The “half-life of knowledge” is the time span from when knowledge is gained to when it becomes obsolete. Half of what is known today was not known 10 years ago. The amount of knowledge in the world has doubled in the past 10 years and is doubling every 18 months” (Gonzalez, 2004).

Therefore, new approaches to student learning needs to be considered. Connectivism is a learning theory that explains how digital technologies have created new opportunities for people to learn and share information among themselves and across the World Wide Web including: web browsers, email, wikis, online discussion forums, social networks, WhatsApp, YouTube, and other tool which enables information sharing. Informal learning is a continual process and a significant aspect of learning experiences. Knowing where to find information is the challenge. Further, learning and work related activities are no longer separate, in many situations, they are the same. Principles of connectivism consider learning, capacity, maintenance of connections, currency and decision making essential for managing and staying abreast of new developments in knowledge. The principles for connectivism is as follows:

- Learning and knowledge rests in diversity of opinions.
- Learning is a process of connecting specialized nodes or information sources.
- Learning may reside in non-human appliances.
- Capacity to know more is more critical than what is currently known.
- Nurturing and maintaining connections is needed to facilitate continual learning.
- Ability to see connections between fields, ideas, and concepts is a core skill.

- Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities.
- Decision-making is itself a learning process. Choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality. While there is a right answer now, it may be wrong tomorrow due to alterations in the information climate affecting the decision (Siemens, 2005).

Consideration need to be given to the foundation competencies required by students for future technological needs for achieving the goals of the 2021, 2030, 2071 and 2117 Visions for the UAE.

Online. Recently, following the digital path, online learning has had more prominence. In 2013 ACTVET developed the national-level Emirates Standardized Test (EmSaT) to measure pupils' knowledge of Arabic, English, Mathematics and Science, which was adopted by the Ministry of Education MoE in 2017. The Arabic language test gaining the Sheikh Mohamed Rashid Al Maktoum Award as the best initiative 2019 in the Arab World. The online test measures the knowledge and skills of students in Grade 12 as they finish their general education, and move on to higher education. The EmSaT score is vital for college admission and placement.

Another introduction of technology is the ACTVET iCampus, a Learning Management System (LMS) used for courses and assessment, a system that reflects the artificial intelligence direction of more integrated learning systems as found in connectivism (Siemens, 2005). Use of LMS supports the view of distance or blended learning, remote teaching by Skype, online communication system, is a feature of artificial intelligence educational developments. Further, schools also have access to Desire to Learn LMS systems. Therefore, the use of online technology supports the smart objectives of meeting the country's visions. Further, use of apps is becoming the norm in education as assistance to teaching and learning in the classroom. Further, the use of apps by students is also the norm in their teaching and learning, the most popular shown in Figure 2.9.

Figure 2.9 The 70 best apps for teachers and students



Source: <http://www.edudemic.com>, September 2013

It is investing heavily in the education of the UAE, in schools, technical and vocational education and further education in order to meet the Vision of the UAE for a technologically advanced economy. Further, the curriculum of schools and the performance of teachers has recently been addressed by the Ministry of Education, to improve provision, but it is too early to report results. Consideration has been given to student performance, which falls below the expectations of the country to meet the requirements of Vision 2021.

Moreover, there is still a reluctance from some post school technical and vocational education, to move away from academic style provision to assessment based technical and vocational education. In order to maximise the expenditure, an approach to

technical and vocational education and training needs to be widely accepted. This led to Research Question B which asks:

Is there an approach in the UAE that can effectively deliver technical and vocational education and training?

2.3 Employment

Next, the system of processing unemployed persons into employment in the UAE will be considered. Education can play several roles in society for example it can be intrinsically important to an individual, valuing knowing something for the sake of knowledge. Whereas, the instrumental economic role of education helps a country's economic growth, the instrumental personal economic role of education helps a person to find a job, and this is a person's human capital.

Human capital. Human capital theory emphasizes how education is seen as an investment in the individual, aiming to secure a job (Olaniyan and Okemakinde, 2008). To enhance the earning capability, individuals are prepared to invest in themselves by attending college and university. In the Western world, particularly in the US and England student loans are the norm and human capital development is increasingly funded through private debt in the form of student loans (Fitzsimons, 2014). Human capital theory considers different educational levels that give different educational economic returns. In the UAE all education from kindergarden to post graduate studies is free to all Emiratis. Sheikh Nahyan bin Mubarak Al Nahyan, UAE former Minister of Higher Education and Scientific Research stated:

“Each institution has its own criteria for admission, but every student will be entitled to a place in higher education. We believe the future of this country – the ability to sustain its development as well as maintain its security and standard of living – will depend on the quality of education we give our young people” (Elan, 2004).

Therefore, Emiratis have every opportunity to maximize their human capital through further and higher education for better employment outcomes. However, competitive advantage from investing in human capital will only be realised with four premises considered, and are:

- The market value of the worker can be no more than its use in the market: in other words over educating does not return an advantage.
- The value of workers skills must be specific: that is, the skills developed must be specialised enough to be paid at a higher premium.
- Workers will stay in one location provided the value is returned: in other words if there are jobs in the local area that pay the going rate for the job then workers will remain.
- Workers are more likely to move if the value is greater elsewhere: which means workers will move for higher wages elsewhere (Campbell, et. al., 2012).

In terms of the UAE, many expatriate workers have used the human capital of their education when they move to the UAE, by gaining work, they will return their investment. Nationally, the human capital of a nation creates economic prosperity, a belief that is strongly supported in the UAE. HH Sheikh Khalifa bin Zayed Al Nahyan, President of the United Arab Emirates has stated:

“Human capital is the real wealth of this country, before and after oil ... serving the interests of citizens is the goal that we strive for every day. Building human resources is central to comprehensive social and economic development” (Elan, 2004).

Human capital represents the investment in a nation that enhances a country’s economic prosperity because education allows a worker to be more productive, leading to investment in the country’s productivity (Olaniyan and Okemakinde, 2008). H.H. Sheikha Fatima bint Mubarak, Supreme Chairwoman of the Family Development Foundation, and President of the Supreme Council for Motherhood and Childhood:

“Education is a true measure of the progress made by states to attain success and excellence in the field of investment in human capital, including women. An educated human, man or woman, is the basis of civilisation and the axis of advancement and progress” (Elan, 2004).

Therefore, it is recognized, in the UAE, that skills and knowledge, acquired through education, is an important part for progress and achievement of the UAE’s Vision goals.

2.3.1 Skills mismatch

Emirati skills mismatch, against availability of employment has become a high-priority policy concern. Imbalances between the supply and demand for people with different skills is sometimes inevitable. Part of skills mismatch is the consequence of individuals' initial education and occupational choices, and a lack of information about opportunities in the labour market (CEDEFOP, 2010; World Economic Forum, 2015). The below table highlights the differences between different skills requirements, as shown in Table 2.6.

Table 2.6 Forms of skills mismatch	
Skill	Explanation
Skill shortage	Demand for a particular type of skill exceeds the supply of people with that skill at equilibrium rates of pay.
Qualification mismatch	The level of qualification and/or field of qualification is different from that required to perform the job adequately.
Over/under qualification/education	The level of qualification is higher/lower than required to perform the job adequately.
Skill gap	The type or level of skills is different from that required to perform the job adequately.
Over/under skilling	The level of skill is higher/lower than required to adequately perform the job.
Source: Cedefop (2010); OECD (2011).	

Skill shortage. Skills mismatch is indicated in much needed and essential sectors, for example only 2% of Emiratis have completed degrees in Medical Health and Sciences, 1% in Education, 1% in Tourism and Hospitality (Mohamed, 2013, p. 52).

Qualification mismatch. A skills qualification mismatch indicates that approximately half of national graduates (42%) studied Business Administration and Economics in 2012 (Mohamed, 2013, p. 52). To alleviate the mismatch, the National Qualification Authority increased development by working with industry to develop National Occupational Standards for technical and vocational education qualifications.

Over/under qualification/education. Skills mismatch also is shown in the over qualified or educated Emiratis, many have Degrees in occupations that require only Diplomas or even school Grade 12 certification (Sebugwaawo, 2017).

Skills gaps. Skills gaps occur when the occupational requirements are not met in the educational environment. Therefore, the level of skills is different from that required to perform the job adequately.

Over/under skilling. Similarly, when the level of skill trained is below or above the expectation, a mismatch occurs. Emiratis may be over qualified for work and reluctant to accept work as they judge they can gain better employment opportunities with their qualification equity elsewhere. Conversely, Emiratis may leave education without the necessary skills and may be unable to perform the work to the required level (Cedefop, 2010; OECD, 2011). High and persistent skills mismatch is costly for employers, workers and society (World Economic Forum, 2015).

However, there are thousands of job vacancies in government schools for Emirati teachers, but those positions still remain unoccupied. Further, there are thousands of jobs in the private sector, particularly in hospitality and retail sectors unoccupied and remain vacant. Employment in the private sector is 99 % expatriate and 1% nationals, and UAE has a target to have 5% of nationals working in the private sector by 2021 (Nasir, 2017). Emiratisation of the work force is being pursued continuously and the process aims to steadily replace the heavy dependence of foreign labours with Emiratis (Metcalf and Mimouni, 2011). The Emiratisation approach is an interventionist approach taken by governments to ensure nationals are employed in the workplace (Forstenlechner and Rutledge, 2010). As stated by H.E. Sheikha Lubna Al Qasimi, fundamental changes in the way UAE nationals are educated and trained may significantly reduce the unemployment rate among nationals (Al Qasimi, 2006). Among the many causes of youth unemployment is not having acquired the essential skills that the labour market demands (Tanmia, 2005). Most Emirati graduates have studied subjects that are more suitable to jobs in the public sector than in the private sector. Therefore, challenges are presented with Emiratisation such as resistance by nationals to certain types of employment particularly the lower paid, longer working hours found

predominantly in the private sector.

To rectify the situation, there are four ways to balance employment; that is controlling, predicting, improving and encouraging. Firstly, expatriate labour could be controlled into the private sector workforce, where jobs can be nationalised. In Oman, for example, they introduced Omanis to certain jobs by excluding expatriates, creating some sectors with 100% nationals (Winch, 2000). Secondly, predicting manpower planning requirements for the workforce. The determinants of the UAE Visions have already decided the technological requirements for the UAE and as such there is a need to determine the manpower to support the required technological developments. Thirdly, working conditions could be improved in the private sector by cutting working hours and increasing salaries. Lastly, encouraging entrepreneurship by Emiratis so they become the employers of the future (Winch, 2000; Al Hammadi and Zarah, 2011).

2.3.2 Careers

To redress the imbalance of unemployment, Emiratis would benefit from career development. A career is broadly defined as a lifelong process of work-related activities that include both objective and subjective aspects evolving within the context of one or two organisations and progressing in a series of linear stages (Super, 1992).

There are two main theories of career development. Super (1992) extended Ginzberg's (1952) work on life and career development into five stages of developmental of the self:

Stage 1: Growth

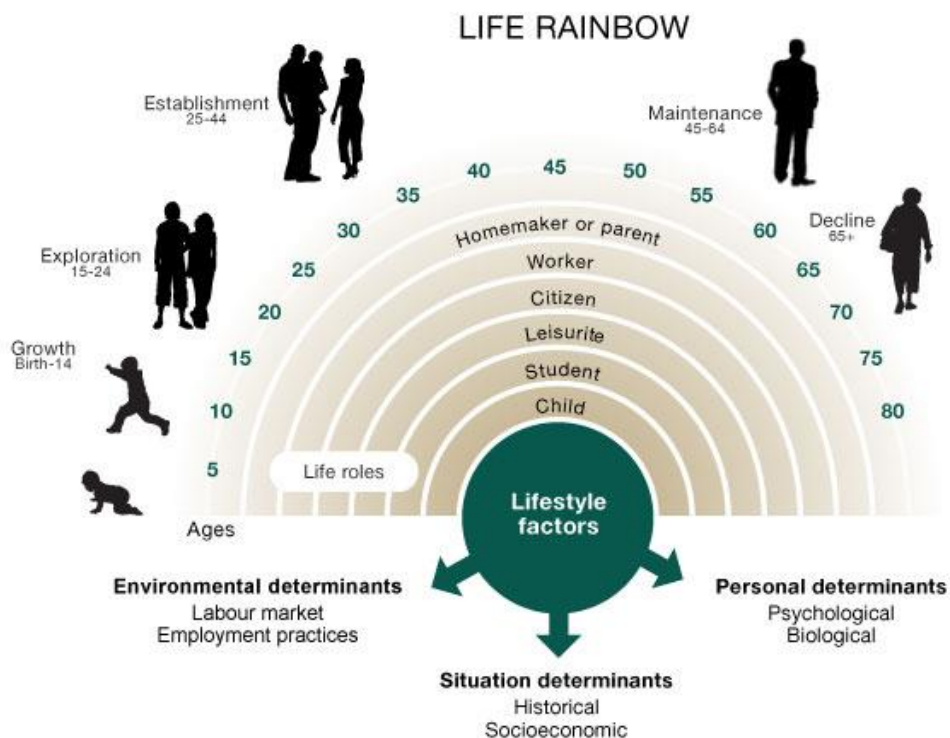
Stage 2: Exploration

Stage 3: Establishment Age 25–44 Characteristics: Entry-level skill building and stabilisation

Stage 4: Maintenance

Stage 5: Decline

Figure 2.10 Super's life rainbow



Source: Super 1992

Super (1992) sees the career over a lifetime with growth at the beginning of the career and decline at the end of the career, as demonstrated in Figure 2.10. However, taking into consideration preferences and competencies, the individual's life situation changes with time and experience.

Holland (1997) on the other hand, considered career interest an expression of personality stating that personality types guide career development and are led by the individual's interests believing that career choice is an extension of the individual's personality.

Holland identified six personality types as:

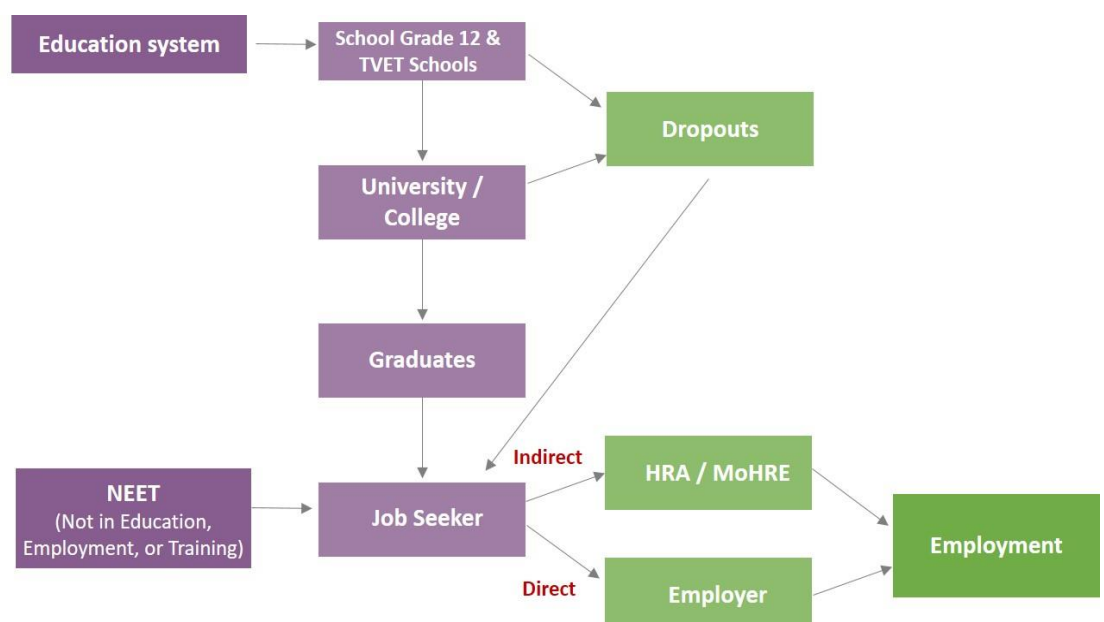
- Realistic
- Investigative
- Artistic
- Social
- Enterprising
- Conventional (Holland 1997).

However, research shows that various factors influence career choice such as family influence and cultural values (Ghosh and Fouad, 2015). Asian families see career choice as mutually beneficial for themselves and their families, choosing a career that is financially secure rather than related to personality and interest (Tang, et. al., 1999). Accordingly, family influence is also evident in Emirati families where a PhD is highly prized. Research within Emirati families indicates parents and other family members heavily influence the decisions of younger Emiratis and are cited as major factors for making informed career decisions (Deleure, et. al., 2014). Therefore, Deleure et. al. (2014) suggest post-secondary institutions and schools must create initiatives that raise awareness among students and their families about the demands of the workplace in a modern knowledge economy (Deleure, et. al., 2014). Furthermore, Deleure et. al. (2014) suggested that to counteract the family influence, a partnership needs to be forged between institutions and labour market policy makers.

2.3.3 Employment systems in the UAE

It is important that Emiratis have a support mechanism to assist them to finding work. The complexity of the involvement of government agencies is fractional for Emiratis seeking education or employment, as shown in Figure 2.11.

Figure 2.11 Current employment system in the UAE



Source: developed for this research.

Presently, students graduating from Grade 12 can put their choices through an online process at National Admissions & Placement Office (NAPO) for the following public educational entities:

- United Arab Emirates University (UAEU)
- Higher Colleges of Technology (HCT)
- Zayed University (ZU)
- Institute of Applied Technology (IAT)
 - Abu Dhabi Polytechnic (AD Poly)
 - Fatima College of Health Sciences (FCHS)
- Abu Dhabi Vocational Education and Training Institute (ADVETI)
- Emirates College for Advanced Education (ECAE)
- Khalifa University of Science, Technology and Research (KUSTAR)
- Mohammed V University Agdal - Abu Dhabi.

Alternatively, the Grade 12 school graduate can go directly to an institute for recruitment, particularly to technical and vocational entities. To find employment, Emiratis either approach the government or private entities directly or they can go through the Abu Dhabi Human Resources Authority, or other Human Resource Authorities in the country. Human Resource Authorities not only specialise in drawing and developing the emirate's general policies for human resources they also draft, develop and oversee the execution of strategies and plans for government Emiratization and also assist Emiratis to find employment. Emiratis register with the Authority for work. Any job advertised in the Human Resources Authority is open to any Emirati of any educational attainment. Emiratis that apply for any job must be given an interview. This approach favours Emiratis but also puts employers in a position of having to interview candidates that clearly do not match the job requirements. Therefore, there does not appear to be a solid systematic approach to directing Emiratis into employment.

However, there are entities that hold information that would be useful for data about the unemployed. For example, the Ministry of Human Resources and Emiratization (MOHRE) consists of four sectors including a Labour Sector. One of the aims of MOHRE

is to prepare UAE business market by enabling nationals to work in the private sector. The two biggest retirement and pensions funds are the federal The General Pension and Social Security Authority (GPSSA) and the Abu Dhabi Retirement Pensions and Benefits Fund (ADRPBF) which manage contributions, pensions and end-of-service benefits for UAE nationals working in government, semi- Government and private sectors and they have information about Emiratis whether they are employed or unemployed, or about to retire. Additionally, the Federal Authority for Identity and Citizenship (ICA) have a 'Population Register and Emirates Identity Card Programme', which includes recording personal and vital data for the Emirati and expatriate population. The ICA have details such as: where a person works, health and car insurance and full personal details. Therefore, the ICA has the ability to determine the different types of jobs that are currently held by expatriates but could be held by Emiratis.

Middle East demographics. In the Middle East and North Africa region, Industry 4.0 will determine the livelihoods of over 300 million people (Siekmann and Fowler 2017, p. III). Currently, the Middle East captures 62% of its human capital. Thirty percent of university graduates remain unemployed, with decreasing numbers of employment opportunities in the public sector (Leopold and Ratcheva, 2017). The UAE has a growing population, rising from 4.1 million in 2005 to 9.121 million by the end of 2016. However, UAE nationals represent less than one million (Government, 2017). Further, the total labour force for Emiratis aged 15 and over was 633,054 (Government, 2017; Sebugwaawo, 2017). It is predicted that 49% of work activities in the UAE are susceptible to automation with a 21% shift in requirements by 2021 (Samans and Zahidi, 2017). Therefore, the workforce will need to evolve rapidly to meet the decline and increasing demands of the workforce (Government, 2017; Sebugwaawo, 2017; Siekmann and Fowler, 2017). By addressing the need for advanced skills now, it will provide employment for Emiratis now and in the future. Emerging is the need for a national strategy to meet the Visions of the 2021, 2030, 2071 and 2117 for technical and vocational education

Figure 2.12 YESToWork retail sales



Source: Yes to Work website [accessed 04 03 2018].

Young Emiratis Start to Work (YestoWork). One initiative, initiated by the researcher of this thesis, that aims to change mind-sets is Yes to Work, a programme to encourage 15 to 23 year-olds to experience work in the retail sector to raise awareness about the importance of working in the private sector and particularly in retail. The UAE has the largest number of shopping malls in the region and has one of the largest shopping malls in the world.

Therefore, there are hundreds of thousands of jobs available in retail but the UAE community is not fully supportive of young Emiratis pursuing careers in retail. The Yes to Work programme started in 2013 with the support of strategic partners from the private sector. Private employers in flagship stores in large malls actively participate and provide onsite mentoring to the students. Regularly, two hundred plus students, as demonstrated in Figure 2.12, attend the programme and parents are very keen to have their children on the programme as it enhances their understanding of work and gives them an appreciation of what work requirements are. This programme is wholly in the workplace and is an example of how qualifications ought to be applied.

Figure 2.13 YEStoWork Bakery



Source: Yes to Work website [accessed 04 03 2018].

After five years of operation, ACTVET in 2018 successfully rolled out programmes for adult job seekers, see Figure 2.13 and Figure 2.14. The programme aims to employ 300 in retail in the next 3 years.

Figure 2.14 YEStoWork bakery sales



Source: Yes to Work website [accessed 04 03 2018].

This Yes to Work approach has been successful in getting Emiratis to experience short work placements. However, it is clear that a better system for Emirati unemployed to seek employment does not exist.

2.3.4 Unemployment system in South Korea

Next, the unemployment systems in South Korea will be discussed. South Korea's economic growth began in the 1960s. However, by the late 1980s, the unemployment rate was an average of below 3 percent. Now the jobless rate among South Korean youths aged 15-29 has hit a record yearly high in 2017 of 9.9%, with the number of those unemployed topping 1 million. It was the highest since the statistical agency began compiling the relevant data in 2000 (Jiaxin, 2018). In addition, discouraged workers, who were too discouraged to seek a job, reached 483,000 in 2017. Therefore, there is a high unemployment rate as mentioned before, and a high skills mismatch in the country. As a result, South Korean President Moon Jae-in stated that the government's top priority was creating decent jobs, by fostering growth through job creation, vowing to increase employment in the public sector and encourage private companies to hire more workers

by providing subsidies (Jiaxin, 2018). It was recognised, at that time that the high unemployment rate was a country wide issue.

On 1 July 1995 the South Korean Government set up the South Korean Employment Insurance Act, the purpose being to:

- Prevent unemployment
- Promote employment
- Develop and improve the technical and vocational skills of workers
- Strengthen the nation's vocational guidance
- Increase job placement capacity
- To stabilize the livelihood of workers
- Promote their job-seeking activities
- Granting necessary benefits (Jiaxin, 2018).

A South Korean worker must contribute 0.45% of his or her annual wages before tax as employment insurance. Further, employers must contribute between 0.7% and 1.3% of the annual payroll, depending on the type of business. The main benefits to the country is to promote employment and standards of living (Jiaxin, 2018). The South Korean government clearly were making efforts to assist its nationals into work or undertake further skills training. Further, claimants are eligible for employment insurance if the claimant's insured employment period is at least 180 days out of the 18-month period before the day of job loss and the claimant is registered at the public employment office as a job seeker. Furthermore, the claimant must prove they are out of work but remain willing to and are able to work, and are actively seeking new employment (Lee, 2016). Benefits are paid through a Job Skill Development Programme that aims to promote competitiveness assisting employers, employees and the unemployed (Lee, 2016). The government recognises that all parties need to be supported to reduce the unemployment rate. Insurance is paid in three ways:

- Training Extended Benefit: when a claimant receives vocational training, as ordered by the PES office, with up to 2 years for the training period. The training route ensures that unemployed workers are re-skilled for the available work found in the job market.

- Individual Extended Benefit: when the PES office recognizes that it is extremely difficult for a claimant to be re-employed within a short period of time, and the claimant has difficulties in maintaining livelihood. This supports the unemployed workers through financial difficulties so that their living conditions can be maintained.
- Special Extended Benefit: is given when the unemployment rate of the last three months is very high (greater than 6.0%) (Lee, 2016). Therefore, a recognition by the government when it is hard to find employment.

To receive benefits, job seekers must register their CV with WorkNet (in Korean), which is an online employment agency run by the Employment Insurance Service, and they must apply for benefits at a Job Centre (Lee, 2016). By registering online, governments are able to track the number of unemployed and resting workers so that financial support or training can be given. This support system helps the unemployed to either re-skill or look for employment, especially if they have to register on line and apply for benefits at the job centre. This is a very strong financial support system for the country. Next, the Swiss system of employment is considered.

2.3.5 Unemployment system in Switzerland

The Swiss unemployment rate unexpectedly edged down to 3.2 percent in February of 2018 and was the lowest jobless rate since November 2017. The number of unemployed totalled 143,930, and jobseekers totalled 208,617. Both figures indicated a drop from previous months (Trading Economics, 2018). Therefore, Switzerland enjoys a relatively low level of unemployment and unemployment is not rife.

Compulsory for all employees in Switzerland, is to pay unemployment insurance, half of this is paid by the employer and the other half by the employee (Smartexpat, 2017). Thus this payment scheme supports the unemployment benefit payments. These contributions (Arbeitslosenversicherung or assurance chômage) are deducted directly from the gross salary. Employees who are over the age of 17 and earn more than 2,300 CHF a year should be automatically registered with their respective Ausgleichskasse (AHV) compensation fund office by their employer (Trading Economics, 2018; Smartexpat, 2017). There are different types of Ausgleichskasse that employees can be

registered with, depending on which industry they work in and where exactly their workplace is located. Certain sectors and industries (Verbandsausgleichskassen) are privately controlled and therefore remain separate from the state. Other compensation fund offices are run by the Swiss federal government (Eidgenössische Ausgleichskasse) or the various cantons (Kantonale Ausgleichskassen) (Trading Economics, 2018). Unemployed persons need to register at the local employment office at the local commune (community) or the Regional employment centre. Once registered, they need to attend an information day and then consultations with an advisor follows on a given date and time to continue to receive unemployment benefits. Daily allowances range from 200 CHF daily allowances for under 25 years of age to 520 CHF daily allowances for age 55 and over with unemployment benefits paid at approximately 70% of the original salary up to a ceiling of 10,500 CHF per month, covering 5 days a week (Smartexpat, 2017).

However, the entitlement to unemployment benefits may be suspended (between 1 and 60 days depending on the severity of the infringement) if, for example:

- Resigns without a valid reason.
- Does not make sufficient effort to seek work.
- Refuse a job assigned by the employment office.
- Provides false or incomplete information (Swissinfo, 2017; Smartexpat, 2017).

There are concerns however about the immigrant population. When the unemployment rate reaches 8% unemployment threshold, employment of local Swiss national preference is reached, further, from January 1, 2020, the unemployment threshold for local preference will be lowered to 5% (Swissinfo, 2017). This means that first employment consideration must be given to Swiss nationals. Further, the system requires the job centres to: once a new job is available, it will be visible for the first five days only to those registered with the unemployment office. Then, officials at the unemployment office will have three working days to send employers the profile of qualified unemployed candidates registered with them. Next, employers will then have to invite these candidates to an interview to assess the suitability for the role advertised

(Swissinfo, 2017). If employers cannot find a suitable employee, then they are then free to hire who they prefer.

2.3.6 Comparison between South Korea, Switzerland and UAE

Unemployment rates in South Korea are comparatively high as opposed to Switzerland that has a low unemployment rate, as does UAE. Therefore, each country's approach to unemployment differs determined by the degree of concern that the country has for the unemployment rate. South Korean and Swiss nationals must pay contributions toward the social security system in the country, whereas UAE national do not. The social security payments made in South Korea and Switzerland contribute to the national unemployment benefits schemes, therefore the employed subsidize the unemployed. South Korean and Swiss nationals must also register with their local Job Centre to be considered for unemployment benefit, whilst the UAE does not. The advantage of having the unemployed register is that the exact number of job seekers can be calculated and the country government can monitor the unemployment situation. Both South Korean and Swiss nationals, who comply with unemployment rules, receive unemployment benefit payments, whereas in the UAE there are no benefits paid. The advantage of paying benefits is that nationals can maintain a level of living, so no national would be on the poverty line unable to feed themselves or their dependents. Both South Korea and Switzerland help find employment for nationals whereas in the UAE the unemployed volunteer to register for job searching. Through job centres in South Korea and Switzerland employment opportunities are advertised and the unemployed can apply for jobs, the advantage of this system is that there is a point where all national know where the jobs are advertised and they can go regularly to see which jobs are available. This is not the case in the UAE. A more advanced offering is where South Korea offer skills training, extended for up to two years. Whereas, Switzerland and the UAE do not. The advantage of re-training is that the unemployed will be trained for a skill that is needed in the market, thus guaranteeing a job at the end with a reasonable salary. More recently introduction of automation is reducing the number of jobs available. In South Korea there are now 175,600 robots (Choi and Baker, 2017; West, 2015). Further, West (2015) states 'If society needs fewer workers due to automation and robotics ... we need to reconfigure the social contract and figure out

how to deliver social benefits in the new economy that is unfolding' (West, 2015 p. 2). Therefore, there is a growing concern about how countries will be able to support a growing number of unemployed. One additional measure that South Korea takes that Switzerland and the UAE do not take, is supporting the employer to hire the unemployed by subsidizing the salaries for the new employee. This incentive allows employers to expand their business with supported cost. Thus facilitating the private sector employment. It therefore leads to the third question, Research question C of:

'Is there a system in the UAE that effectively engages the unemployed in successful jobs and occupational?'

2.4 Conclusion

Chapter 2 reviewed the extant literature to identify research questions that guided data collection and analysis. Three main research areas have been developed, that is, strategy, delivery and employment.

From this research it has been established that the UAE has been through many educational reforms aiming to meet the government Visions. Recent visions such as: Vision 2071 and Mars Project 2117, lead the direction of the country, which is centred on technology. Of importance to the community is the awareness of their role in meeting the visions. Therefore, study of the Vision requirements and how they are communicated to the community is of prime importance. As the visions have identified, the delivery of education needs to centre on technology. It is important that the delivery by teachers effectively develops and prepares cadres for the technological requirements to meet country visions to the standard required that improves the country's ability to reach the Visions of the UAE. Therefore, further research is needed in this area. Finally, this research considers Emiratis in the workplace and whether Emiratis have the skills and support to enter into employment. Therefore, research was conducted into the systems for supporting Emiratis into the workplace.

Chapter 3 Exploratory research

3.0 Introduction

This chapter, introduces the focus groups and the focus group results, the analyses of the comments and the main findings emerging.

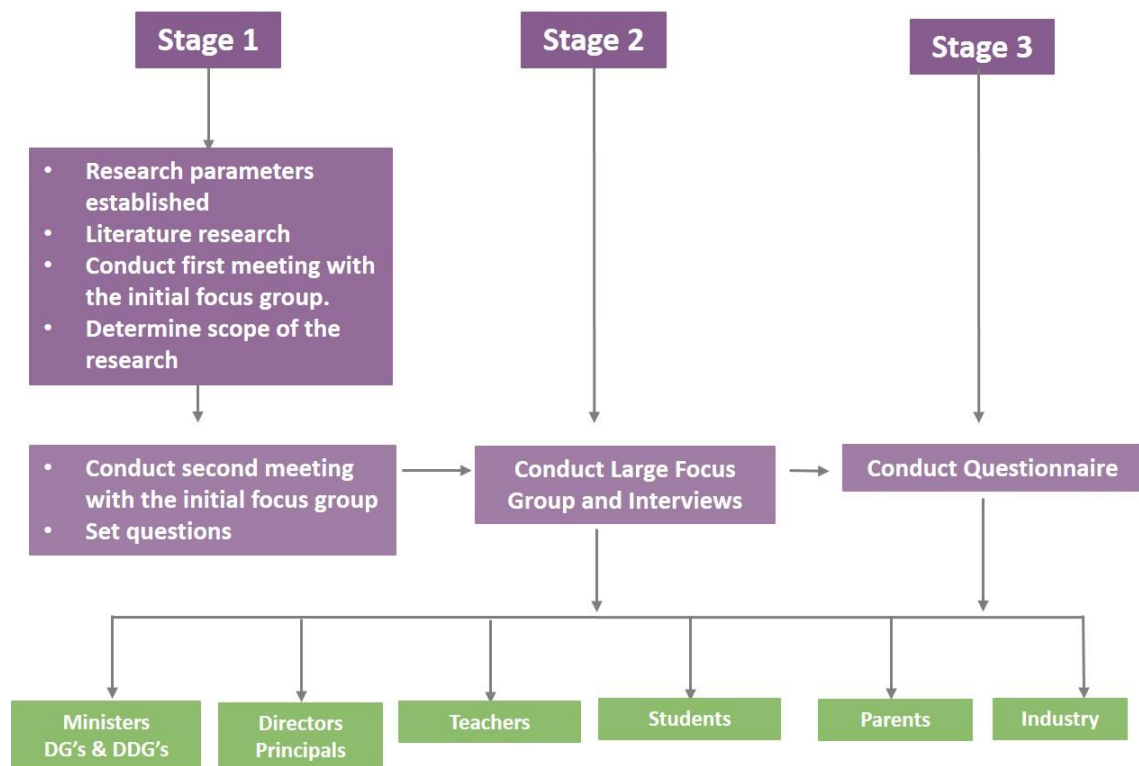
3.1 Plan of the research

Table 3.1 Plan of this chapter		
3.0		Introduction
3.1		Plan of this chapter
3.2		Qualitative and quantitative research
3.3		Selecting focus group interviews for exploratory stage of this research
3.4		Ethical considerations
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	3.7.1	Focus group transcripts
	3.7.2	Comparison of focus groups and emerging themes
3.8		Conclusion

In developing this research, a plan was prepared to achieve the research objectives (Bryman & Bell, 2007).

The plan, as shown in Figure 3.1, included carefully selected strategic approaches to the collection of data beginning with the paradigm.

Figure 3.1 Research Plan



Source: developed for this research.

3.2 Quantitative and qualitative research

Allied to exploratory and explanatory research are the two main approaches to research of quantitative (that is, numbers) and qualitative (that is, words) (Cohen, et. al., 2007; Guba and Lincoln, 2005; Bryman and Bell, 2004). Qualitative research is believed to start from the perspective and actions of the subjects studied, whereas quantitative studies usually progress from the researcher's ideas about the scopes and categories which should constitute the central focus (Alvesson and Skoldberg, 2009). The main reason for using mixed methods design is to obtain different types of data that address the research problem being investigated (Bryman and Bell, 2007). Mixing two data collection methods, qualitative in Chapter 3 and quantitative in Chapter 4 tends to establish two opposing schools of research that form a fusion of methods and approaches, By integrating and synergising mixed methods a holistic understanding of the issue can be considered. This research used archive data and data collected through

a mixed design approach (Johnson, Onwuegbuzie and Turner, 2007; Morse & Niehaus, 2009; Tashakkori & Teddlie, 2010; Teddlie & Tashakkori, 2009). That is, through questionnaires and focus groups. Next, exploratory research is discussed.

Exploratory research. Exploratory research was used when the subject of the research needed deeper consideration. The first stage of this research, Chapter 3 was exploratory, where a literature review (Chapter 2) and an initial focus group was used to gain insight into the research problem and to discover the main questions in this research. Additionally, six large focus groups were used to enable exploration in relation to approach, provision of technical and vocational education and system for employment.

Qualitative research. Qualitative research was used in Stage 1 the Initial Focus Group and Stage 2 large focus groups and was concerned about the individual's behaviours and attitudes that are not always observable (Cohen, et. al., 2007). The induction possibility of qualitative methods was required for Stage 2, Large Focus Groups, to enable the collection of rich data about strategy, delivery and the system for employment. Because the constructs were not well understood and relationships between phenomena were not well known, clarification was required (Bryman & Bell, 2007; Guba and Lincoln, 2005). The focus group interviews in Stage 1 and 2 allowed flexibility in the qualitative research, allowing the researcher to conduct in-depth data gathering from the six groups being questioned.

Triangulation. In order to overcome incompleteness, this research developed a multi-method approach across three sources, namely literature (Chapter 2), exploratory research in this chapter, and explanatory research in Chapter 4 (Cohen, et. al., 2007). These approaches were used to develop 'converging lines of inquiry' (Guba and Lincoln, 2005), to gather information to support findings that had emerged. However, epistemologically, the researcher was aware of their values within this research and sought to minimise the effect of those values on findings (Carson, et. al., 2001). Firstly, the researcher used an initial focus group interview with notable educationalist in the country to determine the direction of the research. This was important to narrow down the research to the three main research areas of: strategy and delivery of technical and vocational education and system for employment. Secondly, the researcher used research assistants as scribes to record focus group interviews and moderators to

moderate focus group interviews. Six groups of respondents were then selected as best representing the problematic area to gather data from stakeholders in the technical and vocational education system and were questioned to gain views on the research sub-questions (Onwuegbuzie, et. al., 2009).

3.3 Selecting focus group interviews for exploratory stage of this research

Morgan defined the focus group as 'a research technique that collects data through group interaction on a topic determined by the researcher' (Morgan, 1996 p.130) and is used when:

- There is a need to assess reaction in group settings, not individual settings
- There is a need to generate new ideas
- The topic cannot be addressed in a survey
- To clarify, extend, qualify or challenge data collected through other methods
- Generation of a list of categories for a survey (Blumberg, Cooper and Schindler, 2005).

The main strengths of focus groups interview are:

- Able to obtain detailed information about personal and group feelings, perceptions and opinions
- Saves time and money compared to individual interviews
- Provides a broader range of information
- Offers the opportunity to seek clarification (Blumberg, Cooper and Schindler, 2005).

Weaknesses of the focus group are:

- When seeking sensitive data, some information cannot be discussed
- Confidentiality of information cannot be ensured
- Takes time to notate the interviews
- Notation is open to error
- If statistical data is required focus groups give depth and insight, but cannot produce useful numerical results (Blumberg, Cooper and Schindler, 2005).

Focus groups can be conducted online either, synchronously or asynchronously or face to face (Moore, McKee and McGloughlin, 2015). In this instance face to face focus

groups were applied. Further, there are two sample types of focus groups, Lay and Expert (Chioncel, et. al., 2003). Lay respondents are not considered expert but are allowed a voice. On the other hand Experts are well informed participants and produce information based experience (Chioncel, et. al., 2003). In this case, all respondents are considered experts in their field.

Focus group interviews followed seven phases: pre-planning, setting time and date, appointing the moderator, guiding the interview, adjusting style, summarising comments and finally recording the interviews (Blumberg, Cooper and Schindler, 2005).

- **Preplanning.** In all cases the focus groups need to be pre-planned, to focus on the topic to be researched. The schedule of questions needs to be designed to have the most important questions at the beginning of the interview to ensure that quality information is gathered. The number of questions ought to be limited to the recommended number of less than a dozen, because too many questions would take too long and would gather too much data (Kruegar, 2002). In some cases, in this research, the same questions were asked of each group for comparative purposes. Therefore, preplanning was essential for the success of Initial and Large Focus group questions.
- **Setting a time and date.** Setting a time and date to gather all the sample groups together for the focus group interviews was quite challenging and care needed to ensure the sample group were available and free to attend (Grudens-Schuck, 2004; Onwuegbuzie, et. al., 2009).
- **Appointing a moderator.** In each focus group a moderator needed to be appointed. The moderator needed to respond actively, positively and respectfully, to encourage communication and guide the interview. However, the moderator did not take part in interviews to avoid expressing personal views that would create bias. Therefore, the moderator needed to remain detached and unbiased.
- **Guiding the interview.** Controversial views can be expressed and some respondents try to dominate the interview, but a good moderator will successfully control an interview. The moderator will receive all comments and ensure all voices are heard and recorded. Once the focus group interviews are underway, the researcher may probe in order to expand on issues that are

required. Therefore, the moderator must maintain the schedule of questions so that all the points planned are addressed.

- **Adjusting style.** Additionally, the moderator has to adjust their style for each different sample group to ensure the groups provided rich information and all respondents participated. Where appropriate, video recordings of focus groups can be helpful. However, the method of notation must represent an accurate record of focus group responses.
- **Summarising.** Further, recording of focus group interviews is lengthy and time consuming. However, for clarification of agreement summaries are agreed throughout the focus group interviews for consensus of judgement. Therefore, agreed summation at each stage was required.
- **Recoding.** In order to make sense of data, common information from different sample groups needed to be sorted by response, and coded so that like with like was comparable to make comprehensible data. This approach helped to highlight important themes within the transcribed text, focusing on relevant areas of the data. Coding can be done on software like NUD*IST (Non-numerical, Unstructured, Data, Indexing, Searching and Theorising). However, although software can handle large volumes of complex text into factors, it cannot develop theories that link those factors and profound meanings and contexts can be lost. Therefore, the responses were transcribed as the most rigorous and time intensive method of analysing data (Onwuegbuzie, et. al., 2009).

Validity and reliability of focus groups. Reliability is the extent to which a measure (such as a focus group) is accurate and replicable (Bryman & Bell, 2007). With focus groups, this could concern whether another focus group, of similar but different people, would give similar answers. Focus groups often have problems with reliability. These can be lessened if the moderator is highly trained and if questions are relatively specific (Chioncel, et. al., 2003).

One way of controlling for reliability is to have a highly structured interview, with the same format and sequence of words and questions for each group so that each interviewee understand the question in the same way (Kruegar, 2002; Moore, McKee and McGloughlin, 2015). It is suggested that the reliability of interviews can be

enhanced by careful piloting of interview schedules. On the other hand, Cohen, et. al., (2007) argues for the importance of open-ended interviews, as this enables respondents to demonstrate their unique way of looking at the world and gives their definition of the situation

Validity is the extent to which a measure measures what it purports to measure. For focus groups, this could mean whether it is reasonably certain that people are talking about what you think they are talking about. Perhaps the most practical way of achieving greater validity is to minimize the amount of bias as much as possible. The sources of bias are the characteristics of the interviewer, the characteristics of the respondent, and the substantive content of the questions and includes the attitudes, opinions and expectations of the interviewer. Because interviews are interpersonal, humans interacting with humans, it is inevitable that the researcher will have some influence on the interviewee and, thereby, on the data.

Defining the information required. In the conceptual framework in Chapter 2, three research questions were identified to guide data collection and analyses. A pilot carried out by six educational professionals, not involved in the research, refined the questions for the problematic area (Wragg, 2002). Next, a group of six technical and vocational educational professionals considered the data obtained from the pilot and supported the re-structuring of some of the questions for the focus group in Stage 2 of this research. It was established that none of the questions would present difficulties when data were analysed (Wragg, 2002).

3.4 Ethical considerations

Ethical considerations are inserted at this point to address focus groups. The focus group interviews were conducted ethically. The authority to collect data was with the researcher, as approval had already been given by the UAE government and Ulster University for the research to be conducted (See Appendix A). Additionally, the advantage of having 'lived' experience of the Abu Dhabi Centre for Technical and Vocational Education enabled access to groups in closed settings (Bryman and Bell, 2007; Wengraf, 2004).

The focus group interviewing was conducted in a professional manner by inviting respondents to take part; allowing any participant to exit the focus group interview at

any time, and assurances were given of anonymity and confidentiality thus affording protection from misrepresentation and exploitation (Zikmund, 2000).

On entering the focus group, six groups of respondents gave informed consent prior to participating in the focus group interviews, and all were made aware of the reasons for the research.

Although the researcher's work designation was the Director General of the school system, the researcher's work designation was not disclosed to respondents, only the researcher designation was disclosed. Therefore, those respondents were not influenced by the researcher's work designation and viewed the interviewer as the researcher. Some respondents would have known the researcher in his work capacity by their work association. This knowing, created a work role and power relationships, which could have resulted in ethical issues that could affect the outcomes of the research (Holian, & Coghlan, 2013). However, it was explained at the onset of the focus group discussions, that the research was for the gain of the UAE, and as such, a new paradigm could be created for the future education system, if truthful discussion ensued. All respondents in the focus groups, particularly the Ministers, Undersecretaries and Directors understood the need to contribute honestly to the research, that in turn would support the economic success of the country.

Another difficulty associated with the duality of research and practice is during the recounting of information (Coghlan, 2007). Further, there is the dilemma about what has been told in confidence and what has been openly discussed in meetings. Giving information out of context or using information from the work environment, that was not given in the Focus group unavoidably gave more in-depth information than an outsider researcher might have access to (Holian and Brooks, 2004). A moderator and recorder/scribe was utilized in the research. Focus group discussion transcripts were completed immediately after each focus group.

In the case of students, as part of the Unified School Inspection Framework, feedback being a valuable aspect of schooling, the students were asked for their views. The Unified Inspection Framework states:

‘Feedback from students and parents are notable features of self-evaluation and information from stakeholders is used effectively to inform developments’ (Unified Inspection Framework, 2015 p. 93).

‘The school receives feedback and takes formal steps to find out what parents, students and others feel about the quality of service, and engages them in consultation. The outcomes of feedback received are visible in subsequent actions’ (Unified Inspection Framework, 2015 p. 93).

As a result, students were involved in the focus groups supervised through school activity. Confidentiality and anonymity was assured for all respondents. Further, the respondents were assured the information gathered would only be used for research purposes.

3.5 Implementing Initial Focus Group

Initial Focus Group. The Initial focus group was established to discuss the concept of the research, (see Appendix B) to try to narrow down the research topic and the main research questions. The initial Focus group was made up of educational experts, familiar with the current technical and vocational education system. Copious discussion led to the main research question, Research questions A, B and C and twenty questions forming the questionnaire.

Strategy. The starting concept from the researcher was leadership and discussion about the level of leadership and the application of leadership in the UAE educational setting. The educational landscape indicated that the technical and vocational education strategy is determined at the level below country leadership, that is, Ministry or Authority. The Ministry or Authority determines the policy and this is cascaded down to the operational level. Key players in the system are identified at this level as those that determine scope and policy, such as Ministers or Director Generals. Further, it was recognised that a UAE Strategic Plan for education exists but not for technical and vocational education. Technical and vocational education in the school setting was introduced in the recent past and is still a relatively small aspect of education in the UAE. The educational problematic areas include: curriculum, team and social, resources and foundation skill requirements. Additionally, education and industry are the strategic

partners in the training and employment market, and technology and change management was determined as an important aspect of the employment problematic area. Further, the industry problematic area considers economic needs, industry, internet of things and artificial intelligence. Therefore, with the vocational educational landscape determined for this research, it was agreed that the landscape warranted further research. This led to the first question of:

Research question A asks: 'Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership's Visions?'

Delivery. Next, discussion turned to the delivery of technical and vocational education and its effectiveness in the UAE context. Since technical and vocational education had been introduced in the UAE to schools and the National Qualifications Framework had recently been introduced, it determined the way that technical and vocational education was required to be delivered to achieve successful occupational outcomes in National Qualifications. It was agreed, by the focus groups, that there was not a uniform approach to the delivery of knowledge, skill and application of national occupational standards and that further research would determine a suitable approach for the UAE.

This led to the second question of:

Research question B asks: 'Is there an approach in the UAE that can effectively deliver technical and vocational education and training?'

Next, discussion focused on the need for Emiratis to contribute to the workforce and the economy of the UAE by being employed and productive employees. Discussion highlighted that there were many government entities that could be part of a systematic employment service, but that they were not and were working independently. Further, databases were independent and not unified. Therefore, it was agreed that research considered whether there was a system that could be applied to assist Emiratis into employment, and this led to the third question of:

Research question C asks: 'Is there a system in the UAE that effectively engages the unemployed in successful occupational outcomes?'

Sample groups. Next, six sample groups, to give a 360 degree view of education, were selected for this research as follows:

Group 1: consisted of senior government officials, that is, Ministers, Undersecretaries, Director Generals Deputy Director Generals and Managing Directors

Group 2: consisted of educationalist, that is, Directors, Principals, Head Teachers and Chairs of Departments

Group 3: consisted of Teachers

Group 4: consisted of Students of Grade 12 or 11

Group 5: consisted of Parents of students in Grade 12 or 11

Group 6: consisted of Industry partners

3.5.1 Sample Group composition

Group 1 consisted of ten senior government officials, and it was important to only have the top three tiers of government officials in the focus group. Firstly, to have the high level view of the direction government would like to move toward, in technical and vocational education. Further, the mix had to ensure that the group would interact well. Secondly, it was important to keep the interview confidential to protect identities (Gruden-Shuck, 2004). Additionally, in execution, government official's time is very valuable and in short supply, so the process of engagement had to be efficient and well planned. However, there was always the possibility that some information was too sensitive to discuss. Therefore, some information might not be forthcoming (Gill et. al., 2008).

For Group 2, it was easier to conduct a focus group with eight Directors, Heads of Departments and Chairs because they met monthly to discuss business and it was important to have the operational view of technical and vocational education. To ensure attendance, a meeting was called during the institute holidays so that respondents were available.

For Group 3, teachers, special arrangements needed to be made to ensure the fourteen teachers were released from their workload to attend focus groups. In this case pre-planning was important to ensure all respondents were available on the pre-designated

time, date and venue. It was important to have the 'hands on' view of technical and vocational education.

Group 4 were students, again it was relatively easy to form focus groups for the students. By contacting the Director of Schools, students were released to attend a focus group interview in one of the schools to allow the focus group interview to go ahead. Forty four students from Grade 11 and Grade 12 were interviewed over a series of four focus groups. It was important to have the recipient's view of technical and vocational education.

Group 5, gathering the parents was a more difficult challenge. However, a spread of six parents from various school systems was required. By contacting the Directors of Schools in the various school systems, parents were invited to attend a focus groups thus allowing for their views to be considered.

Group 6 gathering industry partners was difficult to arrange. Fortunately, one of the ACTVET programmes Yes to Work had built up good relationships with industry. However, this was in the Retail sector only and wider consultation was required. With the help of the Business Development Unit, nine participated forming a wider cross section of industry partners with all twelve of the country skill sectors covered. It was important to have the industry's view of technical and vocational education.

In all cases the environment for the focus groups was accessible and comfortable with all educational facilities being modern and well provided for. To implement the focus group interviews, prior theory had been considered in addition to sample selection and planning of interviews. Areas for which data had to be collected had been identified in Chapters 1 and 2, from published researchers (Fogelman, 2002). However, as research progressed more questions emerged.

3.6 Implementing Large Focus Groups

On receipt and analyses of the data gained from the initial focus group, further questioning emerged that warranted further investigation. Therefore, questions in the large focus groups were determined for each sample group.

The approach chosen to analyse the data was, firstly, to number the respondents to maintain anonymity (as noted above). Then, factors of information were identified that

grouped and simplified to transform raw data into comprehensible data. That is, the researcher sorted through the data that had been sourced from the literature and the conceptual framework (Miles, Huberman and Saldana, 2014). Next, an Inter-Observer Agreement was conducted by an independent researcher on 30% of the transcripts to ensure that the degree of measurement error was very low, resulting in 100% or 1 in the Inter Reliability Rate. This process helped to highlight important themes within the transcribed texts. The resulting theme statements were drawn from the focus group discussions (Kottner, Streiner, 2011).

3.6.1 Focus Group themes

Next, the focus group themes that emerged were reported. Data generated from a series of six focus group discussions resulted in a large amount of information which needed sorting and ordering to extract patterns emerging from the data (Perry, 1998). To differentiate respondents from different groups, a reference system was adopted for this research. The referencing shows F representing focus group followed by initials to represent the group as follows: Group 1 are numbered with the prefix FM, (Focus Group Ministers) Group 2 FD (Focus Group Directors), Group 3 FT (Focus Group Teachers), Group 4 FS (Focus Group Students), Group 5 FP (Focus Group Parents) and Group 6 FI (Focus Group Industry) as shown in Table 3.2.

Table 3.2 Focus Group codes	
Code	Meaning
FM	Focus Group Ministers
FD	Focus Group Directors
FT	Focus Group Teachers
FS	Focus Group Students
FP	Focus Group Parents
FI	Focus Group Industry
Source: developed for this research.	

All respondents were asked questions within each of the three main research questions of:

Research question A: *'Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership's Visions?'*

Research question B: *'Is there an approach in the UAE that can effectively deliver technical and vocational education and training?'*

Research question C: *'Is there a system in the UAE that effectively engages the unemployed in successful occupational outcomes?'*

A series of questions were developed, taking into account Cave's et.al. (2019) determinants, across all three research areas to address all six groups. However, due to the number of questions indicated and the time taken to ask these questions, not all questions were asked of all groups, but the most appropriate questions were asked of the appropriate group. The list of questions are listed as follows:

To what extent are the tweets by the country leadership informative in relation to TVET?

To what extent are the UAE Visions for the country's direction and development informative in relation to TVET?

To what extent are the general level of computing skills in the country sufficient for a knowledge economy?

To what extent are the digital resources available in the UAE schools/institutes sufficient for a knowledge economy?

To what extent is the general level of mathematics in the country sufficient to develop artificial intelligence solutions?

To what extent is the general level of computing programming and coding skills is sufficient for developing Artificial Intelligence?

To what extent are UAE students able to build robots?

To what extent are teachers able to teach the information needed for a knowledge economy?

Teacher's knowledge is supplemented by using computer search engines?

To what extent are teachers in the UAE equipped to teach skills for development of artificial intelligence?

To what extent do teachers have a specific teaching qualification?

To what extent should Post-school English language education be paid by parents?

To what extent is industry involved in the UAE education system?

To what extent do all UAE unemployed, of working age (who are looking for work) need to undergo skill upskilling?

To what extent does the present UAE technical and vocational education system meet the needs of the national economy?

To what extent are skills that are not needed in the economy being provided for in post school education?

To what extent can knowledge of career pathways help learners shape their educational pathway?

To what extent are job vacancies made aware to Emiratis that are looking for work?

To what extent is there a seamless government process to get the Emirati unemployed into employment?

To what extent can the General Pension and Federal Authority for Identity and Citizenship (emirates ID) play a part in assisting Emiratis to find employment?

3.7 Comparison of focus group themes

In total 91 participants participated in the focus groups. The largest group was students with 44 participants interviewed in four groups, followed by teachers with 14, Ministers, Undersecretaries and Director General's group with 10 followed by industry with 9 and parents 6 and directors with 8. In total there were 49 were male and 42 were female, showing an even balance of view between male and female participants.

Gaining involvement of each of the groups was through the school system for the Directors, Teachers, Students and Parents. Contact for Industry was through working contacts and several professional associations. Gaining numbers was most time consuming. The most difficult and important, was contacts for Ministers of State representing five Ministries, Undersecretaries and Director Generals. Ministers were approached through official channels and selected by portfolios related to: education, artificial intelligence, human resources and emiratisation and youth. Director Generals were selected also by their portfolio. Gaining time from their very busy schedule was the main challenge. Additionally, they were having to take important phone calls during focus group discussion. The results of the focus group interviews were recorded and the transcripts are presented in tables 3.3, 3.4, 3.5, 3.6, 3.7, and 3.8.

3.7.1 Focus group transcripts

Next, the transcripts for each focus group is presented. To maintain anonymity for all groups, respondents have been allocated numbers starting with the Ministers Focus Group.

Table 3.3 Focus group 1 transcript	
Research: Development and reform of technical and vocational education in the UAE: the role and vision of the UAE leadership.	
Focus group for Ministers, Undersecretaries, Director Generals, Colleges and Universities Vice Chancellors held on 7 10 2018, 22/10/2018, 12/11/2018, 19/11/2018 and 17/12/2018 and existed of 10 respondents. The group were introduced to the research by Mubarak Al Shamsi as being a research project at Ulster University. The research was outlined and the rights of participants was made public. Participants signed the official consent form consenting to take part in the research. They also agreed it was anonymous and confidential, they could leave at any time without reason, and their answers would not affect their position at work.	
Mubarak Al Shamsi	Researcher
Dr Lindsey McPherson	Moderator
Khaled Talal	Recorder/scribe
Number	Comments
Research question A: Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership's Visions?	
1, 9, 10	No, there is no Technical and Vocational Education and Training (TVET) strategy.
6	This means there are plans for technical education but they are scattered and there is no main and unified publically announced technical and vocational strategic plan.
1, 5, 8	There is a government direction for 40% of total high schools to be vocational but there is no clear technical and vocational strategy that is known to the country.
5	There is no links between vocational and technical education graduates and labor market. As an example in Germany and Switzerland, there are clear future plans for what students should study and what posts are available for them once they graduate but in the UAE there is still lack for that. There are gaps in teacher's skills.
8	Yes and No. There is no strategy, process or detail. For example there is a need for more applied engineering, professional qualifications, in engineering, accounting, finance.
3	The Ministry of Education is introducing technical tracks and Abu Dhabi Centre for Technical and Vocational Education (ACTVET) has a strategy at the local level. However, there is no unified federal plans for vocational and technical education at the country level.
4	The role of National Qualifications Authority (NQA) is crucial and Vocational Education and Training Award Council (VETAC) should develop the technical and vocational education strategic plan but unfortunately it has not yet done so. However, ACTVET was able to develop the technical and vocational education strategy in Abu Dhabi Emirate.
7	Yes there is a general strategy (concept) but not an official published document. The community is not aware of any TVET strategy. Our Youth do have enough information about TVET and the importance of TVET. The importance of TVET is not publically discussed. TVET is not branded in the UAE. Therefore the community does not know enough about TVET. TVET is not seen as a first choice by our students.
9	There must be a unified strategic plan for all education sector to achieve our ultimate targets.
1. To what extent are the tweets by the country leadership informative in relation to TVET?	
3	Some tweets are motivating and encouraging people to produce.
9	The society still looks down on TVET because we have not promoted it well.

2	There are tweets for major programmes such as aerospace because the leadership of the country is supportive of aerospace programmes.
4	I agree with No. 2 and as an example there are no tweets about NQA.
9	Unfortunately, we did not position TVET as an important sector and hardly mentioned it in the social media.
2	Some tweets are source for news or events. Sometimes it is boring as it repeats what is in the media.
10	Not informative for all individuals.
1, 3, 7	Tweets are informative. The government strategy is clear but tweets about TVET are missing. I wish one of the top leadership tweets would focus on the importance of TVET and tweets about TVET, its achievements, and its importance for the national economy. We should engage parents, students, industry, expats, international firms and experts to participate in developing a national strategy for TVET. Then select a day in the year to celebrate UAE TVET, the importance of TVET, to announce TVET strategy and to assess the strategy every year during UAE TVET Day.
8	The vision of the leadership in the country is crystal clear but tweets from leadership do not include technical education therefore the society is not focused on technical education and do not have enough information.
6	Each minister/official knows if the tweet meant for his ministry or not
1, 6	There are no tweets about technical and vocational education from schools to labor market.
2	The society needs to see successful stories about technical and vocational education graduates. There should be tweets and short videos about successful TVET graduates.
10	We must identify the target group first. Then release the tweets through echoing system where other groups retweet it differently to suit each age category.
2. To what extent are the UAE visions for the country's direction and development informative in relation to TVET?	
5, 10	Technical and vocational education's vision is unclear. The visions are useless if they are not clear, they stay as visions only.
4	The vision is clear but the details of the vision are not.
3	Vision is clear and details should come from the Ministries and Authorities.
6	UAE is pioneer in short and long term visions which are very clear. The targets are clear as to what is expected from each official and the UAE government holds annual government meetings to review all visions/plans with the officials.
1	UAE is among the top countries that have clear visions.
2	Vision is clear but the execution plans and process are missing.
8	Students have a lack of information on what future careers and jobs will look like. Many students do not know the future of their undergraduate selected programmes till they complete their studies because of weak career guidance. Jobs are changing and students must be prepared for future jobs. Society is changing. Students do not know what to study. Universities are not prepared for future jobs.
5	There are multi mega industries in the UAE but there are no links between industry needs and technical and vocational education outcomes.
5	Parents lack information and understanding of the UAE vision and they influence the student's education decisions.
7	The visions are unclear to the youth. The youth are asking why there is an Artificial Intelligence Minister and what his responsibilities are. The youth are asking what would be the future jobs in the UAE. There should be different types of language/communication with the youth.

	<p>The youth are not interested in complicated strategy language such as targets, KPIs, deliverable etc.</p> <p>There should be collaborations between all community members and ministries to engage and empower all youth.</p>
9	<p>There is a need to link TVET with industry.</p> <p>There should be a complete chapter about TVET in the country's strategic plan.</p>
10	<p>The youth population is about 60% in the UAE and we must ensure their participations.</p> <p>We must empower them to be productive.</p>
Research question B: Is there an approach in the UAE that can effectively deliver technical and vocational education and training?	
9	There is only ACTVET but not enough.
10	We do not have an organization looking after TVET education at the federal level in the UAE.
3	ACTVET schools and institutes are leading the education system currently. Their outcomes are great. This system should be replicated across the UAE.
3	There are several tracks in high schools with few differences among them. However, it is very difficult to transfer between these clusters because of the complicated approach.
6	There are different projects and initiatives such as the National Qualifications Authority, ACTVET, and Higher Colleges of Technology (HCT) but they are not working together and their systems are standalone systems which makes the approach ineffective. They need to work together.
2	The tracks are complex.
4	Lack of TVET strategy would cause poor plans and implementations.
7	<p>I have seen competent students during the 2017 world skills competition and we shall support and encourage those students to pursue careers in TVET.</p> <p>ACTVET is very active and successful in delivering TVET programmes but its role is limited and it has to be expanded more and it should be at the federal level to be able to offer more TVET programmes across main cities in the country.</p>
4	I strongly recommend the merge of ACTVET with NQA under one umbrella to plan for TVET strategies and executions.
1	ACTVET's role is unclear. The lack of TVET strategy is causing a lack of clarity.
8	<p>To reach 40% of the total number high schools we need a bigger infrastructure and staffing for the National Qualifications Authority (NQA) to help it reach its mandate.</p> <p>Many people in UAE make no differentiation between blue collar and white collar work and this could create confusions.</p> <p>There were two ministries; one for K-12 and another one for higher education. There is no TVET organization and framework authority.</p> <p>Currently there is one Ministry that looks after P-12 and higher education but TVET is not represented.</p> <p>However, we still need an umbrella organization for NQA and TVET to plan well for the vocational education.</p>
9	TVET needs a new organization to manage it.
10	We need to introduce more "skills for life" initiatives such as the ones ACTVET is delivering.
3. To what extent does the present UAE vocational education system meet the needs of the national economy?	
2	There are huge gaps between schools, colleges, industry, and job markets.
9	<p>The current system does not meet the industry needs because of the limited number of TVET graduates.</p> <p>Some companies sponsor TVET students to ensure that they work for them upon graduation.</p>
2	There is no career guidance from school to the types of expected jobs in future. Such a gap causes mismatch and poor skilling for available jobs.
4	In Europe for example vocational education and training is a standalone system and linked with the industry. Such a process could address the need of national economy better.

8	<p>Currently we have competent curriculums and better teachers. Implementing the Emirates Standardized Test (EMSAT) gave the Ministry of Education (MoE) accurate indicators on the students and staff levels across all subjects, mainly in English, math, and science.</p> <p>There is no cooperation between Ministry of Human Resources and Emiratisation (MoHRE) and NQA to set the platform for the present and future jobs. The NQA framework is not clear.</p> <p>Fatima College of Health Sciences and Abu Dhabi Polytechnic have good strategic plans but they are not meeting the country's requirement.</p> <p>Industry engagement is weak and does not help to meet the requirements for the national economy.</p> <p>The National Qualifications Framework is not helping to improve the education system.</p>
6	<p>Technical schools and centers need to be linked with the industry as they are not linked currently.</p> <p>The Technical schools and colleges have advisory councils and not enough, ineffective, and they are not accountable.</p> <p>There is a need for Industry Based Academies where the industry plays key role to establish and fund these academies and serve on their governing boards.</p> <p>The future needs for skilled labor would be huge and technical education is the main key to develop a reputable national economy.</p>
7	<p>There are big gaps and mismatch between graduates and industry needs.</p> <p>There is no link between vocational education, graduates, and the industry.</p> <p>Current vocational education outcomes do not meet the needs of the national economy because of;</p> <ul style="list-style-type: none"> • Small and medium-sized enterprises (SMEs) are primitive in UAE • Industry in UAE is premature compared to the West <p>We need to link industry with vocational education to gain the industry trust.</p>
4. To what extent should post school English language education be paid by parents?	
10	<p>The fact is about 50% of students fail the foundation/preparatory programme because they are not capable of passing this programme means we need to look for other alternative fast, cheap, and effective solutions.</p>
2	<p>Stopping the offering of foundation at the universities is impossible and the MoE should pay the cost as the MoE is operating schools and responsible for their outcomes.</p>
8	<p>Parents need to know their rights, role and responsibility in the education system to avoid shortcomings in the system from parent's side. It is parents' responsibility to ensure their child is educated to the best of the child's ability.</p> <p>Students should not be allowed to miss schooling.</p> <p>Parents have to sign a declaration taking responsibility for their children's education and make them pay where there is a shortfall as a result of the child's behavior.</p> <p>Schools need to have more input on the career preparation for students.</p>
3	<p>Universities are uplifting their admission criteria all the times. It is "moving targets" and parents should be responsible for that and should not pay if they send their children to government schools.</p>
6	<p>I do not agree that university admission is linked to passing national assessment exams. In the UAE, the number of citizens is small and the number of applicants is relatively small. The government shall accept all students into different programmes. The government should educate all nationals.</p> <p>Foundation should be free for all UAE students.</p>
3	<p>If parents chose to send their children to poor private schools. Then it is their responsibility to pay because of their bad selection.</p>
9	<p>Currently federal higher education entities are bearing the cost. This is not their issue and they should not cover the cost.</p>
3	<p>If parents chose to send their children to public schools then it is the MoE responsibility to pay because they are operating the public schools, which fail to prepare the students</p>

	well. Another option would be that the MoE is responsible to send them to community colleges such HCT.
1	MoE must accredit all schools to avoid poor outcomes.
7	I support the government decision that federal universities should not offer any remedial programmes for high school graduates who fail universities admission requirements. However, parents should not pay and the Ministry of Education should pay if those students were enrolled in the Ministry of Education schools. Students who fail universities admission requirements should not be transferred to TVET as such a practice would underestimate TVET and would label it as an alternative education for the low achievers only.
Research question C: Is there a system in the UAE that effectively engages the unemployed in successful occupational outcomes?	
5, 7, 9	There are lots of industry opportunities such as airline industry but there is not strong linkages between vocational and technical education and industry.
9	There is no unified federal database for all unemployed and vacant positions to assist the government helping the unemployed finding the right jobs.
7	Many job seekers do not know about the Ministry of Human Resources and Emiratization (MoHRE) and its role. MoHRE defines a job seeker as an individual who is without a job and is actively looking for job. If this job seeker was offered three different jobs and he/she did not accept any of them. Then MoHRE removes his/her name from their job seekers database. I totally disagree with this practice, as it did not resolve the unemployment problem and the number of job seekers would keep rising. I do not think we have accurate database for the job seekers. I wish MoHRE and MoE start career guidance programmes together at high school levels. They must introduce high school students to the available jobs to help them to make the right academic career pathway decisions. Students should get the opportunity to visit different factories and industries to learn about all available opportunities.
4	There are no real or structured plans to engage the unemployed into successful occupational outcomes.
8	A system of training for the unemployed is not available only short soft skills training. The damage has already been done for the job seekers, their ability to secure jobs is poor because the education did not meet the skills required in the workplace. National Service has helped to categories students by assessment and have reskilled them, this has helped fill some gaps for other industries. Some of the training undertaken is not sustainable, as the jobs trained for will disappear due to AI.HRA and MoHRE are not assessing or re-skilling.
6	Previously job seekers had to register on the ministry employment database. Currently MoHRE is hosting career fairs where employment agencies, public and private entities are participating to recruit and hire job seekers at these fairs. Job seekers could apply for any job they like during these career fairs and if they are selected they sit for interviews and might sign employment offers during these fairs.
3	MoHRE shall focus on the industry demands and not on short-term employment solutions. They should not also focus on soft skills jobs as they are not sustainable.
10	There will be no guaranteed jobs in future. In future and with technology advancement, there will be temporary skill-based jobs and less full time jobs. Ministries need to share staffing. As an example why do you need to hire full time legal advisor or a researcher that you need for less than five days a month. Currently there are staff who work for less than 2 hours a day and this should not continue. We need to create "Crowd Source Platforms" for the government entities and encourage them to use it.
5. To what extent is there a seamless government process to get the Emirati unemployed into employment?	
10	The systems are ineffective.
2	Education outcomes are weak and this makes it very challenging to the government to get young Emirati into employment.

9	Universities should not offer programmes that are not needed in the job market.
1	Creating jobs in the public sectors to accommodate more job seekers is not a good solution.
7	No there is not. Job seekers themselves are very active in looking for jobs and not depending on job placement organizations. The government should select some sectors and focus on getting job seekers trained against the skills required for these sectors.
6	There are still challenges and there should better coordination between all entities.
1	The government should enforce the employment of Emiratis in the private sector.
2	The government is encouraging the private sector to hire Emiratis.
1	The government needs to take tough measures against the private sector including incentives and taxation to encourage the private sector to hire Emiratis.
3	The main responsibility for Education is to graduate competent graduates and the role of private sector and the government is to create jobs.
5	The government process is missing.
8	The creation of MOHRE and HRA is good for speaking to employers. The training given is for soft skills for jobs that are not sustainable. We need a mapping of what jobs are required and where the jobs are and train for the thousands of available jobs. Need to work across all industries. The private sector have specific jobs that need training for, for example, oil and gas sector, health sector. There is a need to focus on Retail, Banking and airlines. Need to go for sustainability, not quick wins. There Is a need for linkages between industry, TVET, HRA, and MoHRE and a holistic approach to schools, universities and technical and vocational education. Need training that leads to jobs. Private sector need ready to work graduates as they will not pay for the re-training needed. Emiratis need to compete with expatriates for jobs. We need complete plans for employment from schools to universities and TVET to employment and we need to create bylaws to govern that. All of this would not work without an umbrella organization for TVET and NQA together.
6. To what extent can the General Pension and the Federal Authority For Identity and Citizenship (Emirates ID) play a part in assisting Emirati's to find employment?	
10	The current process is ineffective. There should be a unified database for all government entities to post all vacant jobs to make it easier for job seekers to apply. Then connect all universities with it to know the current and projected jobs to offer new programmes aligned with these jobs and update their programmes as well.
6	All employed nationals are registered with the pension funds but the unemployed are not. MoHRE has also a database for all employees in the private sectors but there isn't a close coordination between these entities to help jobseekers learn about current and future jobs.
3	The Federal Authority for Identity and Citizenship should play a key role in assisting Emiratis finding employment but unfortunately, it is not. They do not keep a database for academic and vocational credentials for all individuals. Such database would help the government plan well for vacant jobs, what jobs to replace, and who is due for retirement.
7	Unfortunately they do not play any role in assisting Emiratis finding employment. They have great database but they do not share it. There are Emiratis who are due for retirements and we need to know their numbers and occupations to find suitable replacement for them. There are hundreds of thousands of expatriates and we also need to know their figures and occupations to also train Emiratis to be ready to replace them.

3	Even if the local universities use the Federal Authority for Identity and Citizenship card for registration we have thousands of Emiratis who study/studied abroad and hundreds of thousands of non-Emiratis who also studied abroad.
8	Sharing data between government entities is easy but analyzing data and data mining is the challenge. Jobs are not classified and as a result are not specific in their requirements. As an example; teacher is classified as a “teacher” without mentioning if he/she is math teacher, English, science or else. It does not also classifies him/her if teaches in elementary or high schools or else. MOHRE not doing their job systematically.
3	The Federal Authority for Identity and Citizenship need to update its database to register the credentials of everyone into their system.
9	Having one main database between the General Pension Fund and the Federal Authority for Identity and Citizenship, and the Ministry of Human Resources would help the Emiratis finding more and suitable jobs. One database would also help the government to better plan for current and future jobs. Another challenge is the current data is not clean.
Source: developed for this research.	

Next, the transcript for the Directors Focus Group is presented.

Table 3.4 Focus group 2 transcript	
Research: Development and reform of technical and vocational education in the UAE: the role and vision of the UAE leadership	
Focus group for Directors held on 9 August 2018 in Al Etihad meeting room at ACTVET, from 1:30 PM to 3 PM and existed of 8 respondents. Directors were introduced to the research by Mubarak Al Shamsi as being a research project at Ulster University. The research was outlined and the rights of participants was made public. Participants signed the official consent form consenting to take part in the research. They also agreed it was anonymous and confidential, they could leave at any time without reason, and their answers would not affect their position at work.	
Mubarak Al Shamsi	Researcher
Dr Lindsey McPherson	Moderator
Eva Beens	Recorder/scribe
Number	Comments
1. To what extent are the tweets by the country leadership informative in relation to TVET?	
1	Tweets by the leadership of the country on nationwide level are understood by senior staff who interpret the meaning for their own application and sector. However, tweets could be more active, addressing the community and stakeholders in active campaigns specifically for TVET are needed and currently missing.
all	All agreed a strategy for vocational education in the UAE was not available and needs to be developed.
3, 6	Tweets are not reaching all of the stakeholders and TVET tweets are not circulated. Tweets are too generic, only addressing the country’s needs but not addressing vocational education’s needs.
6	Tweets need to be visionary promoting the value of TVET for the country.
7	Retweeting is not effective and strong enough. Could have better coverage and reach if retweeting was practiced by all.
3	Tweets need to have a consistent message and be structured to send the message out to the community that vocational education is again a good career choice. Tweets need to have a bigger platform to reach further into the society for greater understanding of TVET and its rewards.

8	TVET needs to be defined for the community to understand what is meant by vocational education. With greater understanding the community may engage more in vocational education and see it for its value.
2. To what extent are the UAE visions for the country's direction and development informative in relation to TVET?	
8	The visions are informative but they are not explicit enough and the role of TVET in the bigger picture is lost and not explained.
1	There are no clear statements about TVET and therefore the message about TVET is not reaching the population that should be reached and therefore TVET is lost in the bigger picture.
3	The messages in the tweets by the senior leadership are clear for professionals but there is no explicit mandate in the visions. As professionals we can recognize them but the community and others may not. This could be why the message about vocational education is not reaching stakeholders.
4	The job levels and expectations are not aligned to the workforce and the message is very important because new vocations need to be made explicit. The jobs and the level of jobs and the expectation of a job needs to be filtered down to the population. People need to know what is out there and what they can do in vocational education as it is very important.
5	People need to know that doing the job is good for the country and they should do it with passion and they should do it well. It is important for the community to understand that their passions can be practiced in relation to TVET.
6	The vocations/occupations that are available for students are not clear. Therefore, students don't choose well and as a result are more likely to follow an academic route than a vocational route.
7	Stakeholders also need to understand vocational qualifications and industry needs to know what qualifications are and how it fits into the industrial sector structure.
3. To what extent are the digital resources available in the UAE schools/Institutes sufficient for a knowledge economy?	
1	In the main, we don't have enough technology to support the requirements of a knowledge economy. There needs to be continuity stability and better infrastructure in schools. Furthermore, all staff are required to be trained in the use of technology. That means teachers and technicians. Infrastructure is still at the trial stage.
5	We don't have the technology required.
7	We are not using what we have very well and this could be better exploited.
3	We must define what we want and we were going in order for us to reach the end.
4	Capabilities in schools are not sufficient, we need to do more training for staff to be able to stay up-to-date with the abilities of the students.
7	We need to understand what we want so we can use it for further benefit and to meet expectations.
6	We need new technology in schools and institutions. Technology such as Artificial Intelligence are not being used to date and these are essential for coming years.
4. To what extent should post school English language education be paid by parents?	
8	Support is needed for Emirati's with the English language. Support should be provided by the government.
1	I disagree, I think English language should be paid for by the parents. English has been taught since grade 1 and by grade 12 they should have minimum skills. There's no excuse for a student not to have the minimum English skills. Government should not have to support students after high school.
5	Parents would need to be supported to pay for English language training.

1 to 8	A vote in a show of hands showed that six people supported the government paying for English language whereas two people supported parents paying for English language for students that have completed Grade 12 school. All agreed that if parents had to pay for English language the standard of English language would increase dramatically.
7	We need to understand the minimum criteria for skills required for English language and we need to explain what vocational education is and why English language is important for developing a career. Vocational education students are tested on academic IELTS not on a vocational IELTS examination.
3	There is no readiness of the school system to undertake parents paying for English language.
1	We need to have a minimum criteria for English language in vocational education and we need to increase the view of vocational education for parents.
4	We need to consider how good our students/graduates are when they come out of school systems.
1	We need to see English as a foundation in schools that should be well taught in schools before students leave grade 12.
3	We need to consider how ready the country is for parents paying for English language tuition.
1	We need to set a minimum competency level and parents need to understand what this minimum level is.
3	We also need to consider what the society's expectations are for English language and vocational education.
1	Without asking for extra money our school system is bringing students up to the required standard, so it can be done.
3	The whole of the education system needs to improve. We need to consider the readiness of school systems to reach targets.
1	We need to consider how good our graduates are. And we need to consider the role of HCT because when they started they were vocational but now they are higher education. Now there is a greater provision of academic education in HCT and universities than there is for vocational education. This balance needs to be redressed. And we need to consider how good our vocational education graduates are against academic graduates.
5. To what extent is industry involved in the UAE education system?	
all	Not at all, they have a small involvement. All agreed.
6. To what extent do all UAE unemployed, of working age (who are looking for work) need to undergo skill upskilling?	
1	To a great extent.
4	There needs to be enormous skill improvement. Graduates are not skilled enough for the workforce and refuse work that is offered.
7	Reskilling for work is a huge area of concern, it's a big issue, and it's connected to the level of English language. When SEHA was involved in qualifications we had a really good output. SEHA were very happy with the students we produced.
3	There is a huge mismatch of jobs and people. We find graduates doing work they are not qualified to do and were never trained to undertake.
4	Further students are refusing to do certain jobs. This limits the number of jobs that are available for students to be employed in.
3	Those that are employed are not doing the job due to lack of skills and motivation.
1	We need to have a distinction between the Bachelor Degree and the Diploma. What skill sets are required. We need to educate employers as to what an occupational

	qualification means. We also need to prepare students for VET qualifications that are culturally accepted in the community and workplace.
5	We need to define the competencies required for each job.
1	Graduates don't have the basic skills required to work in the workplace.
8	We need to be offering more professional qualifications and professional certification to raise the image of vocational education to professions.
7. To what extent does the present UAE vocational education system meet the needs of the national economy?	
3	There is a partial meeting of vocational education to the needs of the country in some programmes but not all. But there is an expectation that vocational education will serve the country. However, some programmes that we are offering are redundant now and students will not find employment at the end of these programmes. We need to rationalize and make priorities known so that we can deliver to meet the need of the economy.
6	We need to know the employment rate of graduates, this is the answer. We need to look at graduate destinations and compare the graduate destination for academic and the graduate destination for vocational education.
1	We don't have the data to make judgements about the programmes that are meeting workforce expectations of those that do not. Therefore, we need big data to be able to mine the information that we require. We do not have input in this area.
4	Without KPIs being set we cannot collect the big data we need.
6	Statements are made but we are not reaching our KPIs we need to meet. We also need to set KPIs against the national strategy.
6	We need to know who is responsible for the choice of programmes. Does it come from the regulator or does it come from the Institute itself.
1	If we are going to have a reform, where can we get the information to make judgements about programmes if the information is not available?
1	We do not have information available for programme choice we have no basis for our decisions.
4	We need to know what the growth model is, where we are going, state the KPIs, measure the KPIs and make judgements.
8. To what extent are skills that are not needed in the economy been provided for in post school education?	
3	Some occupations are important but are not being offered. Some occupations are offered but are less important. Some occupational qualifications are not moving forward fast enough to meet the industry's needs.
4	Industry only want academic graduates with Bachelor Degrees.
3	Industry is not involved enough in the education system and only want Degree holders.
1	Some Degrees are not producing graduates that are able to work in the workplace.
4	Industry has decided that they are only going to take Bachelor Degree graduates and are not interested in vocational education certificates at 3, 4, and 5. As industry is the only end-user of vocational education, and are not involved, then they won't see the value of vocational education.
3	There needs to be more quality in vocational education. Quality must meet industry's needs.
1	There are some students with Degrees in subjects which are not required but they still get employed before the vocational education graduate.
8	This goes back to the aspect of upskilling to meet industry needs.
7	If we are not meeting industry needs - then we are not serving the needs of the country. Some demands are being made for skills which are not addressed in the country. It

	doesn't look like we are moving fast enough with new skill requirements for the economic future.
9. To what extent are job vacancies made aware to Emirati's looking for work?	
5	Students are made aware of the vacancies available to them generally on the websites of the government.
3	Emiratis are made aware, but not clear access is given for jobs. The screening is not very good, the right CVs are not always presented. There does not seem to be a seamless process with HRA and Federal Authority for Identity and Citizenship. There needs to be coordination between HRA and the Institutes so that students are aware of all the jobs that are available.
8	There needs to be informed choices for students. They need to know what is available so they can apply for it.
10. To what extent is there a seamless government process to get the Emirati unemployed into employment?	
1	There is no formal system available for students to get into employment.
3	A system doesn't exist but it is needed. This is the job of HRA but they don't seem to be doing very well. However, a system is needed to support vocational education students into jobs.
11. To what extent can the General Pension and the Federal Authority for Identity and Citizenship play a part in assisting Emirati's to find employment?	
2	This is a shared responsibility for all.
1	This is part of the national agenda to increase Emirati employment in the workplace. There needs to be a system where we can link all the information together through HRA and the Federal Authority for Identity and Citizenship so we can see which skills are needed for which jobs. There are plenty of jobs, However, some unemployed are unemployed by choice.
2	We need an agreed definition for unemployment. And we also need to take a shared responsibility for finding jobs for vocational education graduates.
4	We need to know whether we have unemployed academic or unemployed vocational education and why they are not in employment or working.
8	We need a system for full employment of Emiratis. And we need to define the role of TVET in providing work ready graduates. We also need to focus on the sectors where we can get graduates into the workforce. We also need to integrate career pathways into our education system by aligning our qualifications. We also need to know where we can have an impact on the market sector more.
7	We also need to look at the pay scale for vocational education graduates with certificates at level 5, 6, and 7.
2	We also need to change the perception of Emirati's, that is, to work at any level within the workforce.
3	There needs to be more vision on career pathways for students and graduates.
4	The regulator of vocational education must be involved in career pathways and job opportunities.
2	The retail initiative has started to change the perception of society to working in the retail environment.
4	Retail does not require an academic qualification for participation in the workforce. And there is a great need for lower level vocational work that could open up opportunities for Emiratis.
3	Emiratis do not see career pathways.
2	On the retail programme, Emiratis can be a Manager within two years.

8	There needs to be consideration of professional qualifications and how they serve industry and the workforce.
4	It also needs to be a clear reason for undertaking a Bachelor Degree because there doesn't seem to be any clear output from some into careers or jobs.
6	We should look at the Australian system where vocational education graduates earn more than academic graduates.
Source: developed for this research.	

Next, the transcript for the Teacher's Focus Group is presented.

Table 3.5 Focus group 3 transcript	
Research: Development and reform of technical and vocational education in the UAE: the role and vision of the UAE leadership	
Focus group for Teachers held on 19th December 2018 in ACTVET meeting room from 1:30 PM to 3 PM and existed of 14 respondents. Teachers were introduced to the research by Mubarak Al Shamsi as being a research project at Ulster University. The research was outlined and the rights of participants was made public. Participants signed the official consent form consenting to take part in the research. They also agreed it was anonymous and confidential, they could leave at any time without reason, and their answers would not affect their position at work.	
Mubarak Al Shamsi	Researcher
Dr Lindsey McPherson	Moderator
Eva Beens	Recorder / Scribe
Number	Comments
1. To what extent are the UAE Visions for the country's direction and development informative?	
4	Teachers know the vision not the roadmap for how it's going to be carried out.
10	Teaching is heading towards achieving the vision of the school mission as published on the website of the school.
14, 10	The principal discusses the vision at the beginning of the academic year and are spelt out using academic week.
4	The vision is for highly skilled technicians.
7	The UAE visions are informative.
2. To what extent is the general level of computing skills in the country sufficient for a knowledge economy?	
2	The younger generation is better prepared than the older generation.
11, 10, 9, 7, 5	The younger generation surpass all expectations.
8, 9, 10	All the resources required are available.
3. To what extent are the digital resources available in the UAE schools/institutes sufficient for a knowledge economy?	
All	All resources are available.
5	Online resources not always available and can't open books online.
3, 8	The speed of the Internet needs to be improved.
10, 8	The knowledge economy is emerging.
4. To what extent is the general level of mathematics in the country sufficient to develop artificial intelligence solutions?	
4	Artificial intelligence is not in the mathematics curriculum.
4	ASP and engineering science and ATHS are taking calculus. However, artificial Intel intelligence is lagging behind with coding and programming.
2, 8	Artificial intelligence is not built into the curriculum.

10	The mathematics given is a good foundation for artificial intelligence,
8	Students need to create apps.
5. To what extent is the general level of computing programming and coding skills sufficient for developing Artificial Intelligence?	
2	The best students are able to code.
7	The vocational schools are more advanced than public schools.
8	Coding needs to start kindergarten.
4	ATHS is clear using Java but it's hard for them.
10	STS has no clear path for mathematics and coding. Need to have pilot classes.
11	Too much attention is on the testing of knowledge and not on the practice of coding.
10	The curriculum doesn't include enough coding.
6. To what extent are UAE students able to build robots?	
6	Students have the basic knowledge but need to work more on coding and programming.
10	The students on the engineering courses have a basic understanding.
10	The curriculum is not clear and teachers don't know how to teach it.
All	All teachers agreed that teachers need more education on working with robots and this could be delivered during PD week.
7. To what extent is teacher's knowledge supplemented by using computer search engines?	
7	Teachers need to relate theory to practice.
10	The curriculum is not clear.
6	Students need to know how to analyse problems.
10	Flipped classroom means that the teacher facilitates not teaches.
All	All agree learning should be student centred.
2	Students challenge everything,
8. To what extent is there a seamless government process to get the Emirati unemployed into employment?	
All	All teachers agreed that the teachers knowledge supplemented by using computer search engines.
10	In physics students need the teacher's guidance
9. To what extent are teachers in the UAE equipped to teach skills for development of artificial intelligence?	
2	Teachers need more education,
4	Teachers to understand all requirements need to be trained. Teachers are not willing to be retrained to learn.
12	Features qualifications and experience needs to be updated.
4	Teachers need to be motivated to maintain the currency of knowledge.
7	The teachers are not available in the system (employed).
13, 2	There is a worry if a teacher takes a course then they are required to teach it, therefore some avoid training.
13	Some teachers are afraid of what they don't know.
10	There needs to be a sharing of best practice to extend teachers repertoire of skills.
10. To what extent do teachers have a specific teaching qualification?	
all	All agreed that teachers have specific teaching qualifications.
11. To what extent does the present UAE vocational education system meet the needs of the national economy?	
9	The vocational education system does meet the needs of the national economy but it is not clear for the students how.
1	The Arabic curriculum meets the MOE requirements.
9	There is no awareness from companies.
2, 3, 8	There needs to be partnerships with industry because there is a gap between school and work.
14	Most experts are already trained for the workplace.

12. To what extent are skills that are not needed in the economy being provided for in post school education?	
10	The skills for the economy are taught in post school.
2	The school adjust curriculum to meet the needs of the economy by adding new clusters.
7	All courses needs to be reconsidered and restructured.
13. To what extent can knowledge of career pathways help a learner shape their educational pathway?	
4, 6	Yes. Knowledge of career pathways would certainly help students to shape their educational pathway.
10	Students are asking what kind of jobs can I get, what is available?
8	All students need to be tested to find out what their aptitude is for.
10	Students need orientation for what they need for career pathways.
7	Career pathway choice should be made in grade 9 and 10.
7	Some of the subjects delivered in STS are not the correct subjects for the careers they will pursue.
2	STS students are being prepared to go to university for an academic degree.
9	STS and AHS curricula are too similar and core subjects for the curriculum need to be reconsidered.
3	If a student enjoys a teacher's teaching they're more likely to follow that path than a pathway they have an aptitude for.
10	Industry need to be involved in the school curriculum so that they can show what a student needs to be able to follow for that career.
2	The school needs to get families involved in the choices of career pathways.
13	Past students can help by explaining what real employment is.
7	Volunteers from industry can come and speak to the students.
7, 4	Currently there are no field trips permitted.
Source: developed for this research.	

Next, the transcript for the Student Focus Group is presented.

Table 3.6 Focus group 4 transcript	
Research: Development and reform of technical and vocational education in the UAE: the role and vision of the UAE leadership	
Focus group for Students Grade 11 and Grade 12 held on 24th and 25th October 2018 in Abu Dhabi Girls Campus meeting room from 1:30 PM to 3 PM. Students existed of 44 respondents, and were introduced to the research by Mubarak Al Shamsi as being a research project at Ulster University. The research was outlined and the rights of participants were made public. Participants signed the official consent form consenting to take part in the research. They also agreed it was anonymous and confidential, they could leave at any time without reason, and their answers would not affect their position at work.	
Mubarak Al Shamsi	Researcher
Dr Lindsey McPherson	Moderator
Eva Beens	Recorder / Scribe
Number	Comments
1. To what extent are the general level of computing skills in the country sufficient for a knowledge economy?	
1	Computing skills level is okay, more than enough, exams are difficult and hard enough.
10, 6	Agree. So far the level is enough.
17	Disagree, computer skills should focus more on the subject and less on other subjects.
5	Aviation students have enough knowledge of computing and they are studying subjects that are not necessary.

4	We got advanced JAVA course but should have had JAVA only.
12	Computer science should have JAVA in Grade 9.
16	We should start computing and primary school so they have the skills for secondary school.
17	Training needs analysis by an outside agency should test to see whether students have good knowledge for the knowledge economy. They need more knowledge to be ready for the outside world.
27, 42	Students need more training in computing skills.
37	The technology in schools is not up-to-date.
Researcher vote	The general level of computing skills in the country is? Sufficient – 7 Not sufficient – 16 Neutral - 4
42	In the workplace Emiratis do not know how to complete tasks.
37	The country should look into upcoming technologies and be more up-to-date.
2. To what extent are the digital resources available in the UAE schools/institutes sufficient for a knowledge economy?	
1	The schools have a lot of digital resources.
2	We have more resources than other schools, such as TVs, which other schools don't have.
17	There is a difference in IAT students as they are performing better. Everyone can see the difference.
3	We have the graduates who will make it in the future because we have projects.
19	We need to improve our labs we need more computers. There are less computers than students so students have to share.
4	Some programmes are not licensed or not available on the computers. Some licenses are outdated.
5	Changes are needed at the school because some websites that we need are blocked. Sometime teachers are asked to open websites which are blocked so students can study.
2	Some of the computers are old and broken, some eight years old, some keyboards are not working or are broken. The iPads were issued long time ago and are out of date and they cannot support the work that we need on the iPad.
12	Video lessons could be used to develop more digital resources for the school. These programmes could come from outside. Schools need to make an online platform for learning.
42	Students have problems with the technologies. Resources are available but they are hard to access or operate.
37, 38	The computer systems are slow and do not work.
27	The Wi-Fi connections are not strong enough and internet searches take too long.
44	Students can access some of the sites even for their own studies.
36	Air drop is not allowed so we cannot receive videos for our studies.
44	Students cannot email each other to communicate, students can only communicate with the teacher.
3. To what extent is the general level of mathematics in the country sufficient to develop artificial intelligence solutions?	
19	The mathematics is very good we have advanced programmes. We study calculus and advanced calculus.
5	Our level of mathematics is not as high as other countries. Therefore, it is not sufficient for the UAE. We need to compete with other countries. We need more advanced subjects.

11	I disagree with number 5. Advanced mathematics and advanced calculus is enough.
10	We get a very basic mathematics and is very simple. It is more than enough.
19	I disagree with number 5. In ASP we have advanced calculus.
2	We need to study more.
4	The mathematics in IAT is strong, but it's not so strong in all schools. Some other schools need improvement.
5	SAT level is a way to improve yourself but SAT doesn't show how good you are. The proof of greater ability is when you use it in college.
13, 5	We should know how to use mathematics and apply it in real life.
38	The mathematics level is not as good as it should be, not to the extent for operating artificial intelligence.
Researcher	Outside of school?
38	ATHS is above average compared to other schools.
38	Focus within mathematics should be linked to artificial intelligence.
41	Students are not taught basics but there is not enough depth of the application of mathematics.
41, 37	Other schools have basic levels of mathematics our schools are more advanced.
35	STS mathematics is sufficient for our school.
All	All agree that the mathematics taught is not sufficient for artificial intelligence.
44	I had one mathematics teacher who knew all about mathematics then I get a second teacher who didn't know much about mathematics.
4. To what extent is the general level of computing programming and coding skills sufficient for developing Artificial Intelligence?	
8	It depends which cluster you are studying, it's not required for some clusters and some clusters give more than others. For example, not all clusters like CS get coding so it's not across the board.
9	Agree. We need to learn the basics. JAVA took time away from what we needed in other subjects. We need to be prepared in school for college. Sometimes we cannot keep up with the curriculum.
5	Everything is digital measurements. We need JAVA because it's mandatory in aviation. Coding is needed but we study at a basic level.
3	No it's needed in every class.
Researcher	Is it sufficient for the country?
19, 11	It is sufficient, we were asked to develop programmes so it is sufficient in the cluster.
2	We need experience in the workplace.
38	There needs to be a deeper focus on subjects for artificial intelligence.
41, 38	The programming we took was theoretical, not practical.
41, 38, 31	I am not capable to apply what I have learnt and I am not updated in the real world life scenarios.
38	Engineering Science only received one year programming, but this year we've got much more mathematics and physics.
31, 42, 27	I disagree I think students should learn to love their programming and they need to practice at home.
31	Programming classes are too short and we are not always able to understand.
38	Some teachers don't know anything about artificial intelligence
Researcher vote	The general level of computing programming and coding skills is? Sufficient – 2 Insufficient – 20 Neutral - 3
24	I have taken over two years to learn but it doesn't mean to say that we are error free.
5. To what extent are teachers able to teach the information needed for a Knowledge Economy?	
10	Teachers are very helpful across all subjects.

2	Not all teachers. Some teachers are not able. Some are prepared but some are not and they don't know what to do.
18	Most teachers are able, it depends on the class, and the curriculum. For example in physics most could not understand the curriculum.
17	Some teachers teach in a way that is not motivational. Some teachers are not able to handle the class.
1	Not all teachers teach. Teachers don't make the students understand they make the students memorise.
11	In Grade 11 we were given the chance to learn by ourselves.
16, 9	Communication skills are missing in some teachers. They need the communication skills to be able to pass on the knowledge to the students.
9, 16	Some teachers need to understand the psychology of learning.
42	Teachers are capable but the students are not. Teachers need to understand student requirements.
36	Disagree with 42. Teachers do not know how to teach, teachers don't know what knowledge economy means. Teachers are weak in teaching.
35	Some teachers just show videos but don't teach.
31, 38	Teachers are teaching subjects that they are not qualified to teach.
44	I disagree with number 31, the higher grade teachers are better at teaching. A good teacher approaches a problem from many angles.
Researcher	Teachers are not capable of explaining how to solve a problem?
31, 27	Teachers need a more flexible way of marking.
17	We are asked questions in exams that are outside of the curriculum.
44, 35	One teacher had given us multiple-choice and open-ended questions but the teacher had not put the correct answers in the multiple-choice exam and we were marked down.
36	In the grade 12 exams some of the questions were not included in the curriculum.
Researcher vote	Teachers are able to teach the information needed for a knowledge economy? Teachers are capable -11 teachers are not capable - 5
22	Students are given choices in Grade 10 but we don't know the basics so how can we choose.
38	Last year's teacher was good, this year the teacher says is not my problem it's your problem.
41, 31, 43, 44, 27, 35	Teachers teaching techniques are aimed at results not comprehension.
43, 44, 27, 35	The problem is with the CDU not the teacher. The CDU is not flexible enough and is not aligned to the teacher.
44	We finished the curriculum the day before the exams. The curriculum is too heavy.
36	Some students think a pass is enough. Teachers think more about passing students exams than learning.
6. To what extent is teacher's knowledge supplemented by using computer search engines?	
10	Teachers just type in YouTube so they can research the problem.
20	The pupil can learn by themselves but they need to be able to use search engines.
Researcher vote	On a vote all agreed
42	The teachers go onto the Internet during class to find out. Some teachers need to supplement their knowledge online.
38, 34	Some apps that we need are blocked.
35	It can take up to 30 minutes to access online sites because the system is too slow.
31	Teachers do need to supplement their knowledge on the Internet.
31	Some teachers give us the password so that the students can get onto the internet sites that are needed for learning.
27	On the laptop there is no access to YouTube so some students hack into it so that they can get YouTube on their computers.

7. To what extent are teachers in the UAE equipped to teach skills for development of artificial intelligence?	
9	The teachers are ready to teach but the students are not. Some students have to learn JAVA over a two-year period but some have to learn JAVA, the same thing over a one-year period.
17, 19	Curriculum does not support artificial intelligence.
17, 19	Yes the teachers are qualified and well equipped.
10	Some teachers rely on the student's knowledge because the student's knowledge is better than the teachers.
16	Primary school education should prepare for secondary education.
14	Teacher quality is good. Quality of the teacher depends on the nationality but some do not have a good teaching style.
15	Some teachers are surprised that the students don't have the knowledge needed for the curriculum. Teachers think that these subjects should have been covered at an earlier age. Teachers believe that students are not as far advanced as they should be.
38	Some teachers don't know anything about artificial intelligence as is not related to the subject they teach.
41, 27	The curriculum is not connected to artificial intelligence. Teachers need more information about artificial intelligence and connect the relevance to the students learning. Some teachers are ready but they have to stick to the curriculum.
31	Other schools have a curriculum and artificial intelligence that it is connected but the teachers cannot deliver it.
Researcher	Teachers are capable but the school or the curriculum cannot support it?
Researcher vote	Teachers are capable – 10 Teachers are not capable - 14
42	I disagree with 31. Schools connect to artificial intelligence but the teachers don't go into any depth.
36	Only a few teachers are ready to teach artificial intelligence.
8. To what extent should post-school English language education be paid by parents?	
10	It depends on the parent and the child. If the parent can pay then they should pay to develop English language by sending the children to extra classes.
20, 8, 9	I disagree it's not the parents who should pay. The students are responsible to develop themselves.
Researcher	What do you mean?
5	The student should pay for themselves.
12	The level of English and the government schools is very low so the school should pay if they provide poor teaching. Some teaching is not good.
11	I agree. The government should take action as well.
4	The government should pay, but only for the next five years and not for everyone. In the future the next generation of students should not need extra English language training.
5	The level of English language depends on parents and teachers. Parents should pay.
8	Students should have to self-study. Each student should know after Grade 12 the level of English they need to reach.
2, 5	Parents should pay.
1	Government should make sure that the English language curriculum meets the government standard.
16, 19	Wealthy parents should pay but the Ministry of Education should pay for the less wealthy.
17	If the student comes from a good school, the parents should pay.
18	The government should pay.
3	The student should pay by taking a part-time job.
Researcher vote	Who should pay for the Post school English language training? Government - 8 Parents - 7

	Students - 5
38	Students in the school excel in English so there is no need for the foundation year.
35	Parents should pay because it is the child's problem.
35	The parents should encourage the children to learn.
36	I agree with 35. Student should be ready for university, it is the student's responsibility.
27	Students don't care because it is not their money. If parents had to pay the students would take more care.
44	Government should not pay, the parents should pay or the school.
35	It's the same as learning any other foreign language, parents should pay if they want to have good English language skills.
23, 21, 22, 25	Parents should pay. It is the parent's responsibility that the student should keep up with learning.
25	The government is already paying for 12 years of schooling.
41	If a school is good student should pay. If a school is bad then the government should pay. If the child attends a private school, or ATHS parents should pay. If the school is weak the government should pay.
41	Student should be taught all skills for English language for university.
42	I agree the government should pay for one year between school and university.
34	Student should self-learn from online courses or the parent should pay.
37	Parents should pay because the government provides enough.
Researcher vote	Who should pay for post school English language? Parents should pay – 20 government should pay – 1 student should pay – 14 schools should pay - 8
37	Students could take a part-time job to pay for that English language.
31	Each school should pay. The school should be responsible for the child graduating.
9. To what extent do all UAE unemployed, of working age (who are looking for work) need to undergo skill upskilling?	
10, 20	Depends on the job level. High level skilled jobs require students to compete skills wise for jobs.
12, 17	Students need to know which skills they need. But they can get these skills while they are working.
5	Jobseekers should know the job that they want and the requirements for their job. Upskilling, communication and language skills are important and students should know at least three languages.
2	The student must be responsible for languages and communication.
4	It is the responsibility of the student to make sure that they can go to a good university. Upskilling is the responsibility of the jobseeker.
19	Students should be responsible for developing and improving themselves, it is the student's responsibility.
9, 7, 17	Some students are overqualified for jobs.
9	Some find there are no places available in universities for them to study.
13	I disagree. There are many jobs but the skills don't match. It's about the people and lack of skills.
16	Students can set up their own business but they need to have the right skills and this will lead to self-employment.
20, 9	It depends on self-interest.
5	Jobseekers who have better skills than employees should take the job of the less competent employee.
18	Employers are looking for the best employees because they want to make money.
36	The unemployed need to improve their skills and they need skills for the field of work.
42	Jobs require skills, so students need to practice the skills to be able to obtain a job.

33	Career guidance at university level is necessary. University should upskill students.
31	Industry should help in upskilling students.
31	Some students don't continuing the career that they studied for.
41	CV's state skills. The job description will determine whether skills are needed for a particular job.
38	Students could take part-time jobs to gain and improve their skills.
35	Work placement and on the job training is very important. STS and ATHS prepare students for the workplace.
42	Skills are still required and they change every two years. We need programmes to upskill so we can apply for jobs. Some upskilling programmes are not available in certain skill areas.
Researcher vote	Emiratis should have an advantage to get a job so they can learn on the job? Agree - 24
31, 36	There are fields that are important to the UAE but are not introduced at school so students don't know about it.
44	I disagree. I believe skills from school meets all needs.
27, 22	There are not enough TVET schools across the country. TVET schools meet the needs for employment.
42	More schools need to be introduced to cluster learning, this should happen around Grade 6.
35	I think it is better after Grade 8.
41	I believe subject streaming is not always good for students. I believe students need to experience a bit of everything.
10. To what extent does the present UAE vocational education system meet the needs of the national economy?	
Researcher vote	The present UAE vocational education system meet the needs of the national economy? Yes - 12 No - 2
17	It is real life experience we need, schools only provide the basics. In real life we need more in-depth more advance courses.
1	The education system raises awareness but it is not sufficient, competence only comes at college level.
31, 36	There's not enough information about jobs.
44	I disagree. I think vocational education meets the needs of the national requirement.
Researcher	Do we have enough vocational education to meet the economy?
27	There's not enough teachers to do the job. There's not enough vocational education schools.
Researcher vote	There are not enough vocational schools? Agree - 22
42	We need more vocational schools with clusters and also student should be introduced to career counselling because if you change majors you have to change subjects.
Researcher	Do you think there should be more streaming in schools?
27	Yes from Grade 6 onwards we need to take choices, but we also need to be exposed to people who do the job so they can tell us what is needed.
Researcher	How could that be done?
42	It should be based on the students where their interest is, but it should stay within the student's capability.
Researcher vote	Subject streaming should take place from grade 6 onwards? Agree - 13

41	I don't think streaming is too important it's not conducive if you've no idea what you want to do.
38	Subject streaming does not give an all-round experience.
Researcher vote	The present UAE vocational education system meet the needs of the national economy? Yes - 12 No - 2
11. To what extent can knowledge of career pathways help a learner shape their educational pathway?	
10	It is up to the student to know what career they want and to do and research to know what courses they need to take. Research would help at Grades 9, 10, 11 and 12.
3, 4, 9	Schools can help with career guidance and familiarise students with what is available. Many students don't know what they want to do. Careers should be given in Grade 8 and 9.
17	A school career centre would be helpful.
2	Parents are forcing students with their preference.
5	Students should know exactly what they want to do. Schools should make available more career fairs and exhibitions so students can learn more.
9	Many students remain unemployed. Career fairs could help them find employment.
9	Some student's skills are not good enough to gain employment.
17	I disagree with number 5, I don't know what I want to do, as a students I need motivation.
35	Students can choose better careers so they know what is available.
38	Students need to know different career pathways.
Researcher	Do you agree that students should know more about careers in order to be able to make a choice? Agree - 25
12. To what extent are job vacancies made aware to Emiratis looking for work?	
Researcher vote	Job vacancies are made aware to Emiratis looking for work? Yes job vacancies are made aware – 6 No job vacancies are not made aware - 14
9	Not all jobs that are available are advertised.
9	The only choice is nuclear or mechanical engineering.
5	We don't know what jobs are available.
2	We only know from newspapers and social media what jobs are available.
17	We can check the websites for jobs in particular ministries.
40	Many Emiratis do not know what jobs are needed or available for the future.
41	There are many internships around but we don't know where to find jobs.
40	If we know where the jobs are we would be given a chance.
Researcher vote	Emiratis do not know about job vacancies? Agree – 3 Don't agree - 22
38	There are new jobs coming to the UAE that require technology but not everyone knows about them.
38	You get a job from who you know.
38	We need to have speakers coming to schools to talk about their jobs.
38	We need to have a website for job adverts and information about what is required.
27	We need job fairs. We need to know about new jobs and what jobs are advertised every week.
Researcher	What do you think of current job fairs?

27	Job fairs are efficient and effective.
37	We need more information about each field, we should know more about each cluster. A cluster should show us what's needed for the UAE.
13. To what extent is there a seamless government process to get Emirati unemployed into employment?	
5	We rely on the government to find jobs. Expatriates are getting good jobs that could be held by Emiratis.
14	The government could offer opportunities through established organisations like TAWTEEN that is looking for Emiratis to employ.
Researcher vote	Yes there is a seamless government process – 11 no there is not enough being done - 9
10, 8	We have no knowledge of the process.
5	There is not a good process for Emiratis to find jobs.
2	Some people are looking for jobs but there are not enough jobs. Government needs to hold job fairs every month.
9	It is the student's responsibility and their ability which will help them to find a job.
31	The current process is not available, it's not useful.
27	The process of employment is not there.
27	If you have connections it's easier. You need 'wasta' (power and influence) to get a job.
42	Emirates integration is happening, so slowly advancing. There are lots of Emiratis getting jobs. More Emiratis are now working.
Researcher	Who thinks more Emiratis are getting jobs? Yes – 6 No - 11
45, 37	Most jobs prefer expatriates to Emiratis, especially in hospitals.
46	I disagree, they are replacing expatriates. Some Emiratis are not going for specific fields, but there are jobs.
46	There are nursing jobs available with a guaranteed job offer, but people are not taking it because they see this as a 'lower' profession.
39	There are not enough jobs in the government for all Emiratis.
36	Some hospitals will take expatriates because they have more experience and they are better quality.
37	Most leading companies in the UAE are non-Emirati.
35	The government is helping but Emiratis are not going for the right jobs.
35	Jobs are available but the salaries are not attractive.
41	There needs to be a fairer way of selecting employees. Job application should focus on experience and qualifications.
44	We need more information about different fields because we don't know what's required in those fields.
Source: developed for this research.	

Next, the transcript for the Parent Focus Group is presented.

Table 3.7 Focus group 5 transcript
Research: Development and reform of technical and vocational education in the UAE: the role and vision of the UAE leadership
Focus group for Parents held on 4 October 2018 in Al Etihad meeting room from 3.00 PM to 5.30 PM. Six parents were introduced to the research by Mubarak Al Shamsi as being a research project at Ulster University. The research was outlined and the rights of participants was made public. Participants signed the official consent form consenting to take part in the research. They also agreed it was

anonymous and confidential, they could leave at any time without reason, and their answers would not affect their position at work.	
Mubarak Al Shamsi	Researcher
Dr Lindsey McPherson	Moderator
Khaled Talal	Recorder/scribe
Number	Comments
1. To what extent are the general level of computing skills in the country sufficient for a knowledge economy?	
1	The current computer curriculum is not covering all topics like most developed countries such as Finland; in these countries, the current generation has great knowledge in this area. The overall outcomes in computers skills are weak.
4	Schools should introduce computer curriculums that focus on Microsoft programmes, such as Word and PowerPoint, as well as coding, since most students do not have a skills in such programmes.
2	School should focus on mobile applications that could help the students obtain the minimum skills required for a knowledge economy. The current outcomes are weak because schools focus more on theoretical methods in teaching. Students are not practicing what they are learning. Computer curriculum level is at a higher level than our students' abilities, I suggest that the schools should focus more on the use of the computer in the classroom.
2. To what extent is the general level of mathematics in the country sufficient to develop artificial intelligence solutions?	
2	Generally, the Math level of the students in the country is weak. The question is whether the way of teaching Math subject in classrooms is difficult or is math difficult for our students to understand. In my opinion math in Applied Technology High Schools is too hard for students. Primary schools should focus more on math so when students reach high schools they would not find it difficult.
4	The question is why do we teach Math? This very important question need to be addressed.
5	On 1 – 10 scale, I would give 5 for the curriculum contents.
1	The current way of teaching math cannot meet the expectation of UAE government where the government is putting high emphasis on using the latest technology and artificial intelligence. As an example, I was a teacher in one of Abu Dhabi schools more than 10 years. Where I accompanied Grade 12 students on a summer programme at the National Institute for Education in Singapore (NIE). Students were assessed in different subject for proper class placements. Then we discovered our student's level in Math was equivalent to Grade 9 Students level in Singapore. In addition, mathematics taught at Applied Technology High schools (ATHS) and Secondary Technical Schools (STS) is more advanced than in other Government and Private schools. The curriculum/main core subjects should be standardized across all schools in UAE to facilitate transferring students between schools. In some schools teaching methods of mathematics is inappropriate. Student's need to be taught to think outside the box.
4	Generally, our students' level in programming does not meet UAE ambition for artificial intelligence.
3. To what extent is the general level of computing programming and coding skills sufficient for developing Artificial Intelligence?	
4	Students programming skills are weak. We have the appropriate curriculum but weak teaching staff.
5	Actually, present students computing skills are much better compared to the previous years, nowadays they have very advanced skills and knowledge. Currently schools teach computing in primary level. The current curriculum will take a few more years to see the results, which I'm confident it will meet UAE expectations for the artificial intelligence.

2	I disagree with No. 8's opinion. The Grade 12 student's level is very basic in coding and programming.
5	I agree that we should teach our students how to use computing skills and tools in a better way but, I think the issue is that there are big difference in how computing is taught in different schools.
2	Several government entities are using coding and artificial intelligence. Abu Dhabi Police has implemented these programmes in its operations. ATHS and STS schools are by far advanced in teaching artificial intelligence (AI) but government schools need to focus more on AI.
4	Another factor to consider is that timing is limited to teach students more subjects.
5	We should apply advanced computing curriculum in cycle one to bridge the gap, such as creative design and coding.
4. To what extent are teachers able to teach the information needed for a knowledge economy?	
2	Teachers need to understand what the knowledge economy is all about. Then the Ministry of Education needs to design training programmes for them to be able to integrate knowledge economy requirements into the curriculum.
1	Most Emirati teachers are competent because they are young and they were exposed to the latest teaching and technology techniques but some expat teachers might be incompetent to teach such subject in schools because they are very senior and have not been exposed to such techniques.
5	There are no clear linkages between the MoE and industry to highlight the knowledge economy requirements to help design proper teacher training. Teachers are not knowledgeable about knowledge economy.
5. To what extent are teachers in the UAE equipped to teach skills for development of artificial intelligence?	
1	Generally teachers qualified but their knowledge about artificial intelligence is limited.
4	We need clear plans to train and prepare teachers to be able to teach artificial intelligence, because teachers themselves do not know what artificial intelligence means.
5	Artificial Intelligence is a new concept in UAE, so we need high quality teachers and start preparing them to teach artificial intelligence.
2	UAE government has a clear vision for artificial intelligence and the government created a Ministry for that. But we still need to prepare and train our teachers who will carry out the responsibility to prepare the whole generation.
6	Teachers in UAE are not ready to teach Artificial Intelligence.
4	Some teacher in UAE are not able to teach Artificial Intelligence and in some cases students know more about AI than the teachers.
6. To what extent should post school English language education be paid by parents?	
6	MoE is responsible to prepare students to be able to skip the foundation programme.
2	MoE should cover the cost.
6	MoE is the one operating the Schools, so parents should not pay.
1	In my opinion, costs should be shared between MoE and Parents. We also do not have qualified centers to prepare students to pass foundation programme requirements.
2	Passing university admission requirements should be one of Grade 12 graduation requirement.
4	MoE should cover the cost.
5	Students who are not following the schools behavioral handbook and not performing well in school, due to their own negligence, their parents should pay. For students who are behaving well and trying hard to perform well but were not able to do that, then it is the responsibility of MoE to pay. To me it means the school is weak and is not performing well.
7. To what extent do all UAE unemployed, of working age (who are looking for work) need to undergo skill upskilling?	
2	Job seekers need to undergo training to develop their skills because the job market is changing. This will increase their chances to find more job opportunities.

4	UAE Government should provide job seekers with proper training programmes.
1	There should be a unified database between government entities, private sector, and the labour market requirements highlighting all vacant positions in both public and private sectors. Then the government should offer training programmes to prepare the job seekers for these vacant positions.
5	Most job seekers lack work experience and on-job training is limited. The government should create work voluntary programmes in all government and private sectors, where job seekers could work on temporary contracts with or without pay. Job seekers could improve their working skills, learn more about work ethics, industry skills requirement, and time management needed by labour market.
8. To what extent does the present UAE vocational education system meet the needs of the national economy?	
1	We have outstanding graduates some of them are working in high-tech entities such as, Emirates Nuclear Energy Cooperation (ENEC), IT Security, etc.
2	We have a shortage of competent graduates. ACTVET TVET schools and institutions are very good but places are limited. There is huge demand for seats in TVET systems and we need more TVET schools across the country.
4	From my experience as an academic advisor at the United Arab Emirates University, ACTVET Grade 12 school graduates are more advanced academically compared to other high schools graduates. This creates a challenge for us to train and prepare students coming from other schools to bring them up to the level of ACTVET student's achievements.
5	I think the understanding of TVET education is unclear for some parents. I also think the outcomes of ACTVET schools are still weak.
1	I disagree with person No. 8.
4	I totally disagree with person No. 8.
9. To what extent can knowledge of career pathways help a learner shape their educational pathway?	
3	Students lack information about different educational pathways. There should be career guidance counsellors and assessments at high school to assist students selecting their career pathways.
2	There is a lack of published industry requirements and available jobs. There are thousands of available jobs in nuclear energy and artificial intelligence but students are unaware of them because of poor career guidance.
4	Students and their parents should be guided about different academic pathways to help them make the right career decisions.
6, 4	Career guidance in early stage is very important but unfortunately, it is not available in our schools. Career orientations for students in early stages is very crucial.
1	Schools and parents should help students and guide them. For example, in Japan the government conducts short courses for 3 months for both parents and students to determine the best educational pathways for the students.
6	All school teachers should prepare reports on students from Grade 1-12 including their academic strengths and weakness, skills, sports, activities, abilities, fitness, health, ... etc. schools should be able to know where to guide students before completing high school.
10. To what extent is there a seamless government process to get the Emirati unemployed into employment?	
4 and 1	Most of Job fairs have lost their credibility among job seekers as most companies attend job fairs just to market their products and not to hire job seekers.
1	There is huge mismatch between job seekers skills and job market needs, some companies are making it difficult for fresh graduates/job seekers, as they require minimum of 3 years' experience, which most job seekers do not have. Employments agencies are not coordinating their efforts to get Emiratis employed. There are thousands of jobs in the UAE but a large number of graduates are still unemployed.

2	There should be structured plans to train fresh graduates for at least 3 months against available jobs, to gain the required skills to ensure their employment. In general, government actions are insufficient to employ graduates, and companies in job fairs choose the best graduates only.
5	The government's procedures are insufficient. Some companies are hesitant to employ UAE nationals, as it is difficult to terminate their employment contracts, once they are hired. I suggest that all job seekers be employed on temporarily basis. Then, to evaluate them with the option to confirm or cancel the employment contracts based on their performance appraisals. Such a practice would encourage the private sectors to employ UAE nationals without liabilities.
2	Graduates need to be employed even if they do not have relevant academic qualification. Companies should focus more on skills and knowledge and not only academic credentials.
4	UAE government should mandate the government and private sectors to raise the percentage of emiratisation and provide incentives to organizations achieving high percentage of emiratisation.
5	There should be annual reviews for employment procedures to guarantee emiratisations across sectors.
3	There are Emirati graduates from top national and international Universities and they are still searching for jobs.
6	Government procedures are ineffective.
Source: developed for this research.	

Finally, the transcript for the Industry Focus Group is presented.

Table 3.8 Focus group 6 transcript	
1. Research: Development and reform of technical and vocational education in the UAE: the role and vision of the UAE leadership	
Focus group for Industry held on 28 th January 2019 in Al Etihad meeting room from 11.00 am to 12.30 pm and existed of 9 respondents. Industry was introduced to the research by Mubarak Al Shamsi as being a research project at Ulster University. The research was outlined and the rights of participants was made public. Participants signed the official consent form consenting to take part in the research. They also agreed it was anonymous and confidential, they could leave at any time without reason, and their answers would not affect their position at work.	
Mubarak Al Shamsi	Researcher
Dr Lindsey McPherson	Moderator
Eva Beens	Recorder/scribe
Number	Comments
2. To what extent are the tweets by the country leadership informative in relation to TVET?	
2, 6	The tweets of the country from the country leadership is very informative.
6	Everyone is on the same page, we are reading through social media.
4	We receive full details and the visions are clear.
6	The visions are very transparent and clear.
7	The visions are defined and informative showing a level of comfort. Gives approach to the economy, but we need to know more about how it's applied because it doesn't cascade down to the users. We need to use more social media for information.
3. To what extent are the UAE visions for the country's direction and development informative in relation to TVET?	
7	The visions are clear about where the country wants to go.

2, 6	The visions for 2030 are very clear for the different sectors, the pillars and goals have been identified to achieve. There is one vision and it cascades down through the sectors. However, it doesn't show us how to achieve the visions.
1	We see ourselves as one nation and there is synergy between the local and federal government, we are one nation.
3	We have a multicultural environment and the young generation needs to have continuous information. There needs to be more collaboration, more workshops.
3, 4	There needs to be a focus on the younger generation that gives them the reasons why these visions are in place, and how it affects them and their career path.
6	A benefit to the country was the establishment of the Youth Council, with open discussion with all the Ministers to hear the voice of youth.
4	The same has happened with the health sector. The health sector has gone to the community to communicate their visions.
4. To what extent are the general level of computing skills in the country sufficient for a knowledge economy?	
3	Not good enough. Fresh graduates need training on communication skills because they are not work ready. During the summer break there needs to be periods of training to develop students to have the skills needed in the workplace and to change mindset.
2	The younger generation, the digital natives, are far more experienced in use of computers. However, the older generation are not able to function on simple computer programmes such as Word and Excel. Schools need to focus more.
6, 4	The younger generation are definitely better with computers than the older generation.
4	In employment we see a 10 years generation gap of the use of technology.
5	Students are not waiting to be taught about computers, they find their own way. The younger generation is learning by themselves. Graduates are much better qualified now than they were before.
9, 4	Students know how to use the social media but are not adept at using Excel or PowerPoint. Students still need to know how to use today's work tools.
8	They need to learn Excel and PowerPoint at high school before students graduate.
7	The curriculum still seems to be traditional, same as in 1980 but with use of computers. As yet, we have not converted our knowledge into the knowledge economy. We don't know what future work requirements are and we don't have the data ready to data mine information for use.
7	We have a social media syndrome.
5. To what extent is the general level of mathematics in the country sufficient to develop artificial intelligence solutions?	
3	Private sector schools are way in advance of public sector schools in terms of mathematics.
4	The standard in private schools and the likes of ATHS are much different than the standard of the Ministry of Education. There is a big gap in competence.
1	The curriculum is enriched in private schools where they have calculus 1. Whereas government schools stay with algebra.
9, 1	The purpose of teaching mathematics needs to be clear to the students because there seems to be no relationship to real life.
8, 3	We need to have real-life applications that have to be linked to the real work environment.
7	Not every child needs to know about mathematics. All we need to do is align it with the future agenda.
6	An example of requiring mathematics is the banking sector.
6. To what extent should post school English language education be paid by parents?	

5	There is a requirement for the foundation programmes to be stopped by 2020 as it is a stated government KPI.
4, 5	Children should be guided by the parents and should ensure that they achieve stated targets, especially after 12 years of education.
7	The question is how can students, some coming through education, be allowed to graduate when they don't have the skills required in English language.
2	The teacher should pay or the education sector should pay.
3, 1	Everyone should know the standard and level required for student expected graduation from school. Education should pay.
6	Private sector schools have a good level of English language and graduation but public sector schools do not.
3	Parents should be alerted when their child is failing.
1	I think the school management or the teacher should pay.
5	If the student fails don't blame the school, blame the parent.
3, 7	Standard should be known for graduation and entry into further education. Therefore the MoE is responsible.
1, 5	The standard of English language needs to be raised in each school.
4	Government schools are the problem because English-language standards are not high enough.
7. To what extent is industry involved in the UAE education system?	
1	Some of the education programmes that schools or universities teach will be obsolete within four years so we should be looking at future job vacancies. Some of the schoolbooks are the same books as we used in the 1990s and the way they teach students is the same. Some graduate's knowledge is out of date.
6	There is big expectation from industry from students. People's engagement and support is required.
8	Industry is not involved in the private school sector.
4,3	There is involvement but no commitment from industry to education.
7	Today is the first time I've been asked for my involvement in education, but we do attend career fairs.
6	There is a huge gap between education and industry, we need one unified system, one unified process.
1	There is no knowledge of vacancies in the public domain, students don't know where to look for jobs.
6, 3	We need to receive students with basic skills, soft skills, skills for the workforce because we are relying on the employer to train the students.
7	There is no requirement here for youth to be employed part-time, during the school years, this would give students a taste of the workforce which is what they need.
3	Students need to know what employment means in each sector as it is unknown by students at this time.
8. To what extent do all UAE unemployed, of working age (who are looking for work) need to undergo skill upskilling?	
6, 3	Yes there is a real need for basic skills.
4, 7	Once students become unemployed for a while they forget their skills. The majority of graduates require training.
4	Some UAE unemployed are better equipped than existing staff.
7	Emiratis need to go through training in different skills for different capabilities. We also need to consider how serious industry is to employ Emiratis.
3	There needs to be a referral system, referral for jobs after training but we need to be ready to hire from the market.

7	Industry gives full training to Emiratis, then they leave for better paid employment elsewhere. However, this benefits the country.
3	It is important for the industry that graduates have the basics such as ICDL.
5	Soft skills are more important at the entry level, industry can do the training thereafter.
4	Student volunteer hours should be partly achieved in the workplace.
8	Parents have to instill the need to chase whatever their passion is to achieve a career output.
9. To what extent does the present UAE vocational education system meet the needs of the national economy?	
9	UAE students need to understand that you start at the bottom of a career and work your way up as this leads to promotion. Internships would benefit the economy.
3, 5	There is a need for apprenticeships, because students need time to improve their skills.
7	HR needs to have some business continuity and succession planning to increase the number of locals in jobs. However, I cannot answer very clearly as I don't have the full picture.
2	Some students coming from vocational education centres into industry have no specific skills and do not meet the demand of industry. They need basic customer service training.
2	There needs to be basic training for all students on customer service.
6	There is a lack of awareness of skills required in the workplace.
4	The country has weak human resource management.
7	Some of the major industries in the United Arab Emirates are not able to recruit their Emirati graduate quota.
9	Industry needs to be more involved in training perhaps we need industry controlled training.
10. To what extent are skills that are not needed in the economy being provided for in post school education?	
1	In general, students are not educated to meet the needs of the economy. Some students have outdated skills. Only 2 out of 10 are good.
6	Those without English language tend to study law in Arabic, then they cannot find jobs.
4, 7	There are also government trends, for example, there are too many human resource graduates. Some subjects taught are not needed for the economy.
1	Seats need to be restricted in university and college programmes to meet market needs - for example, we don't need more teacher training.
6	Some majors in college and university are a waste of time.
11. To what extent can knowledge of career pathways help a learner shape their educational pathway?	
6	Student needs to know the pathways required for their careers.
8	There should be a duty to give career guidance in schools. Further, testing their aptitude and giving guidance on career options would be beneficial.
1	There is insufficient career guidance in schools causing a big gap in knowledge of careers and career pathways.
7	There needs to be school career guidance aligned to the jobs that are vacant in the workplace. For example, what information do we give students from the leadership down? What do students know about sectors, what do they know about job vacancies?
2, 7	There is no assessment of personality for students and if counselling was given will the counsellor know the requirements for the job market?
7	The vision of how to achieve a career needs to be cascaded down.
12. To what extent our job vacancies made aware to Emiratis looking for work?	
2	Tawteef job fair is only an exhibition for employers. 45,000 students apply for jobs only about 1% will get jobs.

1	The process of employment takes too long and students expect better packages.
4	Many students do not have the qualifications for the job that they are applying for.
6	There are gaps between what industry needs and the qualifications given in college and university.
1	Payment levels for jobs are important to students.
2	Students don't want to work because fathers are giving them stipends.
6	Nationals prefer government sector jobs.
5	If students receive a salary of 8000 dirhams their happy.
7	Families spoil employment potential by not allowing their children to work in certain sectors.
6, 2, 7	Sectors need to be selected and moved towards to meet the national agenda.
2	The UAE needs nurses, but there are only 308 licensed national nurses in the UAE.
6	There are jobs available but the students don't have the skills.
9	The country needs to harness the experience of the training given in the military service.
Source: developed for this research.	

Next, the transcripts from the six focus groups are compared and themes emerge.

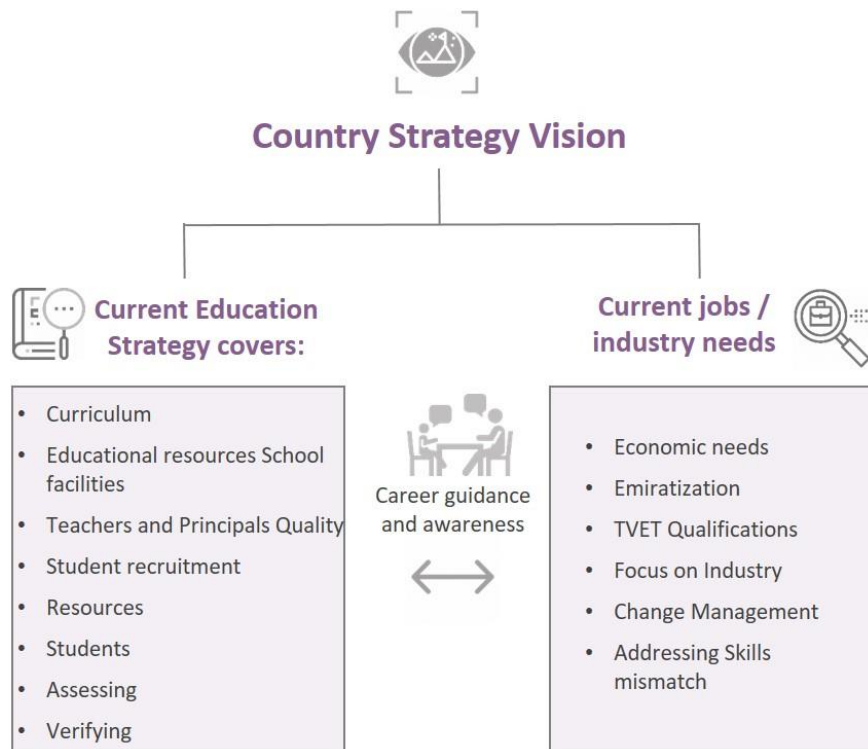
3.7.2 Comparison of focus groups and emerging themes

This section considers the country's approach to informing its citizens about the future direction of the country, it considers the role of the UAE visions, the Leadership communication strategy that used tweets and the impact of those approaches on technical and vocational education.

Strategy. The first question, Research Question A for this research asked: 'Is there a strategy for technical vocational education in the UAE that can effectively meet the advanced technological skills to meet the leadership visions?'

The framework for the initial technical and vocational education strategy for this research was established, as shown in Figure 3.2.

Figure 3.2 Initial Strategy



Source: developed for this research.

Next, questions were addressed to the six sample groups. Responses with the most comments are reported.

This main research question was addressed to the Ministers only; group FM, because Ministers are more aware of the country’s strategic direction and work closely with the government on shaping the future. In response to this question, there is no strategy for technical and vocational education (FM 1 to 10). Further, there is no link between technical and vocational education, academic education and the labour market (FM 5) and a unified strategic plan is needed for the UAE to achieve its goals (FM 1 to 10). In general the Ministers’ views were that there was no formal strategy for vocational education in the United Arab Emirates (FM). Further, there is no clear vocational educational direction for the country (FM). Therefore, the effect of vocational education in being able to meet the advanced technological skills required for the Leadership’s vision is lacking a strategy.

Question 1: ‘To what extent are the tweets by the country leadership informative in relation to TVET?’

This question was addressed to Ministers group FM, Directors group FD and Industry group FI.

In response to this question, the tweets about the vision were clear (FI 2, 6, 7) but there were no tweets about TVET (FM 7, FD 1, 3, 6). Further, tweets about TVET were important to highlight TVET achievements and its importance for the national economy (FM 2, 7). Additionally, tweets needed a consistent message for the community for a greater understanding of TVET not only events. The theme emerging between the groups was that the tweets from the country Leadership was clear and transparent (FM, FD, FI), addressing general education rather than technical and vocational education (FM). The result was that generic tweets were difficult for the population to understand (FD) and the application of skills required to meet the country's vision was unclear (FD, FI). Therefore, tweets are general but not specific to technical and vocational education, they do not outline the road map and the benefits of technical and vocational education to the general public.

Question 2: 'To what extent are the UAE visions for the country's direction and development informative in relation to TVET?'

This question was addressed to Ministers, group FM, Directors, group FD, Teachers, group FT and Industry, group FI.

In response to the question, the country's visions are clear (FM 2, 4, FD 8, 3, FI 7) but the technical vocational education vision and benefits are unclear (FM 5, 10). Further, the roadmap on how to achieve the visions is unclear (FT 4). The theme emerging from the four groups was that the UAE country's leadership direction is clear (FM, FI) but how the visions are to be executed or the road map are not (FM, FT, FI). Furthermore, there is a lack of understanding of the benefits of technical and vocational education (FD). Therefore, the UAE visions are clear but how they are to be achieved, in details, is not, leading to a lack of understanding of the value and benefits of technical and vocational education.

Question 3: 'To what extent are the general level of computing skills in the country sufficient for a knowledge economy?'

This question was addressed to Teachers, group FT, Students, group FS, Parents, group FP, and Industry, group FI.

In response to this question, the curriculum does not include enough coding (FP 2), JAVA is hard for the students, and STS has no clear path for mathematics and coding (FT 10). Further, students need more training in computer skills (FS 27, 42) because according to industry, students' computer skills are not good enough (FI 3). The theme emerging from the four groups is that the older generation are not as competent in use of computers as opposed to the younger generation (FT, FI). Whereas, students believe the computing level in the country is sufficient for a knowledge economy (FS), but the Parents disagree stating the computing skills are not sufficient for a knowledge economy (FP). However, students do believe they have the computing skills, although there is no agreed standard of computing for a knowledge economy. Therefore, the younger generation are considered more competent and able to meet the needs of the economy, but there are clear shortcomings in their current education.

Question 4: 'To what extent are the digital resources available in the UAE school/institutes sufficient for a knowledge economy?'

This question was addressed to Directors, group FD, Teachers, group FT and Students, group FS.

In response to this question, some respondents thought the schools had a lot of digital resources (FS 1, 2). However, there was a wider view that not enough technology was available to support the requirements of a knowledge economy (FD 1, 5, 6, FS 19). Furthermore, more computers were required (FS 19) iPad's were old and out of date (FS 2), some programmes were unlicensed (FS 4), some computers were broken and some keyboards were not working (FS 2). The theme emerging from the three groups is that sufficient digital resources are not available (FD, FP). Furthermore, teachers, although they thought digital resources were available, indicated that internet speed and access needed to be enhanced (FT). Therefore, majority view is that the digital resources are not sufficiently available for a knowledge economy.

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Question 5: 'To what extent is the general level of mathematics in the country sufficient to develop artificial intelligence solutions?'

This question was addressed to Teachers, group FT, Students, group FS, Parents, group FP and Industry, group FI.

In response to this question, artificial intelligence is not in the mathematical curriculum (FT 2, 4, 8) and the level of mathematics was not as good as it should be to be able to operate artificial intelligence (FS 38, FP 2, 7). Further, the teaching of mathematics is taught in such a way that it has no relationship to real life (FI 3, 8). The emerging theme is that the general level of mathematics is not sufficient for the development of artificial intelligence (FT, FS, FP, FI). Further, the curriculum needs to be designed and delivered innovatively to be more appropriate for future country wide developments (FP, FI). Therefore, the mathematics curriculum and the delivery of mathematics is not sufficient to develop artificial intelligence.

Question 6: 'To what extent is the general level of computing programming and coding skills sufficient for developing artificial intelligence?'

This question was addressed to Teachers, group FT, Students, group FS and Parents, group FP.

In response to this question, it was considered that the best students were able to code (FT 2). However, it depended on which type of school was attended (FS 8) with students themselves saying programming classes were too short and not always understood (FS 31). Further, there is a view that students programming skills were weak and the teaching staff were weak (FP 7). The emerging theme from the three groups is that the level of computing and coding skills was not sufficient for a knowledge economy (FS, FP). Further, the curriculum needs to reflect the content and need for artificial intelligence (FP). Therefore, the curriculum offering computing and coding does not produce the skills necessary to meet requirements for developing artificial intelligence.

Question 7: 'To what extent are UAE students able to build robots?'

This question was addressed to the Teachers, group FT only.

The emerging theme from the Teachers is that the curriculum needs to concentrate more on coding and programming (FT 10) and that the teachers themselves need more training on this subject area (FT 10, all). However, students have the basic knowledge of

robotics (FT 6). Therefore, the teachers judge they are not sufficiently competent to teach robotics and students only have basic knowledge of building robots.

To summarise, issues emerging from the focus group discussion addressing the strategy of technical and vocational education are as follows:

1. Leadership vision and tweets are understood but are not specific to technical and vocational education.
2. There is no road map available for the implementation of the country's visions.
3. There is no technical and vocational educational strategy.
4. There is no consistent message about technical and vocational education in the UAE.
5. There is a lack of understanding of the value and benefits of technical and vocational education.
6. Students need more training in computing skills.
7. Not enough technology is available in schools.
8. Access to internet and fast internet speed is not available in schools.
9. Artificial intelligence is not in the curriculum.
10. Level of mathematics is not sufficient for a knowledge economy or artificial intelligence.
11. Level of computing and coding skills is not sufficient for developing artificial intelligence.
12. Students have a basic knowledge of building robots.
13. Teachers judge they are not sufficiently competent to teach robotics.

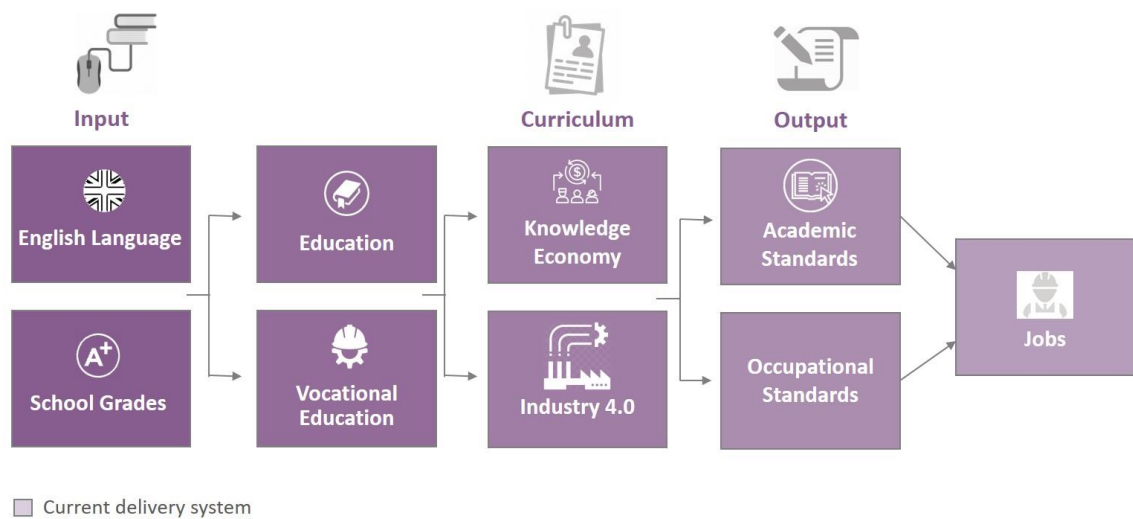
To confirm the extent of the issues presented by focus groups, a questionnaire was issued to determine the strength of judgement about each of the above issues with results reported in Chapter 4.

Delivery. Next, the second research question was addressed and is:

Research question B: 'Is there an approach in the UAE that can effectively deliver technical and vocational education and training?'

The framework for the initial delivery system of technical and vocational education for this research was established, as shown in Figure 3.3.

Figure 3.3 Initial delivery system



Source: developed for this research

Research question B was addressed to Ministers only, group FM because it addresses a strategic question.

In response to this question, the lack of TVET strategy could cause poor planning and implementation (FM 1, 9, 10). Further, there was no organisation looking after TVET at the Federal level in the UAE (FM 10). Additionally, there are different projects and initiatives such as the National Qualifications Authority, ACTVET and Higher Colleges of Technology (HCT) but they are stand alone (FM 6). The theme emerging from the Ministers was that there is no clear approach in the UAE that can effectively deliver technical education (FM). Further, the delivery of technical and vocational education needed to be applied for successful outcomes (FM). However, the Ministers did state that the ACTVET schools and institutes were the most effective in the country (FM). Therefore, the approach for delivering technical and vocational education is not clear.

Question 8: 'To what extent are teachers able to teach the information needed for a knowledge economy?'

This question was addressed to Teachers, group FT, Students, group FS and Parents group FP.

In response to this question, teachers did not judge that the curriculum was clear (FT 10), and teachers need to relate theory to practice (FT 7). Some teachers make students

memorise (FS 1) and are not using up to date practice (FT 10) because the teachers are aiming for results not comprehension (FS 27, 31, 35, 41, 43, 44). Additionally, some teachers need to improve their communication skills (FS 16, 9) and understand what a knowledge economy is (FP 2, 8). The emerging theme from the three groups is that teachers are not knowledgeable enough about the knowledge economy (FP) although students disagree they agree teachers need more effort in this area (FS). However, teachers judge that the method of teaching should be learner-centred and use flipped classrooms for better effect (FT). Therefore, teachers are not sufficiently prepared to teach information technology, using progressive teaching methods, or to address the information needed for a knowledge economy.

Question 9: 'Teachers knowledge is supplemented by using computer search engines?'

This question was addressed to Teachers, group FT, and Students, group FS.

In response to this question, all teachers thought their knowledge was supplemented by the internet (FT all, FS 31, 42). The theme emerging from the two groups is that teachers are not fully knowledgeable about their subject and use the internet to supplement their knowledge for the purpose of teaching students (FT, FS). Therefore, internet browsers are important for teaching purposes.

Question 10: 'To what extent are teachers in the UAE equipped to teach skills for development of artificial intelligence?'

This question was addressed to Teachers, group FT, Students, group FS and Parents group FP.

In response to this question, the Teachers and students stated that teachers needed more training (FT 2, 4, 10, 12 FS 38, 41, 42, 47, FP 1, 6, 7), curriculum is not connected to artificial intelligence (FS 27, 41) clear plans are needed (FP 2, 7), and more qualified teachers were required (FT 7). The theme emerging from the three groups is that teachers are not equipped to teach artificial intelligence (FT, FP) although students disagree (FS). Additionally, teachers need to update and improve their knowledge of artificial intelligence during Professional Development (PD) week (FT). Therefore, teachers themselves are aware that they do not have the skills to teach artificial intelligence and are requesting PD to improve their teaching knowledge.

Question 11: 'To what extent do teachers have a specific teaching qualification?'

This question was addressed to Teachers, group FT.

In response to this question all teachers agreed that they had specific qualifications needed to teach their particular subject (FT). Therefore, a qualified cohort of teachers were employed.

Question 12: 'To what extent should post-school English language education be paid by parents?'

This question was addressed to Ministers, group FM, Directors, group FD, Students, group FS, Parents, group FP, and Industry, group FI.

In response to this question, many views were expressed by the different groups. It was stated that parents are responsible for their children's education, (FM 3, 8, FS 10, FI 5) but the Ministry of Education is responsible for their English language level (FM 8, FD 1, FS 1, 4, 11, 12, 18, FP 1, 2, 6, 7, FI 1, 3, 7). Students on the other hand thought they should be responsible themselves (SF 5, 8, 9, 29). Additionally, it was suggested that the Ministry of Education was only responsible for children attending public schools (FM 8, FS 1, 4, 11, 12, 18). Further thoughts were that parents should pay (FM 8, FS 2, 5, 10, 16, 17, 19). Further, it was agreed that if parents had to pay for English language education, then the level of English language would improve drastically (FD 1, 2, 3, 4, 5, 6, 7, 8). The theme emerging from the five groups is that English language is the responsibility of the government for students who fail to reach the required standard of English language in public schools (FM, FD, FP, FS). However, Parents that have chosen private schooling ought to pay for the extra classes to bring their children up to standard (FM). Furthermore, students themselves believe they have a responsibility to pay for extra classes to bring their level of English language up to standard (FS). Therefore, the majority view is that government should pay for those students that attended government schools.

Question 13: 'To what extent is industry involved in the UAE education system?'

This question was addressed to Directors, group FD and Industry, group FI.

In response to this question, it was voiced that there was very little involvement of industry in the UAE education system (FD 1, 2, 3, 4, 5, 6, 7, 8, FI 3, 4, 6, 8). The theme

emerging from the two groups is that industry does not play a big enough role in shaping education (FM) and is not involved in shaping the curriculum (FI). Therefore, industry and technical and vocational education do not come together to develop technical and vocational education.

Question 14: 'To what extent do all UAE unemployed of working age (who are looking for work) need to undergo skills upskilling?'

This question was addressed to Directors group FD, Students group FS, Parents, group FP and Industry, group FI.

In response to this question, it was determined that there was a requirement for unemployed to re-skill (FD 1, 3, 4, 7, FS 5, 13, 36, 42, FP 1, 2, 8, FI 3, 6, 4, 7). Further, there needed to be a distinction between academic and technical and vocational education and there needs to be harmonisation between the two tracks (FD 1). The theme emerging from the four groups is that there is a huge requirement for upskilling of Emirati unemployed (FD, FS, FP, FI). Further, there is a need for basic soft skills such as customer service, PowerPoint and Excel computing skills (FI). Furthermore, there needs to be a distinction between academic and technical and vocational education which industry understands (FD). Therefore, the programs need to be developed to upskill unemployed Emiratis in technical and vocational skills and soft skills with a clear distinction between academic and technical and vocational education.

Question 15: 'To what extent does the present UAE technical and vocational education system meet the needs of the national economy?'

This question was addressed to all groups of Ministers FM, Directors, group FD, Teachers, FT, Students, group FS, Parents, group FP and Industry, group FI.

In response to this question, there is a huge gap in provision between schools, colleges, industries and the job market (FM 2) resulting in technical and vocational education not meeting the needs of industry (FM 9). Further, there are a limited number of TVET graduates (FM 9). Additionally, technical and vocational education schools need to be linked with industry and there is a need for industry based academies (FM 6). The theme emerging is that the Minister's judge that the technical and vocational education system does not meet the needs of the UAE economy, mainly because entities such as the National Qualification Authority, Ministry of Higher Education Science and Research,

schools and industry are not working cooperatively (FM). Therefore, although there are key Authorities and Ministries in the education system they are not working collaboratively.

In response to this question, some graduates of technical and vocational education arrive in industry without the required skills (FD 3, FI 2) due to the lack of knowledge about the skills required in the workplace (FI 6). Furthermore, some programmes are being offered and they are already redundant for the market place (FD 3). Additionally, there is no data on the outcomes of technical and vocational education that makes it difficult to make a judgement (FD 1, 4, 6, FS 31, 36). Conversely, there is a judgement that technical and vocational education is meeting the needs of the UAE national economy (FP 1, FT 9, FS 44 and 12 students agreed) mainly due to the student voice. The theme emerging is that there is no conclusive judgement on the present technical and vocational education system meeting the needs of the national economy (FM, FT, FS). Further, vocational education is ineffective because of the lack of coordination with industry (FM, FT), and there is a lack of information for decision makers about the future needs of the country (FD). Therefore, technical and vocational education with industry ought to reconsider the needs of the national economy.

Question 16: 'To what extent are skills that are not needed in the economy being provided for in post school education?'

This question was addressed to Directors, group FD, Teachers, group FT and Industry, group FI.

In response to this question, some subjects taught are not needed for the economy (FD 1, 3, FI 4, 6, 7) with programmes needing to be reconsidered and restructured (FT 7) and harmonisation of qualifications is lacking (FD 4). Further, some students studying academic routes holding Bachelor degrees are preferred for employment rather than technical and vocational education graduates, even though the academic graduates could not do the work (FD 4). The theme emerging from the three groups is that some post school programmes, both academic and technical and vocational, are being delivered but do not lead to employment (FD) and it is understood that post school technical and vocational education programmes need to be restructured to meet the economic needs (FT, FI). Therefore, the academic and technical and vocational

education programmes do not always meet the present and future needs of the economy.

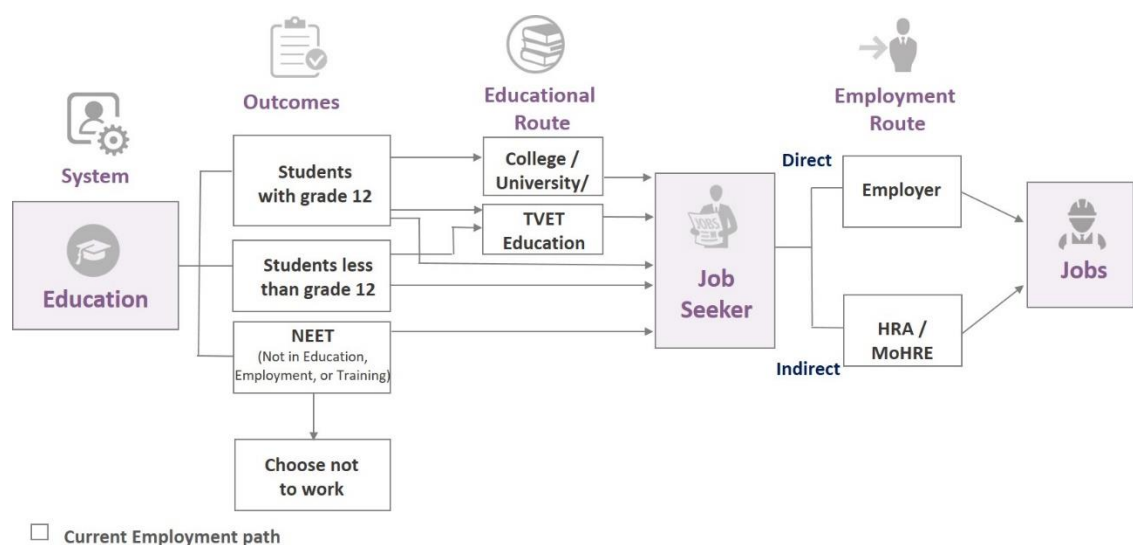
To summarise, issues emerging from the focus group discussion addressing the delivery of technical and vocational education are as follows:

1. There is a lack of TVET strategy causing poor planning and implementation.
2. Technical and vocational education is not meeting the needs of industry.
3. There is no clear approach to TVET.
4. Teachers aim for results not comprehension.
5. Teachers need to improve their communication skills.
6. Teachers are not knowledgeable enough about a knowledge economy.
7. Teachers judge that flipped classroom approaches are more effective.
8. All teachers supplement their teaching knowledge by using the internet.
9. Teachers are aware that they do not have the skills to teach artificial intelligence.
10. All teachers are qualified in their specialist subject but admit they require more training in artificial intelligence.
11. The curriculum is not clear and not connected to artificial intelligence.
12. Ministry of Education is responsible for English language acquisition in post school education where the student attended a public school.
13. There is very little involvement of industry in the UAE education system.
14. Unemployed need to be reskilled or upskilled for employment purposes.
15. Academic qualifications are preferred to technical and vocational qualifications.
16. There needs to be a clear distinction between academic and technical and vocational education.
17. Educational entities like HCT and NQA need to radically collaborate for efficiency in the education system.
18. There is no data on the outcomes of technical and vocational education to make judgement about technical and vocational education's effectiveness.
19. Some programmes that are not needed in the economy are being offered and delivered in government post school institutions.
20. Programmes need to be reconstructed for harmonisation in the educational landscape and meeting economic need.

To confirm the extent of the issues presented by focus groups, a questionnaire will be issued to determine the strength of judgement about each of the above issues with results reported in Chapter 4.

Employment. The next section, considers research question C, the unemployed Emiratis, the systems of employment for Emiratis and the reskilling and employment opportunities in the UAE, as shown in figure 3.4.

Figure 3.4 Initial employment system



Source: developed for this research.

Research question C: Is there a system in the UAE that effectively engages the unemployed in successful occupational outcomes?

This question was addressed to Ministers.

In response to this question, the answer from the Ministers was that there were industry opportunities but not strong links between industry and technical and vocational education (FM 5, 7, 9). Further, there is no Federal database for unemployed to search for job opportunities (FM 3, 4, 7, 9) and there is no accurate database of those that are unemployed (FM 7). The theme emerging from the Ministers' group is that there is no system to capture the unemployed and successfully engage them in coordinated occupational outcomes in cooperation with technical and vocational education and

industry (FM). Therefore, a system between industry and technical and vocational education has not been fully investigated or capitalised on for better meeting the needs of industry and the economy.

Question 17: 'To what extent can knowledge of career pathways help learners shape their educational pathway?'

This question was addressed to Teachers, group FT, Students, group FS, Parents, group FP and Industry, group FI.

In response to this question, knowledge of career pathways would help students chose careers (FT 4, 6, 7, 10, FS 17, 38, FP 3, 6, 7, FI 1, 6, 7, 8). However, there is a lack of published industry requirements (FP 2, 7, FS 7). The theme emerging from the four groups is that there is not enough career guidance available for students (FT, FS, FP, FI). Career pathways need to inform students about the subjects needed to follow their chosen career from Grade 10 onward (FT, FI). Therefore, career guidance helps students make choices for their future career paths.

Question 18: 'To what extent is job vacancies made aware to Emiratis that are looking for work?'

This question was addressed to Directors, group FD, Students, group FS and Industry, group FI.

In response to this question, Emiratis generally find the jobs on company websites (FD 3, 5, FS 17). However, it was agreed that no job vacancies were centrally published, (FS 5, 9, 14). Further, many students did not have the skills for job vacancies (FI 4). The theme emerging is that there is no system in place to assist Emiratis to find work (FM, FD, FS, FI). Therefore, there is no system to assist Emiratis find employment and they have to rely on their own initiative.

Question 19: 'To what extent is there a seamless government process to get the Emirati unemployed into employment?'

This question was addressed to Ministers, group FM, Directors, group FD, Students, group FS and Parents, group FP.

In response to this question, the system for assisting Emiratis to find work is ineffective and not available (FM 7, 10, FD 1, 3, FS 5, 8, 10, 31, FP 6). Further, there needs to be more employment in the private sector as opposed to the public sector (FM 1, 2, 3, 8 FP 3). The theme emerging is that there is no seamless process for Emiratis to follow to register and find work (FM, FD, FS, FP). Further, Emiratis need to be supported by a government agency to find employment (FT). Therefore, government systems are not available to assist Emiratis find and secure work in the workforce.

Question 20: ‘To what extent can the General Pension Fund and the Federal Authority for Identity and Citizenship (Emirates ID) play a part in assisting Emiratis to find employment?’

This question was addressed to Ministers group FM and Directors group FD.

In response to this question, there was agreement that government agencies such as the General Pension Fund and the Federal Authority for Identity and Citizenship (Emirates ID) do not play a part in the employment process (FM 3, 6, 7, 8, 9, 10, FD 1). The theme emerging is that the General Pension Fund and the Federal Authority for Identity and Citizenship (Emirates ID) have excellent databases but do not share the information that could identify unemployed Emiratis and could assist them in finding employment (FM). Therefore, the General Pension Fund and the Federal Authority for Identity and Citizenship (Emirates ID) are not involved in the employment process.

To summarise, issues identified from the focus group discussion addressing the employment processes for Emiratis are as follows:

1. Knowledge of career pathways would help students in their choice of career.
2. Job vacancies, in general, are not made available to Emiratis.
3. There is no seamless system in place to assist Emiratis into work and the present method is inefficient and ineffective.
4. More employment is needed in the private sector.
5. The General Pension Fund and Federal Authority for Identity and Citizenship have databases that would be useful but they are not shared.

3.8 Conclusion

In conclusion, the focus groups have highlighted some of the problematic areas associated with technical and vocational education in the UAE. Therefore, the technical and vocational educational landscape warrants further research to determine the strength of judgement for each of these problematic areas. To capitalise on the results of the focus group, it was decided that a questionnaire be circulated with the results of the questionnaire discussed in the next chapter.

Chapter 4 Explanatory research

4.0 Introduction

This chapter introduces the explanatory research.

4.1 Plan of this chapter

Table 4.1 Plan of this chapter	
4.1	Plan of this chapter
4.2	Selecting questionnaires for explanatory stage of this research
4.3	Ethical considerations
4.4	Implementing questionnaires
4.5	Questionnaire administration
4.6	Comparison of survey results
4.7	Conclusions

4.2 Selecting Questionnaires for explanatory stage of this research

Surveys using structured questionnaires are schedule standardised (Blumberg, Cooper & Schindler, 2005) and follow a schedule but do not allow for deviation from the questions set. The survey questions being asked were pre-determined and did not deviate between respondents surveyed (Blumberg, Cooper & Schindler, 2005). The strengths of a structured questionnaire are that:

- It allows comparison of data, like for like, over all surveyed respondents.
- It can reach a large sample inexpensively.
- A representative sample and results allows statements to be made.
- Questions are structured and asked in the same way.
- Can be collected and recorded by internet electronically (Blumberg, Cooper & Schindler, 2005).

The weaknesses of using a structured questionnaire are that:

- Respondents are answering a set question but do not give meaning behind their answer.

- Questions cannot be explained to the respondent and could be open to misinterpretation.
- Some responses will give socially desirable answers and not necessarily the reality (Blumberg, Cooper & Schindler, 2005).

A five point Likert scale was used because it is:

- Simple to use (Zikmund, 2000).
- Capable of indicating strength of attitude (Bryman and Bell, 2007).
- Able to determine frequencies, and quantitative analysis (Blaxter, Hughes & Tight, 1996).
- A scale that reflected opinion, quality and quantity (Cohen, Manion & Morrison, 2007).
- Quick to administer (Bryman & Bell, 2007).
- One that allowed Muslim women to answer neutrally - to avoid sensitive questions.
- Easy to code (Cohen, Manion & Morrison, 2007).

4.3 Ethical considerations

Approval had already been given by the United Arab Emirates government for this research to be conducted (See Appendix A), as had ethical approval, applied for and given approval by the University of Ulster (See Appendix A) as notified on the 4th July 2018. Respondents were informed at the introduction to the questionnaire of the nature of the research. Respondents had the questionnaire sent to their email addresses electronically and whether they completed the questionnaire or not was completely voluntary. Respondents were assured confidentiality and anonymity. Therefore, ethical considerations were assured.

Truthfulness. Some respondents answer questions the way they think the researcher wanted or expected them to answer, to please the researcher, give socially desirable answers, but are more likely to lie particularly in questions on sensitive issues or private information (Dillman, 2000). However, in the Muslim community Islam commands truthfulness and forbids lying, ‘Always speak the truth. Shun words that are deceitful and ostentatious’ Quran 22:30, (IRFII, 2018). Therefore, it is expected that a Muslim’s

inner beliefs will not allow them to answer dishonestly and as a result it is envisioned that there will be less deceit in this questionnaire than would possibly be found in other cultures.

4.4 Implementing questionnaires

Designing the questionnaires. In this research due to confidentiality, much of the personal data was not collected and did not detract from the final result. The first priority was to make sure the content of the questions was related to the three research questions and the sequence in which they were to appear. The number of questions chosen for each sample group was kept to the minimum so that the questionnaire could be completed quickly and did not become tedious for the respondent. Some similar questions were asked across the sample groups for strength of attitude and for comparison. It was important to word carefully so that questions were clear and not leading in a way that respondents would be led to give particular answers. Respondents were also assured that their responses were both valuable, anonymous and confidential (Dillman, 2000).

Questionnaire construction.

The 20 questions covering all questionnaires were arranged in three groupings to reflect the three research questions.

Strategy. Seven questions addressed Research Question A about the strategy for achieving the visions of the UAE leadership.

Research Question A asks: 'Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership's Visions?' The questions to address Research question A are as follows:

1. To what extent are the tweets by the country leadership informative in relation to TVET?
2. To what extent are the UAE Visions for the country's direction and development informative in relation to TVET?
3. To what extent are the general level of computing skills in the country sufficient for a knowledge economy?

4. To what extent are the digital resources available in the UAE schools/institutes sufficient for a knowledge economy?
5. To what extent is the general level of mathematics in the country sufficient to develop artificial intelligence solutions?
6. To what extent is the general level of computing programming and coding skills is sufficient for developing Artificial Intelligence?
7. To what extent are UAE students able to build robots?

Delivery. Nine questions addressed the second research question about delivery of technical and vocational education and training in the UAE.

Research question B asks: 'Is there an approach in the UAE context that can effectively deliver technical and vocational education and training?'

The questions to address Research Question B are as follows:

8. To what extent are teachers able to teach the information needed for a knowledge economy?
9. Teacher's knowledge is supplement by using computer search engines?
10. To what extent are teachers in the UAE equipped to teach skills for development of artificial intelligence?
11. To what extend do teachers have a specific teaching qualification?
12. To what extent should Post-school English language education be paid by parents?
13. To what extent is industry involved in the UAE education system?
14. To what extent do all UAE unemployed, of working age (who are looking for work) need to undergo skill upskilling?
15. To what extent does the present UAE technical and vocational education system meet the needs of the national economy?
16. To what extent are skills that are not needed in the economy being provided for in post school education?

Employment. Four questions addressed the third research question about a system of engaging the unemployed in jobs.

Research question C asks: 'Is there a system in the UAE that effectively engages the unemployed in jobs in successful occupations?'

17. To what extent can knowledge of career pathways help a learner shape their educational pathway?
18. To what extent are job vacancies made aware to Emiratis looking for work?
19. To what extent is there a seamless government process to get the Emirati unemployed into employment?
20. To what extent can the General Pension Fund and Federal Authority for Identification and Citizenship play a part in assisting Emiratis to find employment?

Conducting questionnaires. The next step was to design the questionnaire to gather the data. Survey methods take many forms such as telephone, face-to-face, mail, electronic, self-administered, group administered or some combination of these methods (Cohen, Manion & Morrison, 2007). It was decided to send out questionnaires by email/ This had advantages of clarity and speed, motivation, response rate, anonymity, sample quality control, cost, availability of facilities and duration of data collection. Any disadvantages were outweighed by the advantages. Next, the questionnaire needed to be piloted.

Piloting and administering the questionnaires. Piloting of a questionnaire is important to ensure that the questions are clear, asks what is intended to be asked and is clearly understood by the respondent. Initially, the questionnaires were piloted by a team of 6 educationalists and the questions were refined several times until the questions met the design criteria. The pilot indicated that the final version of the questionnaire design was 'fit for purpose' and was ready to be applied. Next, the method of conducting the questionnaire is discussed as each sample group received a questionnaire.

Group 1. It was important to pre-inform the Group 1 Senior Government Officials that a questionnaire was planned and would be sent to them through their personal work email address. Senior Government officials receive many emails per day and it was important that they expected and received the questionnaire.

Group 2. Group 2 as the Directors, Heads of Departments and Chairs of Departments email addresses were known. It was easy to distribute the questionnaire through their work email address. Coding for these questionnaires allowed analyses of where the

Directors, Heads of Departments and Chairs of Departments worked, to allow for geographical comparison.

Group 3 and 4. The respondents in the sample groups for Group 3 Teachers and Group 4 Students were all contacted through the school database system and emails were sent as internal mail to the teachers and students. Coding for these questionnaires allowed analyses of where the student or teacher worked, to allow for geographical comparison.

Group 5. Sending the questionnaire to Group 5, the Parents required agreement. Although the school system had the email addresses on record, due to disclosure of personal details, approval and clearance had to be gained first before contacting the parents.

Group 6. For Group 6, industry partners, the Business Development Manager's gave their contacts to gain sufficient email addresses for a reasonable response.

The questionnaires were administered, in English, to each sample group. Questionnaires were circulated electronically, using Google docs to the sample groups. Google docs were used because the results arrived electronically and were automatically collated in a spreadsheet format. Results rates varied but were better than expected returns.

Each questionnaire was headed by a short introduction to the survey informing respondents of what the survey was about and why the information was being collected. The questionnaire heading stated the reason for the information to be collected, and assured respondents of their anonymity and confidentiality, with results only being used for research purposes (Sekaran, 2000).

Administering the survey was inexpensive in time, cost and travel (Bryman & Bell, 2007) and the time frame for collection was short. Therefore, external events could not affect the results over time (Cohen, Manion & Morrison, 2007).

Further, all raw data from the questionnaires applied to the analysis of the results, is shown in Appendix E.

In the remainder of this chapter, all the questionnaire results are presented and summarised. Next, in Section 4.5 the responses are presented and interpreted for each question for each group (Ministers, Directors, Teachers, Students, and finally Industry).

4.5 Questionnaire administration

The respondents were from the same population as the Focus groups and consisted of the same type of group member. A total of 8,990 were contacted for the survey and 4,395 responded. Each group was asked a series of questions that were applicable to that group, out of the total number of twenty questions. Not all groups were asked the same set of questions. Further, results presented for the groups reflects the results from the Likert scale used in the questionnaire and are worded accordingly. Further for comprehension the Likert questions offered five options for respondents to select and are:

- Extremely high
- High
- Moderate
- Low
- Very low.

Based on the respondents' responses, the dominant answer was taken as representing the result for that question. In chapter 5, the dominant answers will be used to compare the responses between groups to gain an overall judgement of the research results. The results of the questionnaire are presented below.

Group 1: Ministers

Twelve Ministers and Undersecretaries, a representative sample for this group, were contacted to complete the questionnaire and 11 completed showing a very high or 91% return rate. Twelve questions, one general and 11 from the series of 20 questions, were asked of the Ministers group in a follow up survey to the FM Large Focus Group. Next, the results of the questionnaire for the Minister's group are presented. The first question was general about where the respondent worked and their position, the remaining 11 were from the questionnaire series.

Of the eleven Ministers and Undersecretaries, 45.5% were government Ministers, 36.4% were Director Generals or Managing Directors, 18.1% were Deputy Director Generals. This group of respondents represents the highest level of government officials in the United Arab Emirates and of those responding, just under half were Ministers with a portfolio. The first question was:

Ministers question 1a: Is your position..

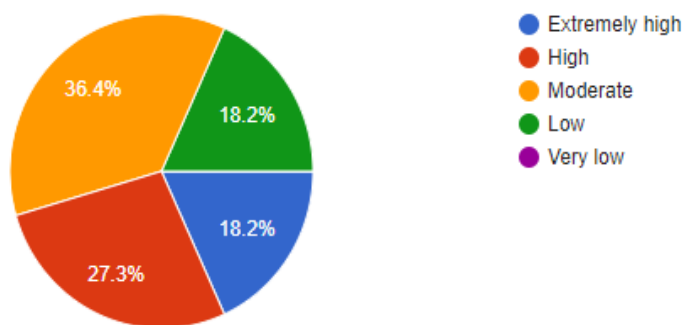
- *Related to education?*
- *Not related to education?*

Of the eleven Ministers, 72.7% were related to education. The remaining 27.3% were in ministerial positions associated with MoHRE, youth and artificial intelligence and therefore had a view of the education system from alternative directions. This result was positive as all respondents were familiar with the UAE education system and could knowledgeably make comments.

Next the responses to the 11 questions from the questionnaire series are summarised.

To what extent are the tweets by the country leadership informative in relation to TVET?

Figure 4.1 To what extent are the tweets by the country leadership informative in relation to TVET?

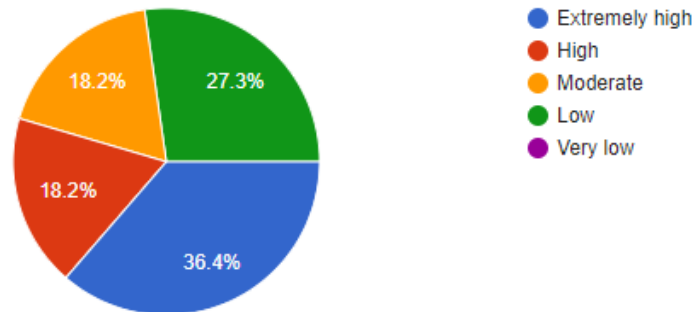


Source: developed for this research.

36.4% of Ministers selected moderate, 27.3% selected high, 18.2% selected extremely high and an equal number (18.2%) selected low, as shown in Figure 4.1, that the extent of the tweets by the country leadership was informative in relation to TVET. This result indicates that Ministers are not convinced that the tweets by the country leadership are informative enough in relation to TVET. Therefore, a recommendation to the leadership could be to tweet positive messages about TVET to the general public to enhance the awareness of vocational education and its value to the country. The dominant answer is moderate.

To what extent are the UAE Visions for the country's direction and development informative in relation to TVET?

Figure 4.2 To what extent are the UAE Visions for the country's direction and development informative in relation to TVET?



Source: developed for this research.

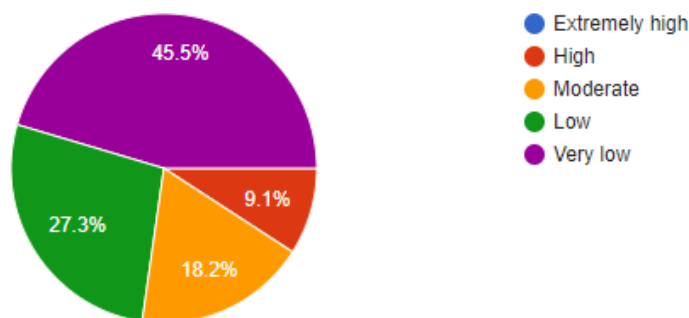
Eleven respondents considered the UAE Visions for the country's direction and development informative, 36.4% of the Ministers group selected extremely high, 27.3% selected low, 18.2% selected moderate and 18.2% selected high, as shown in Figure 4.2. This result indicates that only just over one third of the respondents thought the UAE visions gave them information about the country's direction and development. Therefore, it can be inferred, that the visions of the country are not as clear as they need to be, for high ranking officials to be certain about the direction that the country is taking. The dominant answer is extremely high.

To what extent are the digital resources available in the UAE schools/institutes sufficient for a knowledge economy?

54.5% of Ministers selected moderate, 36.4% selected high and 9.1% selected extremely high that the digital resources available in the UAE schools/institutes were sufficient for a knowledge economy, This result indicates that just over half of the respondents were ambivalent to the extent of digital resources available in schools or institutes. Therefore, there is not a result that would indicate the level of confidence in the type or amount of digital resources available in the UAE schools/institutes is sufficient for a knowledge economy. The dominant answer is moderate.

To what extent should Post-school English language education be paid by parents?

Figure 4.3 To what extent should Post-school English language education be paid by parents?



Source: developed for this research.

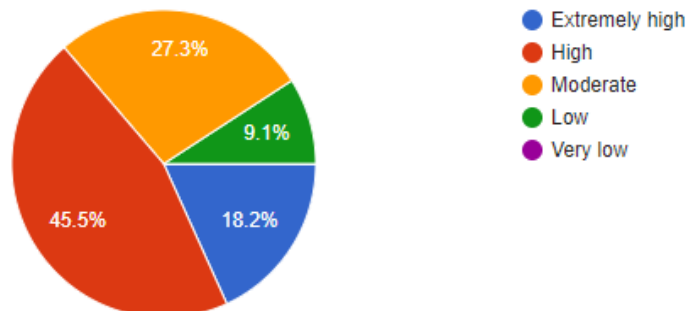
45.5% of the Ministers group selected very low, 27.3% selected low, 18.2% selected moderate and a further 9.1% selected high, as shown in Figure 4.3. This means that Ministers did not think that parents should pay for post school English language education. Further, this indicates that parents are not responsible for students that do not succeed in English language, despite the English language education received in schools. Therefore, high level government officials consider Post-school English language education is the responsibility of another source other than parents. The dominant answer is very low.

To what extent is industry involved in the UAE education system?

36.4% of the Ministers group selected low, 27.3% selected very low, 27.3% selected moderate and 9.1% selected high about the extent of industry involvement in the UAE education system. This result indicates that top government officials judge that industry is not involved in the education process. Therefore, if the education system is to prepare students for employment in industry, then closer collaboration is needed for guidance on the supply of workforce for existing industry requirements and for future industry requirements. The dominant answer is low.

To what extent do all UAE unemployed, of working age (who are looking for work) need to undergo skill upskilling?

Figure 4.4 To what extent do all UAE unemployed, of working age (who are looking for work) need to undergo skill upskilling?

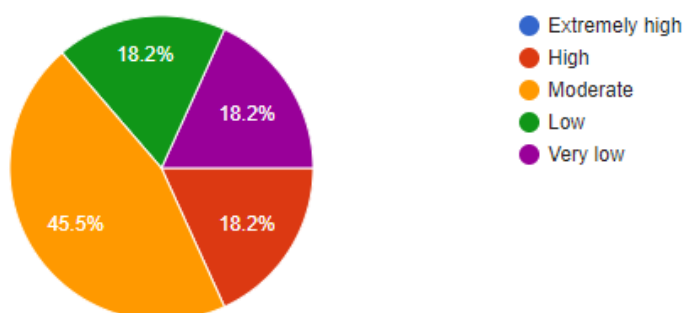


Source: developed for this research.

45.5% of the Ministers group selected high, 27.3% selected moderate, 18.2% selected extremely high and 9.1% selected low, that all UAE unemployed, of working age (who are looking for work) needed to undergo skill upskilling, as shown in Figure 4.4. This result indicates that skilling and reskilling is required. Therefore, there is a clear message that two actions are required: those that are unemployed need to return for skills training and programmes currently on offer need to be evaluated as to whether they meet the needs of the job market. The dominant answer is high.

To what extent does the present UAE vocational education system meet the needs of the national economy?

Figure 4.5 To what extent does the present UAE vocational education system meet the needs of the national economy?

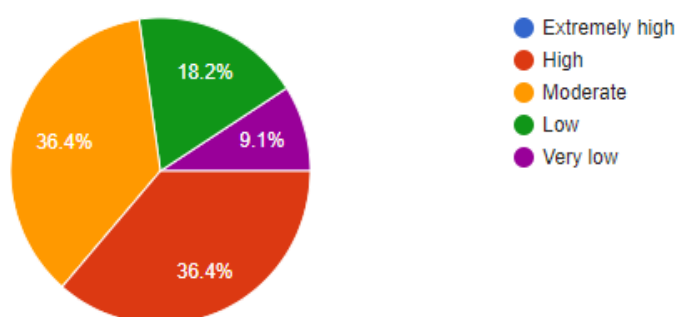


Source: developed for this research.

45.5% of the Ministers group selected moderate, 18.2% selected high, 18.2% selected low and 18.2% selected very low, as shown in Figure 4.5, that the UAE vocational education system does not meet the needs of the national economy. The response indicates that the vocational education system is not meeting the needs of the national economy. Therefore, as in the above question, justification for programmes needs to be considered before programmes are offered in vocational education. The dominant answer is moderate.

To what extent are skills that are not needed in the economy being provided for in post school education?

Figure 4.6 To what extent are skills that are not needed in the economy being provided for in post school education?



Source: developed for this research.

36.4% of the Ministers group selected moderate, 36.4% selected high, 18.2% selected low and a further 9.1% selected very low, as shown in Figure 4.6, that skills not needed in the economy are being provided for in post school education. This means responses could either be considered not knowing, as opposed to others knowing or judged that it was high that skills are not needed in the economy being provided for in post school education. Therefore, further consideration needs to be given to this question to determine why there is a split in the results as it does not show an overwhelming judgement by senior government officials. The dominant answer is moderate/high.

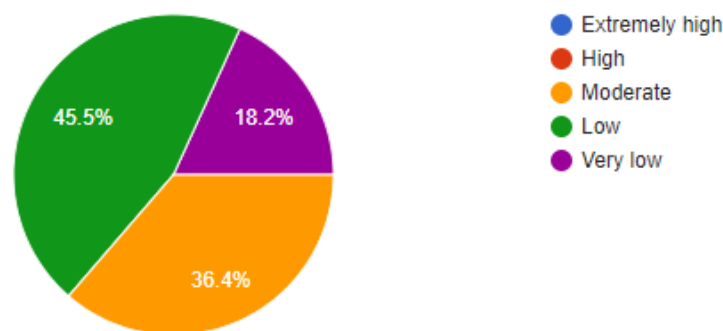
To what extent are job vacancies made aware to Emiratis that are looking for work?

54.5% of the Ministers group selected low, 27.3% selected moderate, 9.1% selected very low and 9.1% selected high about the extent that job vacancies are made aware to Emiratis looking for work. This result is low indicating that just over half of the respondents agreed that job vacancies were not made aware to Emiratis looking for

work. Therefore, it can be recommended to the government that a system to make job vacancies available through a planned process be introduced to assist Emiratis to access jobs available in the market. The dominant answer is low.

To what extent is there a seamless government process to get the Emirati unemployed into employment?

Figure 4.7 To what extent is there a seamless government process to get the Emirati unemployed into employment?

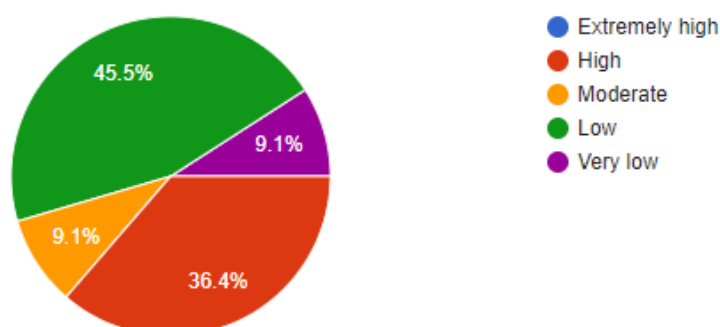


Source: developed for this research.

45.5% of the Ministers group selected low, 36.4% selected moderate, 18.2% selected very low that there is a seamless government process to get the Emirati unemployed into employment. This result indicates that government official were not positive that there is a seamless process for getting Emirati unemployed into employment. Therefore, it could be recommended to government that a process be considered to address this issue. The dominant answer is low.

To what extent can the General Pension Fund and the Federal Authority for Identity and Citizenship play a part in assisting Emirati's to find employment?

Figure 4.8 To what extent can the General Pension Fund and the Federal Authority for Identity and Citizenship play a part in assisting Emirati's to find employment?



Source: developed for this research.

45.5% of the Ministers group selected low, 36.4% selected high, 9.1% selected very low and 9.1% selected moderate, as shown in Figure 4.8, that the General Pension Fund and the Federal Authority for Identity and Citizenship play a part in assisting Emirati's to find employment. This result indicates that there appears to be no value in the General Pension Fund and the Federal Authority for Identity and Citizenship, who hold all details of employed and unemployed Emiratis, playing a part in assisting Emirati's to find employment. Therefore, these two authorities can currently be ruled out in the current process developed to consider assisting Emiratis find employment. The dominant answer is low.

Next, Director questionnaire results are presented.

Group 2: Directors

Forty Directors, the total sample for this group, were contacted to complete the questionnaire and 33 completed showing a very high or 82.5% return rate. Twenty one questions were asked, the first two questions were general about where the respondent worked and their position, the remaining 19 were from the questionnaire series.

Directors Question 1: What is your position?

Of the Directors, the majority or 33.3% were Principals, 27.3% were Heads of Department, 27.3% were Directors and 12.1% were Chairs of Subjects, all were selected for their leadership role within technical and vocational education institutions.

Directors Question 2: Where do you work?

Of the Directors, 66.7% worked in Abu Dhabi, 9.1% in Ras Al Khaimah, 6.1% in Dubai, 6.1% in Ajman, 6.1% in Fujairah and 3% in Sharjah. The results indicate that six of the seven emirates were represented in the survey. This is useful as the country's view can be considered even though the majority worked in the emirate of the UAE, Abu Dhabi.

Next, results from the 19 questions from the questionnaire series are presented.

To what extent are the UAE Visions for the country's direction and development informative in relation to TVET?

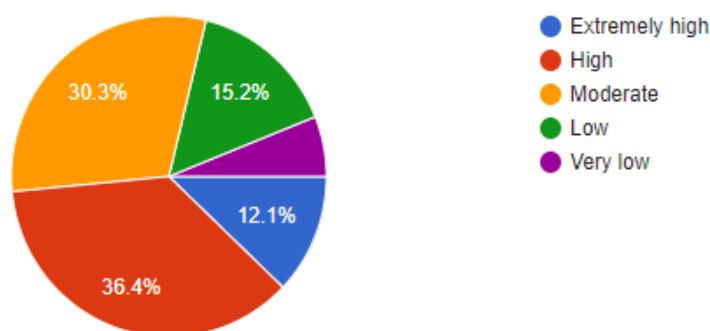
60.6% Of Directors selected high, 18.2% selected extremely high, 3% selected low, and 18.2% selected a moderate view that the visions of the country were informative. Therefore, the UAE Visions for the country's direction and development were seen as positive by Directors as informative. Therefore, Directors were aware of what the country was aiming to achieve. The dominant answer is high.

To what extent are the general level of computing skills in the country sufficient for a knowledge economy?

48.5% of the Directors selected high, 9.1% selected extremely high, 24.2% selected moderate, 15.2% selected low and 3% selected very low that the general level of computing skills in the country was sufficient for a knowledge economy. This indicates that most of the respondents thought there was sufficient computing skills in the country. However, it could still improve further. The dominant answer is high.

To what extent are the digital resources available in the UAE schools/institutes sufficient for a knowledge economy?

Figure 4.9 To what extent are the digital resources available in the UAE schools/institutes sufficient for a knowledge economy?



Source: developed for this research.

36.4% of Directors, selected high, 30.3% selected moderate, 12.1% selected extremely high, 15.2% selected low and 6.1% selected very low, as shown in Figure 4.9, that the extent of the digital resources available in the UAE schools/institutes was sufficient for a knowledge economy. This means that sufficient digital resources were available.

Therefore, there was confidence in the level of computing in schools. The dominant answer is high.

To what extent is the general level of mathematics in the country sufficient to develop artificial intelligence solutions?

45.5% of Directors selected moderate, 21.2% selected it high, 21.2% thought low and 12.1% very low that the level of mathematics in the country was moderate. Therefore, it is clear that there is a view that mathematics in schools could improve further. The dominant answer is moderate.

To what extent is the general level of computing programming and coding skills is sufficient for developing artificial intelligence?

36.4% of Directors selected moderate, 24.2% selected low, 12.1% very low, 24.2% high and 3% extremely high that the extent of the general level of computing programming and coding skills is sufficient for developing Artificial Intelligence. This result indicates that computing programming and coding skills for the development of artificial intelligence development is not strong enough to meet the country's leadership visions. Therefore, more attention to computing programming and coding skills is required. The dominant answer is moderate.

To what extent are UAE students able to build robots?

45.5%, of Directors selected moderate, 24.2% stated low and 6.1% stated very low, 18.2% selected high and 6.1% selected extremely high, that UAE students are able to build robots. Therefore, there is a belief that UAE students are only moderately able to build robots part of the main requirements for artificial intelligence. Therefore, more emphasis could be placed on building robotics. The dominant answer is moderate.

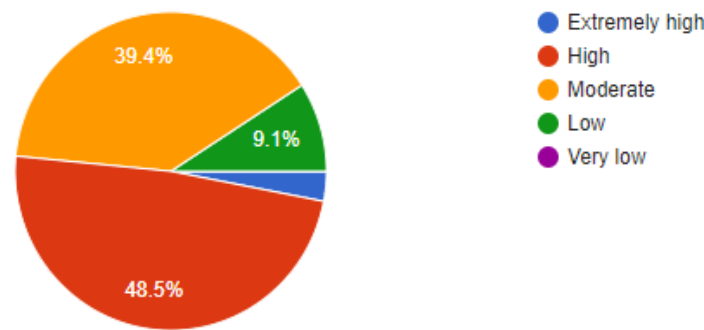
To what extent are teachers able to teach the information needed for a knowledge economy?

48.5% of Directors selected moderate, 24.2% selected high, 3% selected extremely high, 21.2% selected low and 3% selected very low that teachers were able to teach the

information needed for a knowledge economy. This result indicates that teachers are only moderately able to teach the information needed for a knowledge economy. Therefore, with the UAE aiming to be a knowledge economy, the teaching staff are not thought to be able to deliver this result. The dominant answer is moderate.

To what extent teacher’s knowledge is supplemented by using computer search engines.

Figure 4.10 Teacher’s knowledge is supplement by using computer search engines.

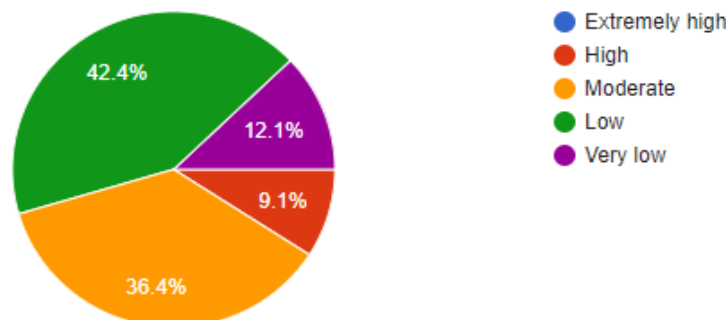


Source: developed for this research.

48.5% of Directors selected high and 3% selected extremely high, that Teacher’s knowledge is supplement by using computer search engines. A large proportion 39.4% selected moderate and 9.1% selected low, as shown in Figure 4.10. Therefore, it is considered that Teacher’s supplement their knowledge by using computer search engines as being an effective way of finding and supporting learners in class and shows that up to date information is best found on the internet. The dominant answer is high.

To what extent are teachers in the UAE equipped to teach skills for development of artificial intelligence?

Figure 4.11 To what extend are teachers in the UAE equipped to teach skills for development of artificial intelligence?

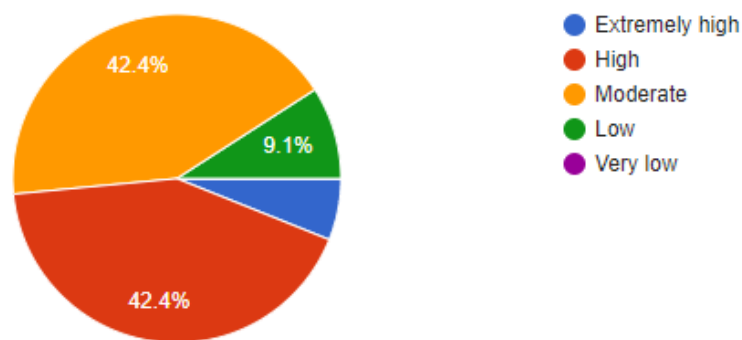


Source: developed for this research.

42.4% of Directors selected low and 12.1% selected very low that teachers in the UAE were equipped to teach skills for developing artificial intelligence. Whereas, 36.4% selected moderate and 9.1% selected high, as shown in Figure 4.11. More than half of the respondents considered teachers in the UAE were not equipped to teach skills for developing artificial intelligence, a main thrust of the UAE leadership visions. Therefore, following the present trend, the country is not equipped with teachers who can teach artificial intelligence. The dominant answer is low.

To what extent teachers have a specific teaching qualification?

Figure 4.12 Teachers have a specific teaching qualification.



Source: developed for this research.

42.4% of Directors selected high and 9.1% selected extremely high. Conversely, 42.4% selected moderate and 9.1% selected low, as shown in Figure 4.12. This result indicates that respondents thought teachers were qualified. However, it is still worrying that just under half, did not think teachers in the UAE were qualified. This reinforces the requirement for the new UAE teacher licensing initiative. The dominant answer is high.

To what extent should Post-school English language education be paid by parents?

42.5% of directors selected a moderate view that Post-school English language education should be paid for by parents. However, 27.3% selected low and 6.1% selected very low, a view that parent ought to pay. Only 18.2% selected high and 3% selected extremely high that parents should pay for English language. The result shows that opinion is divided about whether English language ability is the responsibility of the UAE government or parents. The dominant answer is moderate.

To what extent is industry involved in the UAE education system?

36.4% of Directors selected low and 15.2% selected very low, and did not think industry was sufficiently involved in the UAE education system. However, 39.4% selected moderate and only 9.1% selected high. This results indicates that even though the graduates of all the institutions in the UAE would service industry, industry was not sufficiently involved in the education system. Therefore, industry needs to have a larger involvement in the education system. The dominant answer is low.

To what extent do all UAE unemployed; of working age (who are looking for work) need to undergo skill upskilling?

66.7% of Directors selected high and 18.2% selected extremely high, 12.1% selected moderate and only 3% selected low. This result shows there is an overwhelming wish to re-skill unemployed Emiratis to assist them into employment. It also reflects that previous education has not met the needs of industry and that programmes and or delivery methods need to change to meet the needs of industry. Further, graduate alumni need to be tracked to see which programmes were successful and which were not. The dominant answer is high.

To what extent does the present UAE vocational education system meet the needs of the national economy?

54.5% of Directors selected a moderate view with a further 18.2% selected low and 6.1% selected very low, only 21.2% selected high. This result indicates that vocational education only moderately meets the needs of the economy. Therefore, there is a requirement to further promote the vocational education agenda to meet the needs of the national economy. The dominant answer is moderate.

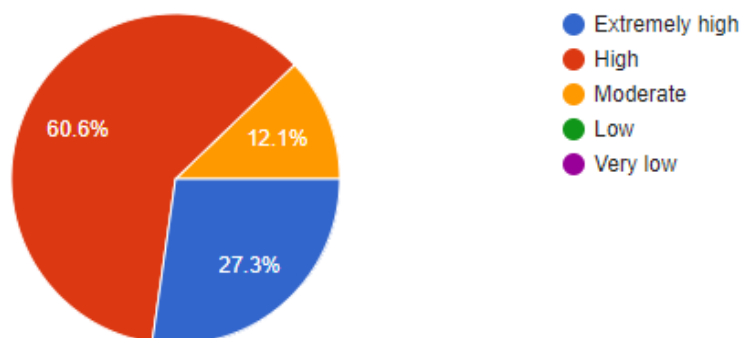
To what extent are skills that are not needed in the economy being provided for in post school education?

66.7% of Directors selected moderate with 18.2% selected high, 3% selected extremely high that skills are not needed in the economy are being provided for in post school

education, only 9.1% selected low and 3% selected very low. Meaning this result strongly indicates that there is a redundancy in some of the programmes being offered in institutes. Further, it raises the question of what information is used to select programmes in institutes and who is the decision maker in this process. Furthermore, if skills did meet the needs of the economy then there might would be very little unemployment of Emiratis as they would all be trained and their skills would make them employable. The dominant answer is moderate.

To what extent can knowledge of career pathways help a learner shape their educational pathway?

Figure 4.13 To what extend can knowledge of career pathways help a learner shape their educational pathway?



Source: developed for this research.

60.6% of Directors selected high, 27.3% selected extremely high, 12.1% selected moderate, as shown in Figure 4.13. This result indicates that knowledge of career pathways help a learner shape their educational pathway. Therefore, consideration needs to be given to more applicable career guidance in schools. The dominant answer is high.

To what extent are job vacancies made aware to Emiratis that are looking for work?

45.5% of Directors selected moderate, 39.4% selected high and 15.2% selected low thinking that job vacancies were made aware to Emiratis. Therefore, this result indicates that although Emiratis are made aware of work vacancies they are not all being employed. The dominant answer is moderate.

To what extent is there a seamless government process to get the Emirati unemployed into employment?

51.5% of Directors selected moderate 27.3% selected extremely high 3% selected high that there is a seamless government system of getting Emiratis into employment. However, 15.2% selected low and 3% selected very low. This result indicates that respondents were fairly confident that Emiratis have a government providing a seamless process for finding employment. The dominant answer is moderate.

To what extent can the General Pension Fund and Federal Authority for Identity and Citizenship play a part in assisting Emiratis to find employment?

57.6% of Directors selected high, 3% selected extremely high, 33.3% selected moderate and 6.1% selected low that the General Pension and Federal Authority for Identity and Citizenship could play a part in assisting Emiratis to find employment. None of the respondents thinking very low. Therefore, there is a belief that the General Pension and Federal Authority for Identity and Citizenship could play a part in Emirati job search. The dominant answer is high.

Group 3: Teachers

Seven hundred and fifty three, the total sample for this group, were contacted to complete the questionnaire and 451 completed showing a very high or 59% return rate. Fourteen questions, one general and 13 from the series of questionnaires, were asked.

Teachers Question 1: In which Emirate do you work?

Of the respondents, 47.2% live in Abu Dhabi, 16.2% in Ajman, 11.8% in Fujairah, 11.5% in Ras Al Khaimah, 5.5% in Dubai, 4.3% in Umm Al Quwain and finally, 3.5% Sharjah. The results show that there was teacher representation from all of the seven Emirates and this representation allows the questionnaire results to be considered as representative of the UAE.

Teachers Question 2: Do you currently, or have in the past, had students on work placement in the UAE?

50.1% of teachers selected that students had been on work the placement and 49.9% had not. This result indicates that some students in Grade 11 and 12 have been on

placement. Therefore, for technical and vocational schooling perhaps the government needs to consider developing more work placements for students in Grade 11 and 12 to consolidate the technical and vocational education received by students.

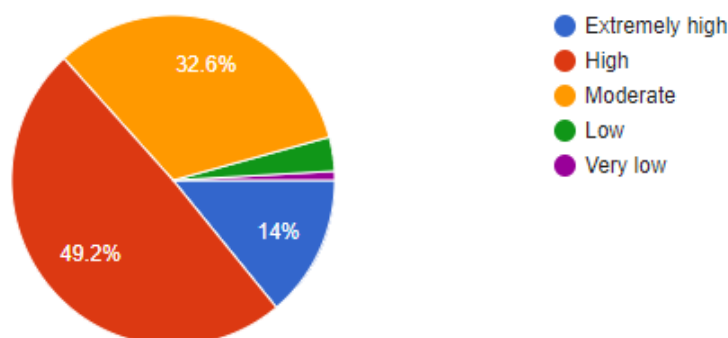
Next, the 13 questions from the questionnaire series are presented.

To what extent are the UAE Visions for the country's direction and development informative in relation to TVET?

49.7%, of teachers selected high, 26.6% selected moderate, 21.1% selected extremely high, 1.8% selected low and a very small proportion 0.9% selected very low that the UAE Visions for the country's direction and development was informative in relation to TVET. This result indicated that teachers understand the UAE Visions for the country's direction and development and judge it is informative in relation to TVET education. The dominant answer is high.

To what extent are the general level of computing skills in the country sufficient for a knowledge economy?

Figure 4.14 To what are the general level of computing skills in the country sufficient for a knowledge economy?



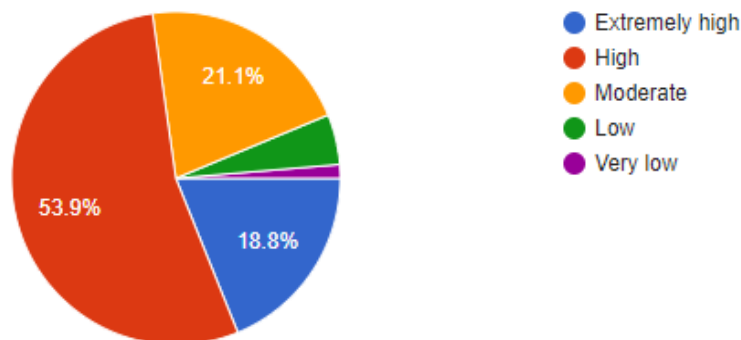
Source: developed for this research.

49.2% of teachers selected high 32.6% selected moderate, 14.0% selected extremely high, while in view, and 3.3% selected low and a small amount, 0.9% very low, as shown in Figure 4.14. This result indicates teachers consider the general level of computing skills is sufficient for a knowledge economy, Therefore, the level of computing taught is

considered sufficient by teachers for the development of a knowledge economy. The dominant answer is high.

To what extent are the digital resources available in the UAE schools/institutes sufficient for a knowledge economy?

Figure 4.15 To what are the digital resources available in the UAE schools/institutes sufficient for a knowledge economy?

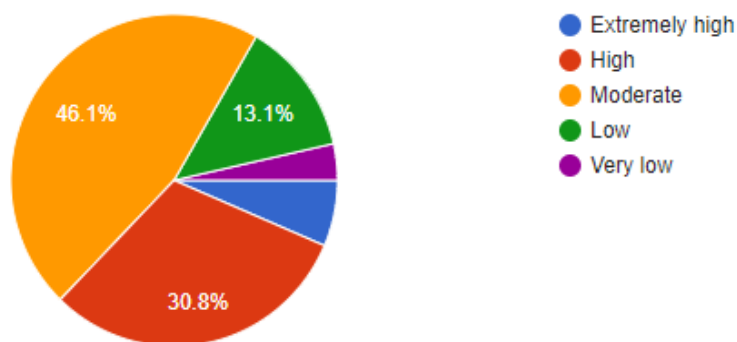


Source: developed for this research.

53.9% of teachers selected high, 21.1% selected moderate, 18.8% selected extremely high, 4.9% selected low and 1.3% selected very low, as shown in Figure 4.15, that the provision of digital resources available in the UAE schools/institutes was sufficient for a knowledge economy. This result indicates that teachers believe that the digital resources available in the UAE schools/institutes are sufficient for a knowledge economy. Therefore, the lack of digital resources is not a barrier to development of a knowledge economy in the UAE. The dominant answer is high.

To what extent is the general level of mathematics in the country sufficient to develop artificial intelligence solutions?

Figure 4.16 To what extent is the general level of mathematics in the country sufficient to develop artificial intelligence solutions?

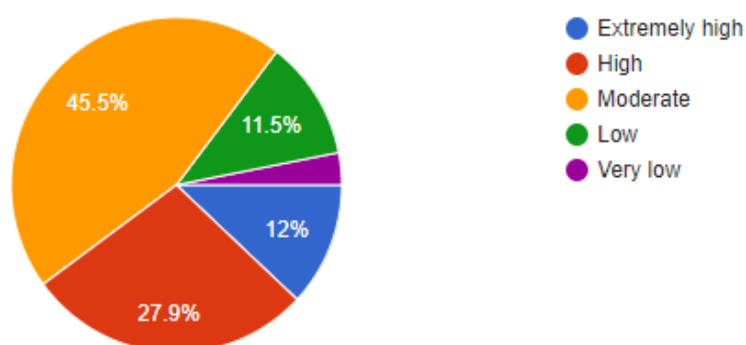


Source: developed for this research.

46.1% of teachers selected moderate, 30.8% selected high, 13.1% selected low, 6.4% selected extremely high and 3.5% selected very low, as shown in Figure 4.16, that the view of the level of mathematics was sufficient to develop artificial intelligence solutions. This result indicates that level of mathematics was sufficient for developing artificial intelligence. In this case, the government may wish to consider the mathematics curriculum to be reconstructed to take account of artificial intelligence requirements. The dominant answer is moderate.

To what extent is the general level of computing programming and coding skills is sufficient for developing Artificial Intelligence?

Figure 4.17 To what extent is the general level of computing programming and coding skills is sufficient for developing Artificial Intelligence?



Source: developed for this research.

45.5% of the teachers selected moderate, 27.9% selected high, 12% selected extremely high, 11.5% selected low and 3.1% selected very low, as shown in Figure 4.17. This shows that the general level of computing programming and coding skills was sufficient for

developing artificial intelligence. This result indicates that doubt by the teachers that the level of programming and coding is up to the required standard for developing artificial intelligence. In this case, the government may wish to consider the programming and coding in the curriculum to be reconstructed to take account of artificial intelligence requirements. The dominant answer is moderate.

To what extent are UAE students able to build robots?

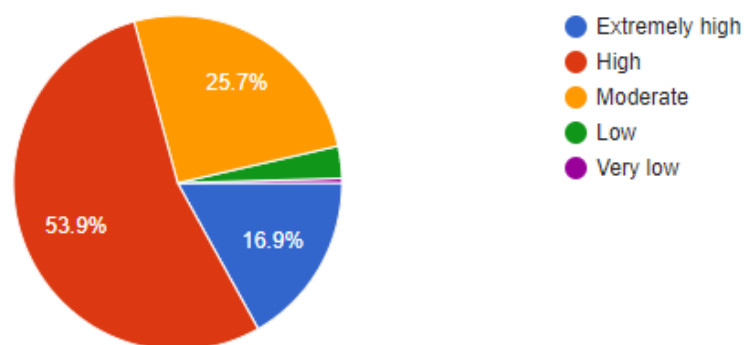
49.2% of teachers selected moderate, 26.4% selected high view, 12.6% selected low view, 8% selected extremely high view and 3.8% selected very low that UAE students were able to build robots. This result indicates that more efforts needs to be applied to building robot and robotics in the school curriculum. The dominant answer is moderate.

To what extent are teachers able to teach the information needed for a knowledge economy?

59% of teachers selected high, 22.8% selected moderate, 13.3% selected extremely high, 3.5% selected low, and 1.5% selected very low that teachers were able to teach the information needed for a knowledge economy. Therefore, teachers consider they have the capability to teach students for a knowledge economy and it can be inferred that they know and understand the requirements for teaching for a knowledge economy. The dominant answer is high.

To what extent teacher's knowledge is supplemented by using computer search engines.

Figure 4.18 Teacher's knowledge is supplement by using computer search engines.



Source: developed for this research.

53.9% of teachers selected high, 25.7% selected moderate, 16.9% selected extremely high, 3.1% selected low and a very small amount (0.4%) selected very low, as shown in Figure 4.18. Teachers' agree that knowledge is supplement by using computer search engines. This is a clear result and indicates that a source of knowledge for teachers is the use of the internet. Therefore, to assist teachers with their teaching content, teachers need to have access to the internet. The dominant answer is high.

To what extent are teachers in the UAE equipped to teach skills for development of artificial intelligence?

42.1% of teachers selected high, 39.2% selected moderate, 11.1% selected low, 5.5% selected extremely high and 2% selected very low view that they were equipped to teach skills for development of artificial intelligence. This result indicates that teachers judge they are equipped with the ability to develop student's skills for development of artificial intelligence. The dominant answer is high.

To what extent teachers have a specific teaching qualification?

55% of teachers selected high, 23.1% selected extremely high, 18.2% selected moderate, 2.7% selected low and 1.1% selected very low that they had specific teaching qualifications. This result indicates that teachers believe they are qualified to teach their specific subject. The dominant answer is high.

To what extent does the present UAE vocational education system meet the needs of the national economy?

43.9% of teachers selected high, 12.4% as selected extremely high, 35.3% selected moderate, 6.9% selected low, and 1.6% selected very low, that the present UAE vocational education system meets the needs of the national economy. This indicates that teachers judge that the vocational education system in the UAE is meeting the needs of the economy. Therefore, teachers judge they are preparing the students for vocational employment in the UAE. The dominant answer is high.

To what extent are skills that are not needed in the economy being provided for in post school education?

57.4% of teachers selected moderate, 18.8% selected high, 17.7% selected low, 4% selected extremely high and 2% selected very low that skills are not needed in the economy selected being provided for in post school education. This result indicates that skills not necessary for the economy are being provided for in post school education. Therefore, some post school courses may not be providing skills useful for direct entry into employment in the workforce. The dominant answer is moderate.

To what extent can knowledge of career pathways help a learner shape their educational pathway?

46.1% of teachers selected high, 25.7% selected extremely high, 24.2% selected moderate, 3.1% selected low and 0.9% selected very low that knowledge of career pathways help a learner shape their educational pathway. This result indicates that teachers value knowledge of career pathways as being useful in shaping educational pathways for students. Therefore, the government may consider promoting further career education. The dominant answer is high.

Next, results from Student questionnaires are presented.

Survey Group 4: Students

Survey results for Group 4 Students show that 4308 were contacted to complete the questionnaire and 2587 completed showing a very high or 60.1% return rate. Twenty questions, two general and 18 from the series of questionnaires, were asked of the Students in a follow up survey to the FS Large Focus Group. The first two questions were general asking if they were students and their location, the remaining 18 were from the questionnaire series.

Students Question 1: Are you a student?

All (100%) respondents were students and represented the sample group.

Students Question 2: In which Emirate do you live?

The largest group of students, 52%, lived in Abu Dhabi, 14.4% in Sharjah, 10.5% in Dubai, 9.5% Ras Al Khaimah, followed by 8.2% in Ajman, 2.9% in Fujairah and 2.6% in Umm Al

Quwain. The result shows that the views of students from all Emirates are contained in the results of this survey and therefore represents students' views in the UAE.

Students Question 3: Which school system do you attend?

Of the students, 49.6% attended ATHS Schools, 36.8% attended STS Schools, 13.2% attended Private Schools and 0.4% attended Public School. The result shows a spread of students across different school types with the majority or 86.4% attending technical and vocational educational schooling. This is a positive result as it represents the technical and vocational educational school students' opinion.

Students Question 4: Which grade do you attend?

Of the students, 67.2% attended Grade 11 and 32.8% attended Grade 12. This result is positive as it targets the school grades of more mature technical and vocational educational students whom have undergone or are undergoing technical and vocational education in the UAE schooling system.

Next, results from the 18 questions from the questionnaire series are presented.

To what extent are the UAE Visions for the country's direction and development informative in relation to TVET?

39.1%, of students selected high, 36.2% selected extremely high, 19.8% selected moderate, 2.3% selected low and 2.6% selected very low that the country's direction and developments informative in relation to TVET. This result indicates that students understood the vision messages for the country. Therefore, students could effectively work toward its achievement. The dominant answer is high.

To what extent is the general level of computing skills in the country sufficient for a knowledge economy?

40.3% of students selected high, 22.3% selected extremely high, 28.3% selected moderate, 5.6% selected low and 3.5% selected very low that the general level of computing skills in the country was sufficient for a knowledge economy. This result indicates that two thirds of the students' judge that the levels of computing they have is sufficient for building a knowledge economy. The dominant answer is high.

To what extent are the digital resources available in the UAE schools/institutes sufficient for a knowledge economy?

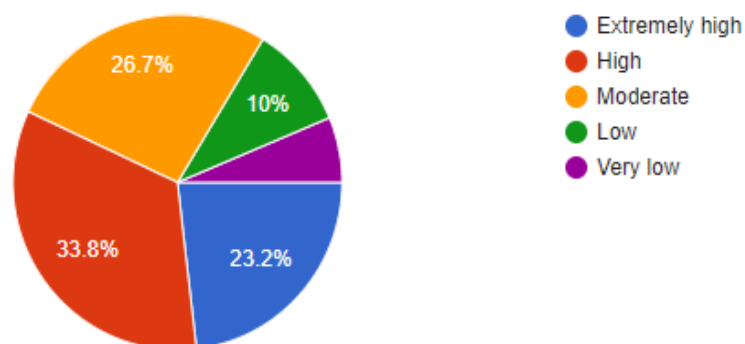
38% of students selected high, 23.4% selected extremely high, 29.8% selected moderate, 5.3% selected low and 3.5% selected very low that the digital resources available in the UAE schools/institutes was sufficient for a knowledge economy. The result indicates that students judge that the digital resources available are sufficient for a knowledge economy. The dominant answer is high.

To what extent is the general level of mathematics in the country sufficient to develop artificial intelligence solutions?

35.7% of students selected high, 28.2% selected extremely high 25% judged moderate, 6.5% judged low and 4.6 % judged very low that the general level of mathematics in the country was sufficient to develop artificial intelligence solutions. This indicates that students judged the general level of mathematics in the country was sufficient to develop artificial intelligence solutions. This result indicates that students have a level of confidence in their mathematical ability to develop artificial intelligence solution. The dominant answer is high.

To what extent is the general level of computing programming and coding skills sufficient for developing Artificial Intelligence?

Figure 4.19 To what extend is the general level of computing programming and coding skills sufficient for developing Artificial Intelligence?



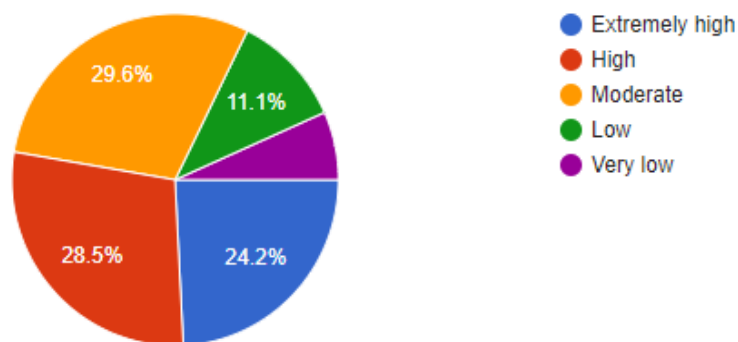
Source: developed for this research.

33.8% of students selected high, 23.2% selected extremely high, 26.7% selected moderate, 10.0% selected low and 6.3% selected very low, as shown in Figure 4.19, that

the general level of computing programming and coding skills was sufficient for developing artificial intelligence. This result indicates students believe they have the skills for programming and coding to develop artificial intelligence but, would also indicate that further education in this area would be advantageous. The dominant answer is high.

To what extent are UAE students able to build robots?

Figure 4.20 To what extend are UAE students able to build robots?

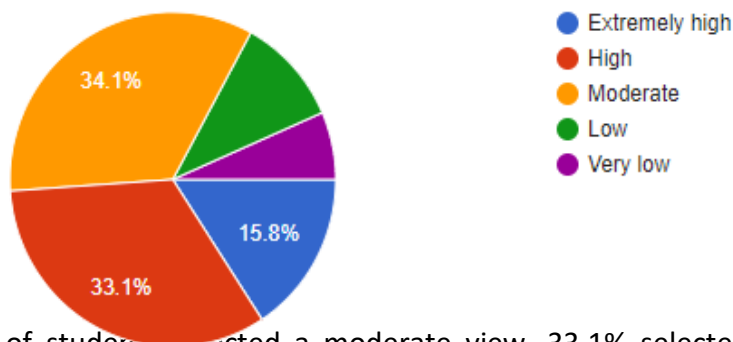


Source: developed for this research.

29.6% of students selected moderate, 28.5% selected high and 24.2% selected extremely high, 11.1% selected low and 6.6% selected very low, as shown in Figure 4.20, that UAE students could build robots. This result indicates that further education in the field of building robots is needed in schools. The dominant answer is moderate.

To what extent are teachers able to teach the information needed for a knowledge economy?

Figure 4.21 To what extend are teachers able to teach the information needed for a knowledge economy?



34.1% of students selected a moderate view, 33.1% selected high, 15.8% selected extremely high, 10.5% selected low and 6.5% selected very low, as shown in Figure 4.21,

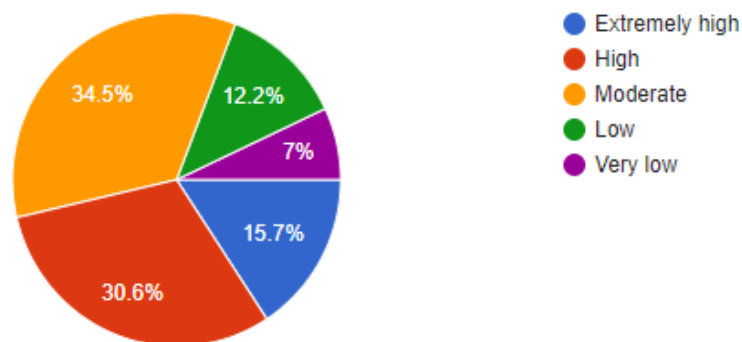
that teachers were able to teach the information needed for a knowledge economy. This result indicates that teachers need to improve their information needed for a knowledge economy in order to improve their teaching and enhancing the ability of the students. The dominant answer is moderate.

To what extent teacher's knowledge is supplemented by using computer search engines?

33.3% of students selected high, 33.0% thought extremely high, 24.1% thought moderate and a further 5.4% low and 4.3% very low that teacher's knowledge is supplemented by their use of search engines on computers. This result indicates that reinforcing the role of the internet within the school education system is required. Therefore, this result indicates there is room for improvement in some teachers' knowledge. The dominant answer is high.

To what extent are teachers in the UAE equipped to teach skills for development of artificial intelligence?

Figure 4.22 To what extent are teachers in the UAE equipped to teach skills for development of Artificial Intelligence?



Source: developed for this research.

34.5% of students selected moderate, 30.6% selected high, 15.7% selected extremely high, 12.2% selected low and 7% selected very low, as shown in Figure 4.22, that teachers are equipped to teach skills for development of artificial intelligence. This means that the Ministry of Education needs to consider how to increase the extent that teachers are equipped to meet the demands of the country's visions. The dominant answer is moderate.

To what extent is industry involved in the UAE education system?

35.8% of students selected high, 29.2% selected moderate, 23.5% selected extremely high, 7.3% selected low and 4.1% selected very low view that involvement of industry in the UAE education plan. This result indicates students believe that industry is involved in the education plan. However, the low and very low results (11.4% combined) indicate that in general students are not happy with the involvement of industry in the education plan. The dominant answer is high.

To what extent do all UAE unemployed, of working age (who are looking for work) need to undergo skill upskilling?

37.8% of students selected high, 24.7% selected moderate, 29.9% selected extremely high 4.7% selected low and 2.9% selected very low that the extent of all UAE unemployed, of working age (who are looking for work) need to undergo skill upskilling. This result indicates that students think that there is a need for UAE unemployed to undergo reskilling. Therefore, there is a recognition that past education has not met the market's need for the right type of skilled individuals for the workplace. This result would indicate that students support a re-skilling programme to assist UAE unemployed to enter into the workforce. The dominant answer is high.

To what extent does the present UAE vocational education system meet the needs of the national economy?

39.7% of students selected high, 24.9% selected extremely high, 27.7% selected moderate 4.7% selected low and 3.0% selected very low that the UAE technical and vocational education system did meet of the UAE vocational education system. This result indicates that students believe the UAE vocational education system has positive impact on the national economy. Therefore, the perception of technical and vocational education needs to be improved. The dominant answer is high.

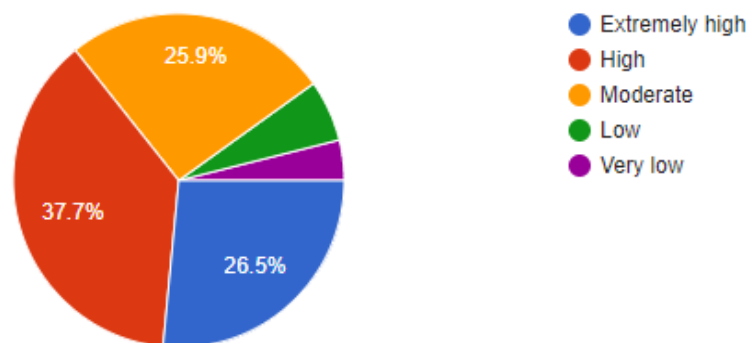
To what extent are skills that are not needed in the economy being provided for in post school education?

33.9% of students selected moderate, 28.8% selected high, 20.0% selected extremely high, 11.1% selected low and 6.2% selected very low that skills, that are not needed in the economy are being provided for in post school education. This result from students

who judge that post school education does not necessarily lead to employment because it is considered as not meeting the needs of the economy. The dominant answer is moderate.

To what extent can knowledge of career pathways help a learner shape their educational pathway?

Figure 4.23 To what extent can knowledge of career pathways help a learner shape their educational pathway?



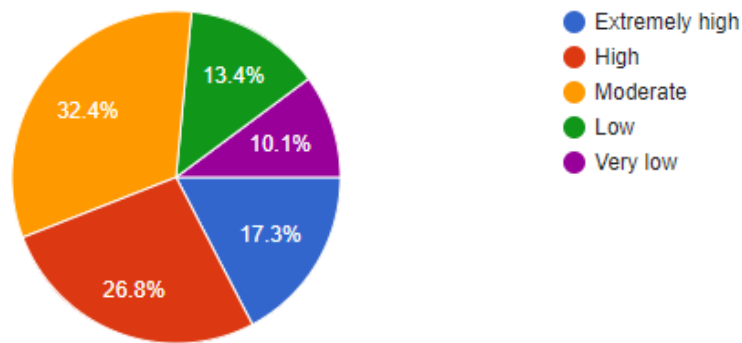
Source: developed for this research.

37.7% of students selected high, 25.9% selected moderate 26.5% selected extremely high 6.0% selected low and 3.9% selected very low, as shown in Figure 4.23, that the extent that knowledge of career pathways can help a learner shape their educational pathway.

This result indicates that students value knowledge of career pathways in shaping their educational pathway. Therefore, students would be supportive of more career education/pathways. The dominant answer is high.

To what extent are job vacancies made aware to Emiratis that are looking for work?

Figure 4.24 To what extent are job vacancies made aware to Emiratis looking for work?



Source: developed for this research.

32.4% of students selected moderate, 26.8% selected high, 17.3% selected extremely high, 13.4% selected low view and 10.1% selected very low, as shown in Figure 4.24, that job vacancies were made aware to Emiratis looking for work. This result indicates that students do not believe strongly that available job vacancies are made aware to them. Therefore, more efforts are needed to make public and inform students of job vacancies for employment and the government needs to consider how this process can better serve students. The dominant answer is moderate.

To what extent is there a seamless government process to get the Emirati unemployed into employment?

29.7% of students selected moderate, 29.5% selected high, 19.8% selected extremely high, 13.7% selected low and 7.3% selected very low that there is a seamless government process to get the Emirati unemployed into employment. Therefore, from the student perspective there is not a strong belief that there is a seamless government process for getting Emiratis into employment. Therefore, the government needs to consider how they system can be bettered for student use. The dominant answer is moderate/high.

Next, results for the Parent's questionnaire are presented.

Group 5: Parents

Survey results for Group 5 Parents showed that 3277 were contacted to complete the questionnaire and 1021 completed showing a very high or 36.6% return rate. To assist

with the completion of the questionnaire, the survey was translated into Arabic and checked by two bilingual specialists to ensure that the meaning of the English and the Arabic was the same. Additionally, the questionnaires were circulated through the official school system channel and were only sent to parents of Grade 11 or 12. Fourteen questions, two general and 12 from the series of questionnaires, were asked of the parents in a follow up survey to the Parents Large Focus Group. The first two questions were general about where the respondent worked and their position, the remaining twelve were from the questionnaire series.

Parents Question 1: I am a parent?

Of the parents, 100% stated they were parents. This means that the survey reached the target group, therefore the responses in this survey for parents are valid.

Parents Question 2: Which Emirate do you live?

In response to which Emirate the parents lived in, 24.6% lived in Abu Dhabi, 17.2% in Ras Al Khaimah, 17.2% in Ajman, 16.2% in Sharjah, 14.2% in Fujairah, 7.1% in Dubai and 3.6% in Umm Al Quwain. The results show high interest from parents in Abu Dhabi, Ras Al Khaimah and Ajman two of the smaller emirates and a relatively low response from Dubai and the smallest emirate of Umm Al Quwain. However, the results do show a spread of parents from all over the UAE meaning that the sample is representative of UAE parents.

Next, results from the 12 questions from the questionnaire series are presented.

To what extent are the UAE Visions for the country's direction and development informative in relation to TVET?

42.7% of parents selected extremely high, 39%, selected high, 14.3% selected moderate, 2.5% selected very low and 1.5% selected low about the UAE Visions for the country's direction and development informative in relation to TVET. The result would indicate that the methods used to provide citizens with information about the country's visions direction and development are informative and understood by parents. Therefore, this method is a method that communicates with the parents and provides them with the required information about country direction and developments. The dominant answer is extremely high.

To what extent are the general levels of computing skills in the country sufficient for a knowledge economy?

46.4% of parents selected high, 27.9% selected extremely high, 19.6% selected moderate and a combined total of low and very low selections 6.1% that the general levels of computing skills in the country sufficient for a knowledge economy. The result indicates that parents are confident that the level of computing their students are receiving is sufficient for the country to build a knowledge economy. Therefore, parents have confidence that the school system is equipped in this area. The dominant answer is high.

To what extent are the digital resources available in the UAE schools/institutes sufficient for a knowledge economy?

46.5% of parents selected high, 23.9% selected extremely high, 22.1% selected moderate, and a combined 7.4% of parents selected a low or very low that the digital resources in the country available in schools/institutes was sufficient for a knowledge economy. This result indicates that parents judge that the digital resources in the country available in schools/institutes sufficient for a knowledge. Therefore, the availability of digital resources is not flagged as a major hindrance to the successful achievement of a knowledge economy. The dominant answer is high.

To what extent is the general level of mathematics in the country sufficient to develop artificial intelligence solutions?

45.5% of parents selected moderate, 21.2% selected low, 21.2 selected high, and a combination of 12.1% selected low or very low, that the general level of mathematics in the country was sufficient to develop artificial intelligence solutions. This result indicates that parents are uncertain as to the level of mathematics need for artificial intelligence. Therefore, they are unsure if their students' skills are to the standard required for development of artificial intelligence. The dominant answer is moderate.

To what extent is the general level of computing programming and coding skills sufficient for developing Artificial Intelligence?

40.9% of parents selected high, 20.6% selected extremely high, 26.5% selected moderate 6.5% selected low and 5.6% selected very low that the general level of

computing programming and coding skills was sufficient for developing artificial intelligence. This result strongly indicates that parents have a level of confidence that their students' computing programming and coding skills is sufficient for developing artificial intelligence. The dominant answer is high.

To what extent are UAE students able to build robots?

Parents had a positive view that their students were able to build robots with 35.7% of parents selected high, 22.9% selected extremely high, 26.6% selected moderate, 8.7% selected low and 6 % selected very low. This result indicates that parents have a strong belief that students could build a robot. Therefore, the students have the ability, either real or conceived to build robots. Therefore, parents are aware of the need for students to be able to build robots to contribute to the achievement the visions of the UAE. The dominant answer is high.

To what extent are teachers able to teach the information needed for a knowledge economy?

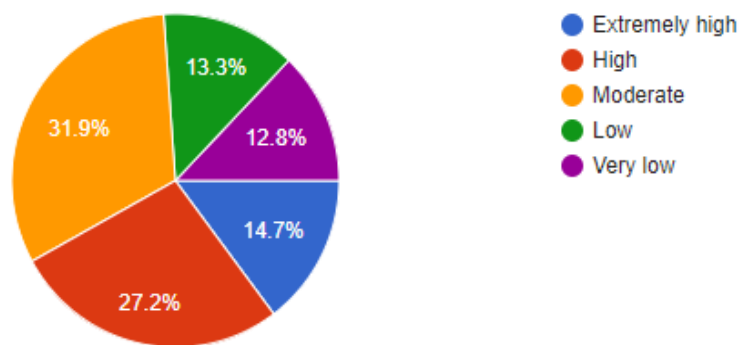
35.6% of parents selected high, 15.1% selected extremely high, 33.5% selected moderate, 10.1% selected low and 5.7% selected very low that teachers were able to teach the information needed for a knowledge economy. This result indicates that the parents may understand what is required for a knowledge economy but they judge it is not being taught in schools. Therefore, more information about requirements for a knowledge economy needs to be made available to teachers so that they can impart the information required by students for a knowledge economy. The dominant answer is high.

To what extent are teachers in the UAE equipped to teach skills for development of artificial intelligence?

36.4% of parents selected high, 13.2% selected extremely high, 33.9% selected moderate view, 10.3% selected low view and 6.2% selected very low that teachers in the UAE were equipped to teach skills for development of artificial intelligence. The result indicates that parent judge the teachers equipped with the necessary skills for development of artificial intelligence in schools. Therefore, parents judge teachers are able to teach skills for development of artificial intelligence. However, teacher training on artificial intelligence may assist in this process. The dominant answer is high.

To what extent should post-school English language education be paid by parents?

Figure 4.25 To what extent should post-school English language education be paid by parents?

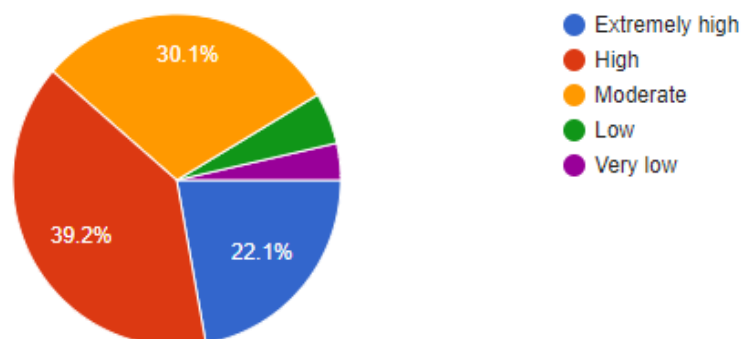


Source: developed for this research.

31.9% of parents selected moderate, 27.2% of cases selected high, 14.7% selected extremely high, 13.3 selected low and 12.8 selected very low, as shown in Figure 4.25, that post-school English language education be paid by parents. This result indicates an ambivalence to parents, school or government paying for post-school English language. Therefore, parents expect the schools, who teach English language, or the Ministry of Education, be responsible for student's level of English language. The dominant answer is moderate.

To what extent do all UAE unemployed, of working age (who are looking for work) need to undergo skill upskilling?

Figure 4.26 To what extent do all UAE unemployed, of working age (who are looking for work) need to undergo skill upskilling?



Source: developed for this research.

39.2% of parents selected high, 22.1% selected extremely high, 30.1% selected moderate, 5% selected low and 3.6% selected very low, as shown in Figure 4.26, that the UAE unemployed, of working age (who are looking for work) needed to undergo skill upskilling. This result indicates that parents judge the need for upskilling. Therefore, parents judge that students could be better educated for the workforce and the current jobs available. The dominant answer is high.

To what extent does the present UAE vocational education system meet the needs of the national economy?

41% of parents selected extremely high, 30.2% selected moderate, 17% selected high, 6.4% selected low and 5.3% selected very low, that the present UAE vocational education system meets the needs of the national economy. This result indicates that parents strongly judge that the schooling system was meeting the needs of the economy. Therefore, parents are in support of the present school curriculum. The dominant answer is extremely high.

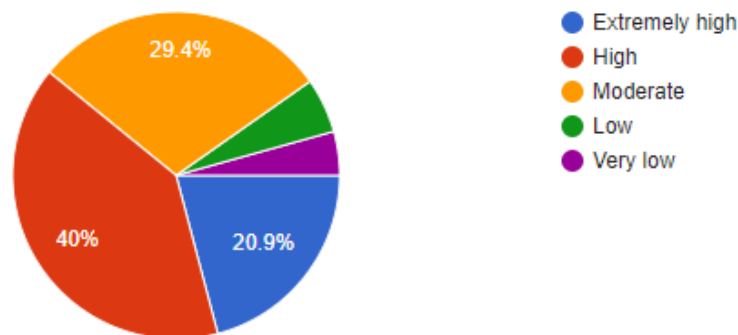
To what extent are skills that are not needed in the economy being provided for in post school education?

In the case of skills that are not needed in the economy being provided for in post school education

38.8% of parents had a moderate view, 30.9% selected high, 14.2% selected extremely high, 11.1% had a low view and 5% a very low view, that skills that are not needed in the economy are being provided for in post school education. This result indicates that parents are aware of the skills needed for the economy and recognize that skills not needed for the economy are still being delivered in post-school education. Therefore, the impression that parents are aware of how untargeted education can result in unemployment as the skills are not meeting the economic need of the country. The dominant answer is moderate.

To what extent can knowledge of career pathways help a learner shape their educational pathway?

Figure 4.27 To what extent can knowledge of career pathways help a learner shape their educational pathway?



Source: developed for this research.

40% of parents selected high, 20.9% selected extremely high, 29.4% moderate, 5.4% low and 4.3% very low, as shown in Figure 4.27, that educational pathways could be shaped with knowledge about careers. This result indicates that parent's judge that knowledge of career pathways help a learner shape their educational pathway. Therefore, parents are supportive of career education being part of the curriculum. The dominant answer is high.

To what extent is there a seamless government process to get the Emirati unemployed into employment?

34% of parents selected high, 16.2% extremely highly, 32.6% selected moderate view and a combined 17.2% selected low or very low that there was a seamless government process to get the Emirati unemployed into employment. The result indicates that there is a clear process that all Emiratis are aware about, for the unemployed to find employment Therefore, government services need to do more to help Emiratis into work and reduce unemployment. The dominant answer is high.

Next, results from the Industry questionnaire are presented.

Group 6: Industry

Survey results for Group 6 showed that 292 responded to the survey. Many databases were used to circulate the questionnaire to industry to gain a representative sample. Around 6000 surveys were sent out, but the number estimated to have received it,

based on the accuracy of the databases used, would be calculated at 10%, which equals to around 600. The percentage return is estimated to be around 48%. In total fifteen questions were asked, two were general and the remaining 13 were questions from the series of questions.

Industry Question 1: In which Emirate do you work?

In response to industry and where they worked, 71.6% were from Abu Dhabi, 23.3% from Dubai, 2.4% from Sharjah, 1.4% from Fujairah, 0.7% from Ras Al Khaimah and 0.7% from Ajman. The rate of return reflects the demographic population and is a reflection of the views of the respondents from across the UAE. Therefore, their judgement is valid for the UAE.

Industry Question 2: Which sector do you work in?

In response to which of the 12 sectors in the UAE the respondent worked in, the response was as follows: 43.8% from Education, learning and social development, 15.1% from Government services and public administration, 9.2 % from Business administration and social services, 8.6% from Building and construction, estates and assets development and management, 4.1% from Agriculture, livestock and fishery, 4.1 % from Tourism, hospitality, retail and leisure services including personal care services, 3.4% from Utilities and infrastructure, 3.4% from Energy resources – oil, natural gas, petrochemical, chemical and mining/quarrying, 3.1% from Community, health and social services, 2.4% from Manufacturing, 2.1% from Logistics and transport, 0.7% from Arts, culture and entertainment. The diversity of the respondents work sectors represent all sectors in the UAE. Next, the results from the 13 questions from the questionnaire series are presented.

To what extent are the tweets by the country leadership informative in relation to TVET?

37.7% of industry selected high, 30.5% selected moderate, 25.0% selected extremely high, 4.5% selected low and 2.4% selected very low that the tweets by the country leadership are informative in relation to TVET. This result indicating that industry judges the country leadership is informative. Therefore, greater support in relation to TVET and tweets need to reach industry. The dominant answer is high.

To what extent are the UAE Visions for the country's direction and development informative in relation to TVET?

42.1% of industry selected high, with 40.1% selected extremely high, 15.4% selected moderate, 2.1% selected low and 0.3% selected very low. This result indicates industry judges that the UAE Visions for the country's direction and development are informative. Therefore, the UAE Visions are understood by industry. The dominant answer is high.

To what extent are the general level of computing skills in the country sufficient for a knowledge economy?

43.5% of industry selected high, 28.8% selected moderate, 20.5% selected extremely high, 5.5% selected low and 1.7% selected very low, that the general level of computing skills in the country sufficient for a knowledge economy. This result judges the general level of computing skills in the country sufficient for a knowledge economy. Therefore, it can be assumed that a high number of entrants to industry have appropriate computing skills. The dominant answer is high.

To what extent are the digital resources available in the UAE schools/institutes sufficient for a knowledge economy?

45.9% of industry selected high, 27.7% selected moderate, 18.5% selected extremely high, 6.8% selected low and 1.0% selected very low that the digital resources available in the UAE schools/institutes is sufficient for a knowledge economy. This result indicates that industry judge the digital resources available in the UAE schools/institutes sufficient for a knowledge economy. Therefore, it can be assumed that entrants to industry have access to appropriate digital resources. The dominant answer is high.

To what extent is the general level of mathematics in the country sufficient to develop artificial intelligence solutions?

36.3% of industry selected moderate, 34.6% selected high, 17.1% selected low and 9.9% selected extremely high and 2.1% selected very low that the general level of mathematics in the country is sufficient to develop artificial intelligence solutions. This result indicates that industry moderately judges the general level of mathematics in the country to be sufficient to develop artificial intelligence solutions. Therefore, it cannot

be assumed that the mathematical ability of graduates is sufficient for industry and developing artificial intelligence solutions. The dominant answer is moderate.

To what extent is the general level of computing programming and coding skills is sufficient for developing artificial intelligence?

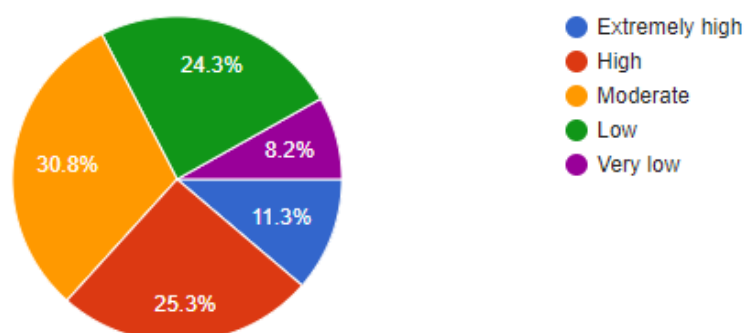
34.2% of industry selected moderate, 31.8% selected high, 16.1% selected low, 14.7% selected extremely high and 3.1% selected very low, that the general level of computing programming and coding skills is sufficient for developing artificial intelligence. This result by industry judges the general level of computing programming and coding skills is moderately sufficient for developing artificial intelligence. Therefore, it can be assumed that industry do not have an issue with graduates entering industry with the level of their computing programming and coding skills. The dominant answer is moderate.

To what extent should Post-school English language education be paid by parents?

39.7% of industry selected moderate, 30.8% selected high, 13.4% selected extremely high, 11.3% selected low and 4.8% selected very low, that Post-school English language education be paid by parents. This result indicates that industry leans toward Post-school English language education being paid by parents. Therefore, it can be assumed that industry do not judge this as being their issue to decide who should pay for English language provision for students who fail. The dominant answer is moderate.

To what extent is industry involved in the UAE education system?

Figure 4.28 To what extent is industry involved in the UAE education system?

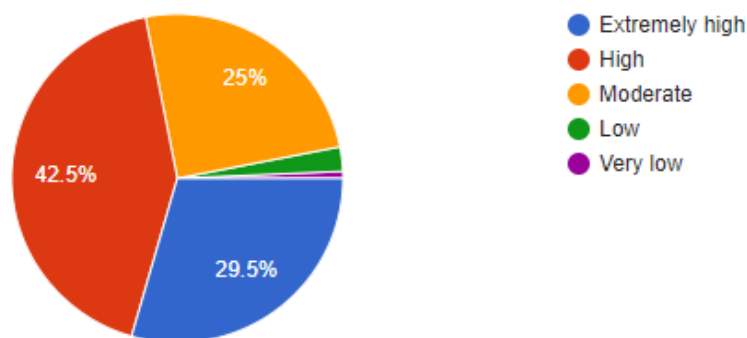


Source: developed for this research.

30.8% of industry selected moderate, 25.3% selected high, 24.3% selected low, 11.3% selected extremely high and 8.2% selected very low, as shown in Figure 4.28, about industry involvement in the UAE education system. This result indicates that industry are neutral in their view on their involvement in the UAE education system. Therefore, industry do not have a positive or negative view of their involvement in industry in the UAE. The dominant answer is moderate.

To what extent do all UAE unemployed, of working age (who are looking for work) need to undergo skill upskilling?

Figure 4.29 To what extent do all UAE unemployed, of working age (who are looking for work) need to undergo skill upskilling?

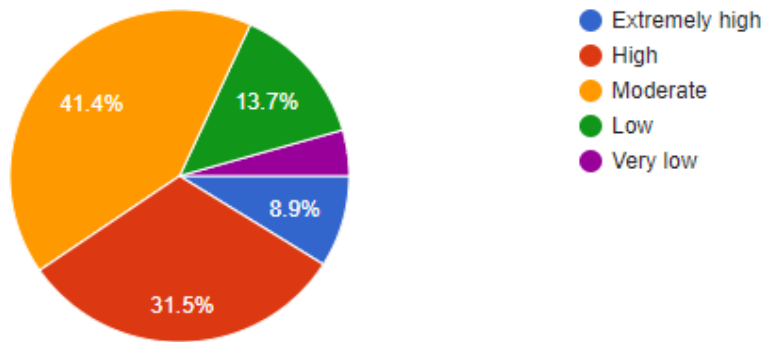


Source: developed for this research.

42.5% of industry selected high, 29.5% selected extremely high, 25.0% selected moderate, 2.4% selected low and 0.7% selected very low, as shown in Figure 4.29, that all UAE unemployed, of working age (who are looking for work) need to undergo skill upskilling. This result indicates that industry judge all UAE unemployed, of working age (who are looking for work) need to undergo skill upskilling. Therefore, it can be assumed that industry are receiving student graduates that do not have the skills for their industry. The dominant answer is high.

To what extent does the present UAE vocational education system meet the needs of the national economy?

Figure 4.30 To what extent does the present UAE vocational education system meet the needs of the national economy?

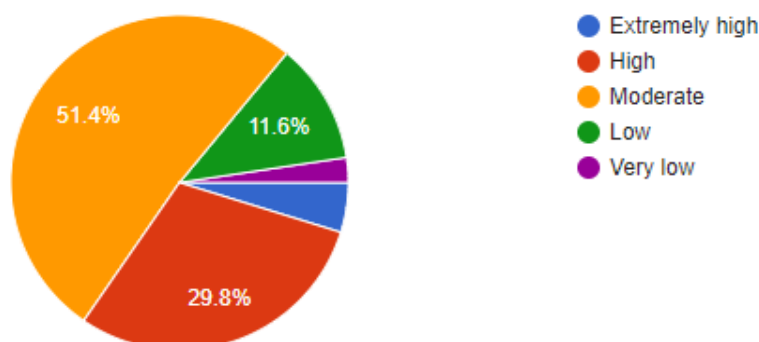


Source: developed for this research.

41.4% of industry selected moderate, 31.5% selected high, 13.7% selected low, 8.9% selected extremely high and 4.5% selected very low, as shown in Figure 4.30, that the present UAE vocational education system meet the needs of the national economy. This response indicates that industry moderately judge the present UAE vocational education system meets the needs of the national economy. Therefore, it can be assumed that industry is ambivalent toward students entering industry with the skills needed to meet the country's national economy. The dominant answer is moderate.

To what extent are skills that are not needed in the economy being provided for in post school education?

Figure 4.31 To what extent are skills that are not needed in the economy being provided for in post school education?



Source: developed for this research.

51.4% of industry selected moderate, 29.8% selected high, 11.6% selected low, 4.8% selected extremely high and 2.4% selected very low, as shown in Figure 4.31, that skills that are not needed in the economy are being provided for in post school education. This result indicates that industry judge skills that are not needed in the economy are being provided for in post school education. Therefore, industry do not have a strong view on school education meeting the requirements for the national economy. The dominant answer is moderate.

To what extent can knowledge of career pathways help a learner shape their educational pathway?

41.8% of industry selected high, 38.0% selected extremely high, 16.8% selected moderate, 3.1% selected low and 0.3% selected very low, that knowledge of career pathways help a learner shape their educational pathway. This result indicates that industry judges that knowledge of career pathways can help a learner shape their educational pathway. Therefore, this result indicates that industry judge that more career education would help students to prepare better for employment. The dominant answer is high.

To what extent are job vacancies made aware to Emiratis that are looking for work?

38.7% of industry selected high, 30.8% selected moderate, 14.4% selected extremely high, 12.3% selected low and 3.8% selected very low, that job vacancies are made aware to Emiratis looking for work. This result indicates that industry judge job vacancies are made aware to Emiratis looking for work. Therefore, it can be assumed that industry is advertising all job vacancies on the open market. The dominant answer is high.

4.6 Comparison of survey results

Next, the results from the questionnaires are discussed with a comparison of results between the six sample groups. Where the same question was asked across several groups, the results were compared. If the sample sizes were big enough, the distributions of ratings were compared statistically. Because the ratings were all categorical, a non-parametric test, the chi-square test, was used to assess whether the distribution of ratings varied with sample groups (Cohen, Manion and Morrison, 2007).

As a large number of tests were carried out, the significance level for rejected the null hypothesis that the group did not differ, was set at 0.01.

To allow for the weight of judgement to be considered from the questionnaires on an equal basis, the results have been grouped into three categories to show a positive, neutral or negative result for better comparison of the judgement of respondent view, as follows:

- extremely high and high result – positive
- Moderate – neutral
- Low and very low – negative.

Percentages already displayed and discussed in Section 4.5 are not shown again.

Research Question A addressed strategy, Research, Question B addressed delivery and Research Question C addressed employment.

Strategy. The Research question that addressed strategy is as follows:

Research question A: ‘Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership’s Visions?’

Seven questions were addressed in this section and the results are as follow:

1. *To what extent are the tweets by the country leadership informative in relation to TVET?*

This question was addressed to the Ministers and Industry.

The results showed that Ministers had a neutral view and Industry had a positive view that the tweets by the country leadership were informative in relation to TVET. Therefore, a strategy for technical vocational education in the UAE is required, that sets out the objectives and the key performance indicators for the UAE to improve the performance of technical and vocational education in the country.

2. *To what extent are the UAE Visions for the country’s direction and development informative in relation to TVET?*

This question was addressed to Ministers, Directors, Teachers, Students, Parents and Industry.

In response to this question Ministers and Parents were positive in their view that the UAE visions for the country's direction and development were informative in relation to TVET. Also positive were Directors, Teachers, Student's, and Industry. Therefore, using visions has proven to be a successful method of communicating the country direction and development.

The chi-square test was applied to the Teachers, Students, Parents and Industry groups, (see Appendix D Question 2) chi-square was 45.21 at 6 degrees of freedom at $p < 0.0001$ thus disproving the null hypothesis which means there is a significant difference between group responses.

3. To what extent are the general level of computing skills in the country sufficient for a knowledge economy?

This question was addressed to Directors, Teachers, Students, Parents and Industry.

In all groups except the Minister's the result was positive. Positive scores were recorded by Teachers, Directors, Parents, Industry and Students. Therefore, it is viewed that computing skills can support the country's efforts to develop a knowledge economy and should not pose a barrier to success.

The chi-square test was applied to the Teachers, Students, Parents and Industry groups, (see Appendix D Question 3) chi-square was 48.11 at 6 degrees of freedom at $p < 0.0001$ thus disproving the null hypothesis which means there is a significant difference between group responses.

4. To what extent are the digital resources available in the UAE schools/institutes sufficient for a knowledge economy?

This question was addressed to Ministers, Directors, Teachers, Students, Parents and Industry.

Ministers judged the extent of digital resources available neutral whereas, positive returns were gained from Teachers, Parents, Industry, Students and Directors.

Therefore, digital resources are sufficient in schools and institutes for a knowledge economy.

The chi-square test was applied to the Teachers, Students, Parents and Industry groups, (see Appendix D Question 4) chi-square was 58.69 at 6 degrees of freedom at $p < 0.0001$ thus disproving the null hypothesis which means there is a significant difference between group responses.

5. To what extent is the general level of mathematics in the country sufficient to develop artificial intelligence solutions?

This question was addressed to Directors, Teachers, Students, Parents and Industry.

Teachers, Directors, Parents and Industry, showed a neutral result respectively. However, Students returned a positive result. Therefore, according to students the general level of mathematics is sufficient to support the development of artificial intelligence solutions. However, Teachers, Directors, Parents and Industry are not so sure.

The chi-square test was applied to the Teachers, Parents and Industry groups, (see Appendix D Question 5) chi-square was 161.67 at 6 degrees of freedom at $p < 0.0001$ thus disproving the null hypothesis which means there is a significant difference between group responses.

6. To what extent is the general level of computing programming and coding skills sufficient for developing artificial intelligence?

This question was addressed to Directors, Teachers, Students, Parents and Industry.

Three groups, Teachers, Directors, and Industry returned a neutral response. Positive results were returned by Parents and Students. Therefore, Students the future of the country, supported by their parents, judge they have sufficient computer programming and coding skills to develop artificial intelligence to move the country forward in its quest for technological change. However, Teachers, Directors, and Industry are not so sure.

The chi-square test was applied to the Teachers, Students, Parents and Industry groups, (see Appendix D Question 6) chi-square was 125.49 at 6 degrees of freedom at

$p < 0.0001$ thus disproving the null hypothesis which means there is a significant difference between group responses.

7. To what extent are UAE students able to build robots?

This question was addressed to Directors, Teachers, Students and Parents. Three groups returned a neutral response that is Teachers, Directors and Students. Only Parents were positive. Therefore, it can be assumed that more efforts need to be made to assist Students on how to build robots.

The chi-square test was applied to the Directors, Teachers and Students groups, (see Appendix D Question 7) chi-square was 126.58 at 6 degrees of freedom at $p < 0.0001$ thus disproving the null hypothesis which means there is a significant difference between group responses.

Next, to make sense of the weight of judgement of the positive, neutral and negative results between the survey groups responses, the results have been categorised into four categories as follows:

- Positive - where most of the group results were positive.
- Neutral - where results were balanced between positive and negative.
- Negative – where most of the group results were negative.
- Inconclusive – where the results were mixed between the above three categories and no clear view could be discerned.

Similarly, the results of chi-square are also shown in Tables 4.3, 4.4, and 4.5 in categories as follows:

- Not tested – chi square was not applied to the result.
- Significant difference – chi square result showed a significant difference in results from different groups.
- No significant difference – there was no difference in results from different groups.

Both sets of results are recorded in Table 4.3, 4.4 and 4.5.

Next, Research Question A, considers the outcome of the view of the group results from the questionnaires and the results of the chi square test for strategy, as shown in Table 4.5.

Table 4.2 Survey outcomes Research question A			
RQ A	'Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership's Visions?'		
Series Number	Question	Outcome	Chi square test
1.	To what extent are the UAE Visions for the country's direction and development informative in relation to TVET?	Positive	Significantly different
2.	To what extent are the general level of computing skills in the country sufficient for a knowledge economy?	Positive	Significant difference
3.	To what extent are the digital resources available in the UAE schools/institutes sufficient for a knowledge economy?	Positive	Significant difference
4.	To what extent is the general level of mathematics in the country sufficient to develop artificial intelligence solutions?	Neutral	Significant difference
5.	To what extent is the general level of computing programming and coding skills sufficient for developing artificial intelligence?	Neutral	Significant difference
6.	To what extent are UAE students able to build robots?	Neutral	Significant difference
7.	To what extent are the tweets by the country leadership informative?	Inconclusive	Not tested
Source: developed for this research.			

Positive results were returned for three questions, that is:

- The UAE Visions for the country's direction and development were informative in relation to TVET. Meaning the Visions for the country were clear in their direction for the development requirements for TVET. Therefore, Visions were an effective

communication method for informing the citizens of the direction and development of the country.

- The general level of computing skills in the country was sufficient for a knowledge economy. Meaning the level of computing was sufficient for the execution of the technical requirements for developing a knowledge economy. Therefore, the ability to operate computers would not be a barrier to achieving a knowledge economy.
- The digital resources available in the UAE schools/institutes were sufficient for a knowledge economy? Meaning that the institutes in the country had the digital resources to support a knowledge economy. Therefore, the resources required for students to develop solutions for a knowledge economy are available.

Neutral responses were returned on three questions, that is:

- It was undecided whether the general level of mathematics in the country was sufficient to develop artificial intelligence solutions. Meaning there was indecision about the mathematical ability indicating difficulty in evaluation of mathematical ability. Therefore, testing of mathematics would give an indication to levels of mathematical ability.
- It was undecided whether the general level of computing programming and coding skills is sufficient for developing Artificial Intelligence. Meaning there was difficulty in assessing this subject. Therefore, an assessment methodology for computing and coding would indicate the ability in this area.
- It was undecided whether UAE students were able to build robots? Meaning there was no assessment of ability to develop robots. Therefore, assessment in this area would help to make a judgement.

Inconclusive responses were returned on one question, that is:

- Tweets by the country leadership were informative. Meaning that there was insufficient strength of judgement to make a decision. Therefore, it is not clear whether tweets are effective or not and further research would lead to a more solid view point.

The result of the chi-square tests indicated that there was a significant difference in responses to all questions as demonstrated in Table 4.3. Indicating that the view of the

Teachers, Students, Parents and Industry differ from each other. Therefore, when a strategy for technical and vocational education in the UAE is conveyed to the public regarding the effectiveness of meeting the advanced technological skills of the Leadership's Visions, Teachers, Students, Parents and Industry will interpret the strategy in different ways. This means that strategic messages need to address each segment of society to ensure that the desired message reaches the targeted group for society to have comprehensive information about and understanding of the country's strategy and Visions.

Delivery. Research question B results that addressed delivery are as follows:

Research question B asks: 'Is there an approach in the UAE context that can effectively deliver technical and vocational education and training?'

To answer this question, nine questions were addressed as follows:

8. *To what extent are teachers able to teach the information needed for a knowledge economy?*

This question was addressed to Directors, Teachers, Students and Parents.

Directors and Students returned a neutral response. Whereas, Teachers and Parents returned a positive response. Therefore, further research would have to be conducted to gain a conclusive result.

The chi-square test was applied to the Teachers, Students and Parents groups, (see Appendix D Question 8) chi-square was 96.96 at 4 degrees of freedom at $p < 0.0001$ thus disproving the null hypothesis which means there is a significant difference between group responses.

9. *Teacher's knowledge is supplement by using computer search engines?*

This question was addressed to Directors, Teachers and Students.

Directors, Teachers and Students returned a positive result. Therefore, Teacher's use computer search engines to supplement their knowledge.

The chi-square test was applied to the Teachers and Students groups, (see Appendix D Question 9) chi-square was 8.73 at 2 degrees of freedom at $p < 0.05$ thus disproving the null hypothesis which means there is a significant difference between group responses.

10. To what extent are teachers in the UAE equipped to teach skills for development of artificial intelligence?

This question was addressed to Directors, Teachers, Students, and Parents.

Directors returned a negative result indicating that they do not think teachers are equipped with the skills to teach the development of artificial intelligence. On the other hand, Teachers and Parents were positive. Conversely Students had a neutral view. Therefore, this result indicates that Teachers and parents are positive that the teachers are equipped to teach skills for the development of artificial intelligence.

The chi-square test was applied to the Teachers, Students and Parents groups, (see Appendix D Question 10) chi-square was 18.91 at 4 degrees of freedom at $p < 0.001$ thus disproving the null hypothesis which means there is a significant difference between group responses.

11. To what extent teachers have a specific teaching qualification?

This question was addressed to Directors and Teachers.

Directors had a neutral view whereas, teachers were positive that teachers have specific teaching qualifications. Therefore, delivery of the curriculum should be by qualified teachers teaching to teacher standards.

12. To what extent should Post-school English language education be paid by parents?

This question was addressed to Ministers, Directors, Parents and Industry.

Ministers recorded a negative result meaning that they do not believe that parents should pay for post-school English language tuition. Neutral views were recorded by Directors, Industry and Parents. Therefore, Ministers have a different view of the provision of post-school English language than Directors, Industry and Parents.

The chi-square test was applied to the Parents and Industry groups, (see Appendix D Question 12) chi-square was 14.40 at 2 degrees of freedom at $p < 0.001$ thus disproving the null hypothesis which means there is a significant difference between group responses.

13. To what extent is industry involved in the UAE education system?

This question was addressed to the Ministers group, Directors, Students and Industry.

The Ministers and Directors group had a negative view, and Industry had a neutral view, and Students had a positive view. Therefore, only Ministers would like to see more involvement by industry and the UAE education system to further the visions of the country and to support economic growth.

The chi-square test was applied to the Students and Industry groups, (see Appendix D Question 13) chi-square was 68.45 at 2 degrees of freedom at $p < 0.0001$ thus disproving the null hypothesis which means there is a significant difference between group responses.

14. To what extent do all UAE unemployed of working age (who are looking for work) need to undergo skill upskilling?

This result was addressed to Ministers, Directors, Students, Parents and Industry.

This result was positive, Directors, Ministers, industry, Parents and Students judged that all UAE unemployed, of working age (who are looking for work) need to undergo skill upskilling. Therefore, this result, shows high priority for reskilling of UAE unemployed.

The chi-square test was applied to the Students, Parents and Industry groups, (see Appendix D Question 14) chi-square was 70.11 at 4 degrees of freedom at $p < 0.0001$ thus disproving the null hypothesis which means there is a significant difference between group responses.

15. To what extent does the present UAE technical and vocational education system meet the needs of the national economy?

This result was addressed to Ministers, Directors, Teachers, Students, Parents and Industry. Three groups, Directors, Ministers and Industry returned a neutral response. Conversely, three groups returned a positive response, that is, Teachers, Parents and Students. Therefore, further research on the present technical and vocational education system needs to be conducted to judge whether the present technical and vocational education system meets the needs of the economy.

The chi-square test was applied to the Teachers, Students Parents and Industry groups, (see Appendix D Question 15) chi-square was 150.61 at 6 degrees of freedom at $p < 0.0001$ thus disproving the null hypothesis which means there is a significant difference between group responses.

16. To what extent are skills that are not needed in the economy being provided for in post school education?

This question was addressed to Ministers, Directors, Teachers, Students, Parents and Industry.

This result returned were neutral with only Ministers divided equally between neutral and positive. Conversely, neutral responses were received from Directors, Teachers, Industry, Parents and Students. Therefore, research, data collection, and data analysis needs to be carried out to ensure that skills that are not needed for the economy are not being provided for in post-school education.

The chi-square test was applied to the Teachers, Students, Parents and Industry groups, (see Appendix D Question 16) chi-square was 181.22 at 6 degrees of freedom at $p < 0.0001$ thus disproving the null hypothesis which means there is a significant difference between group responses.

Next the results are recorded within the four categories of: Positive, Neutral, Negative and Inconclusive. Similarly, the results of chi-square are also shown in Table 4.4 in categories as follows: Not tested, Significant difference and No significant difference.

Table 4.4, records the results about Research Question B, delivery, with categories and the chi-square test indicated for ease of understanding.

Table 4.3 Survey outcomes Research question B			
RQ B	‘Is there an approach in the UAE context that can effectively deliver technical and vocational education and training?’		
Series Number	Question	Outcome	Significant difference
1.	To what extent teacher’s knowledge is supplement by using computer search engines?	Positive	Not tested
2.	To what extent teachers have a specific teaching qualification?	Positive	Significant difference
3.	To what extent do all UAE unemployed of working age (who are looking for work) need to undergo skill upskilling?	Positive	Significant difference
4.	To what extent are teachers in the UAE equipped to teach skills for development of artificial intelligence?	Positive	Significant difference
5.	To what extent should Post-school English language education be paid by parents?	Neutral	Significant difference
6.	To what extent are skills that are not needed in the economy being provided for in post school education?	Neutral	Significant difference
7.	To what extent does the present UAE technical and vocational education system meet the needs of the national economy?	Inconclusive	Significant difference
8.	To what extent are teachers able to teach the information needed for a knowledge economy?	Inconclusive	Significant difference
9.	To what extent is industry involved in the UAE education system?	Inconclusive	Significant difference
Source: developed for this research.			

Positive results were returned for four questions, that is:

- Teacher’s knowledge is supplement by using computer search engines? Meaning teachers are no longer coming to the class only with reserves of knowledge but supplement their knowledge using computer search engines. Therefore, internet connection are as important to students as teachers in the teaching environment.

- Teachers have a specific teaching qualification? Meaning that all teachers reach the educational standard to be qualified and appointed as teachers within the education system. Therefore, teaching standards ought to be to national standards.
- UAE unemployed; of working age (who are looking for work) need to undergo skill upskilling? Meaning respondents were certain that unemployed Emiratis needed to be reskilled. Therefore, extensive reskilling would be acceptable for the unemployed to assist them to find employment.
- Teachers in the UAE are equipped to teach skills for development of artificial intelligence? Meaning teaching staff in the UAE have the skills to educate students to develop artificial intelligence solutions. Therefore, teachers ought to be able to develop student talent for artificial intelligence solutions.

Neutral results were returned for two questions, that is:

- To what extent should Post-school English language education be paid by parents?
- To what extent are skills that are not needed in the economy being provided for in post school education?

Inconclusive results were returned for three questions, that is:

- The present UAE technical and vocational education system meets the needs of the national economy? Meaning there was no conclusive judgement about whether the UAE technical and vocational system was or was not meeting the needs of the national economy. Therefore, further research needs to be carried out to establish a view.
- Teachers are able to teach the information needed for a knowledge economy? Meaning there was no clear judgement on whether teachers were contributing to the teaching of students to meet the needs of a knowledge economy. Therefore, assessment of this area would help to establish the effectiveness of teachers teaching in the area of knowledge economy.
- Industry is involved in the UAE education system? Meaning there is no positive or negative view on whether industry is involved in the UAE education system. Therefore, to ensure industry are involved, more efforts need to be addressed to increase the amount of industry involvement in the education system for positive benefit.

The result of the chi-square test indicated that there was a significant difference in the responses of the sample groups in all categories of outcomes, as shown in Table 4.3, showing there are significantly different views on the approach of effective delivery of technical and vocational education and training in the UAE. This means that the ability of teachers, involvement of industry and the ability of UAE national's skills to meet the needs of the economy are judged differently by the different groups. Therefore, each group needs to be involved, informed and collaborated with, to ensure that all groups appreciate the delivery strategy and play their respective role in technical and vocational education in the UAE to ensure success.

Employment. The Research question that addressed employment is as follows:

‘Is there a system in the UAE that effectively engages the unemployed in jobs in successful occupations?’

Four questions addressed the third research question about a system of engaging the unemployed in jobs.

17. To what extent can knowledge of career pathways help a learner shape their educational pathway?

This question was addressed to Directors, Teachers, Students, Parents and Industry.

The overall result was positive from Directors, Teachers, Industry, Parents and Students, Therefore, emphasis on career education, it is considered, will help students to select the career path, curriculum, examination, employment and further education choices necessary for successful outcomes and a reduction in unemployment.

The chi-square test was applied to the Teachers, Students, Parents and Industry groups, (see Appendix D Question 17) chi-square was 56.83 at 6 degrees of freedom at $p < 0.0001$ thus disproving the null hypothesis which means there is a significant difference between group responses.

18. To what extent are job vacancies made aware to Emiratis looking for work?

This question was addressed to Ministers, Directors, Students and Industry.

Ministers had a negative view conversely, Industry returned a positive view and Directors and Students had a neutral view. Therefore, industry is positive that job

vacancies are made aware to Emiratis looking for work. However, Ministers do not agree and Directors and Student had no positive or negative view.

The chi-square test was applied to the Students and Industry groups, (see Appendix D Question 18) chi-square was 30.39 at 2 degrees of freedom at $p < 0.0001$ thus disproving the null hypothesis which means there is a significant difference between group responses.

19. To what extent is there a seamless government process to get the Emirati unemployed into employment?

This question was addressed to Ministers, Directors, Students and Parents.

Ministers had a negative view conversely, Parents were positive and Directors and Students had a neutral view. Therefore, Ministers judge that more should be done in this to create a seamless government process that would help unemployed Emiratis into employment.

The chi-square test was applied to the Students and Parents groups, (see Appendix D Question 19) chi-square was 26.17 at 2 degrees of freedom at $p < 0.0001$ thus disproving the null hypothesis which means there is a significant difference between group responses.

20. To what extent can the General Pension Fund and Federal Authority for Identity and Citizenship play a part in assisting Emiratis to find employment?

This question was addressed to Ministers and Directors.

Directors had a positive view indicating the challenges in finding Emiratis employment. On the other hand, Ministers returned a negative view, ruling out, in their view, that the General Pension Fund and the Federal Authority for Identity and Citizenship could play a part in assisting Emiratis find employment. Therefore, Directors and Ministers do not agree that the General Pension Fund and the Federal Authority for Identity and Citizenship could play a part in assisting Emiratis in finding employment, and further research would need to be conducted to establish a view.

Table 4.5 records the results about Research Question C, employment, with categories indicated for ease of understanding. The results are recorded within the four categories of:

- Positive
- Neutral
- Negative
- Inconclusive.

Similarly, the results of chi-square are also shown in Table 4.4 in categories as follows:

- Not tested,
- Significant difference
- No significant difference.

Table 4.4 Survey outcomes Research question C			
RQ C	'Is there a system in the UAE that can effectively engage the unemployed in jobs in successful occupations?'		
Series Number	Question	Outcome	Significantly different
1.	To what extent can knowledge of career pathways help a learner shape their educational pathway?	Positive	Significantly different
2.	To what extent are job vacancies made aware to Emiratis looking for work?	Neutral	Significantly different
3.	To what extent is there a seamless government process to get the Emirati unemployed into employment?	Neutral	Not tested
4.	To what extent can the General Pension Funds and the Federal Authority for Identity and Citizenship play a part in assisting Emirati's to find employment?	Inconclusive	Significantly different
Source: developed for this research.			

Positive results were returned for one question, that is:

- Knowledge of career pathways help a learner shape their educational pathway? Meaning that there is support for career education in schools. Therefore, more career guidance in schools would be positively received and advantageous for students planning career paths.

Neutral results were returned for two questions, that is:

- Job vacancies are made aware to Emiratis looking for work? Meaning there was no positive or negative view that jobs were being advertised for Emiratis to apply to for employment. Therefore, more efforts need to be exerted to ensure that jobs are advertised for Emiratis to apply for.
- There is a seamless government process to get the Emirati unemployed into employment? Meaning it is not obvious that there is a seamless government process to get Emiratis into employment, leading to unemployed with no direction to go to find employment. Therefore, more efforts need to be made to ensure that the government sets up a process to assist Emiratis into employment.

Inconclusive results were returned for one question, that is:

- The General Pension Fund and the Federal Authority for Identity and Citizenship play a part in assisting Emirati's to find employment? Meaning there was no conclusive view expressed about whether there should be involvement by the General Pension Fund and the Federal Authority for Identity and Citizenship entities in the employment process.

The result of the chi-square test indicated that there was a significant difference in the responses of the sample groups in all categories of outcomes, as shown in Table 4.7, showing there are significantly different views on the success of the system in the UAE that promotes careers and engages the unemployed in jobs. This means that different groups have different understanding of how Emiratis build their careers, and seek and find employment. Therefore, career development and a system for finding employment needs to be made available and publicised to all seeking employment, for increased employment of Emiratis in the workforce.

4.7 Conclusions

In this chapter, survey findings have been categorized. In total, twenty survey questions were addressed, eight returned positive results, seven returned neutral results and five returned inconclusive results as shown in tables 4.3, 4.4 and 4.5. Positive, indicated where most of the group results were positive. Neutral indicated where most of the group results were neutral and inconclusive indicated where the results were mixed and no clear view could be discerned.

Similarly, the results of chi-square are also shown in Table 4.3, 4.4 and 4.5 indicated as follows: not tested indicated that chi square was not applied to the result, significant difference indicated that chi square result showed a significant difference in results between different groups, and no difference, indicated that there was no difference in results from different groups. Where it was possible to test for group differences using chi-square tests, significant differences between groups were obtained in nearly all cases. This shows that while there is a consensus across the community on many of these questions, there are also variations in perceptions between different groups of stakeholders. This means that each group should be further consulted about any specific changes that are made in the future.

Chapter 5 Analysis of exploratory and explanatory data

5.0 Introduction

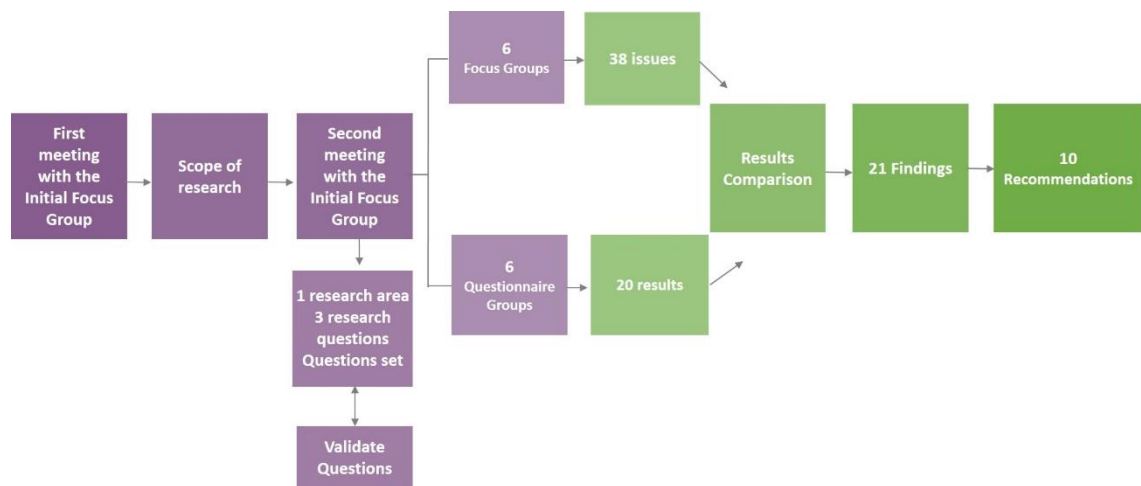
This chapter compares the findings from the twenty one questions addressed to the six focus group discussion and the questionnaires, findings are related to the extant theory and conclusions are made.

5.1 Plan of the chapter

Table 5.1 Plan of this chapter		
5.0	Introduction	
5.1	Plan of this chapter	
5.2	Research question A - Strategy	
	5.2.1	Communication
	5.2.2	Strategy
	5.2.3	Curriculum
	5.2.4	Digital resources
	5.2.5	Mathematics
	5.2.6	Computing and coding
	5.2.7	Teacher's competence
	5.2.8	Conclusion for Research question A
5.3	Research question B - Delivery	
	5.3.1	Teacher
	5.3.2	English language
	5.3.3	Industry
	5.3.4	Skilling
	5.3.5	National economy
	5.3.6	Conclusion for Research question B
5.4	Research question C - employment	
	5.4.1	Career pathways
	5.4.2	Job vacancies
	5.4.3	Employment process
	5.4.4	Conclusion for Research question C
5.5	Conclusions	

In this chapter, the findings from the focus group and the questionnaires will be compared and reference will be made to the extant theory. The following Figure 5.1, indicates the research journey. From the 38 issues derived from the focus groups and the 20 results from the questionnaires, 21 findings emerged resulting in 10 recommendations.

Figure 5.1 Research approach



Source: developed for this research

Next, results are discussed and conclusions made. To enable comparison, the focus group results have been converted to: positive, negative and inconclusive to match the classification found in the questionnaire results. Where there is a divergence of findings between the questionnaire and focus groups, the focus group has been deferred to because the smaller focus groups were able to be questioned more thoroughly during discussions and as a result there was a deeper understanding of issues, not to negate the findings of the questionnaire. However, the focus groups were able to express ideas where the questionnaire could not give the same depth of expression.

The research has indicated different outcomes between the questionnaires and the focus group results on some questions. As stated in Chapter 3 section 3.7, the initial and large focus groups allowed issues to be determined, discussed and expanded upon (Siniscalco & Auriat, 2005). Participants shared their views and covered a greater range of views within each research question. Therefore, focus group results were deferred to

because the smaller focus groups consisted of respondents who were able to be questioned more thoroughly during discussions and as a result there was a deeper understanding of issues. Conducting focus group interviews allowed each aspect of the research to be explored in more detail and a general understanding of each groups judgements were easy to record.

- Focus groups established the areas of concern for the research allowing the main issues to be determined through open and transparent discussion which would have been difficult to achieve if the researcher had used his own judgement as to what the research questions ought to be. Therefore, Focus groups provided richer, more in-depth illuminations of the complex nature of the research to guide the three main research questions and the sub-questions.
- Focus groups were smaller in number to that of the questionnaires and smaller groups may have had the ability to view their concerns with reasoning which cannot be achieved through a Likert scale questionnaire.

On the other hand, closed questions were used in this case, to confirm the strength of views of the sample groups as stated in Chapter 5 section 5.1. When the Chi-square test was applied to the results to determine the difference between the statistically generated expect result and an actual (observed) result a significant difference between groups was demonstrated.

- The questionnaires were conducted over thousands of respondents. Therefore, the results will become level out with a greater number of respondents.
- The questionnaires judged the strength of attitude to the key questions indicating satisfaction or dissatisfaction with each research question which was easier to determined statistically using a Likert scale questionnaire.
- Ministers and Directors are the most informed regarding the leadership's strategy, delivery and employment as they are closest to the leadership and are therefore better able to interpret leadership direction. Although Ministers and Directors were small groups, they significantly represented the group but their views were not reflected in the chi-square result and this may have had a bearing on the results.

- Particularly in Research Question B, Teachers are the **deliverers** of the input to technical and vocational education, students (and parents) are the **receivers of the input** of technical and vocational education and industry are the **receivers of the output** of the technical and vocational education landscape and made their judgements based on their angle of the research issues.
- Different aspects of input, receipt of input and receipt of output of the technical and vocational education system are viewed differently by the different groups and their judgements are based on the applicability of the education service from different points of view. Teachers are looking to educate to a standard, students and parents are looking forward to further career and industry is looking for work ready graduates to jobs that students may not have been prepared for. Therefore, satisfaction or dissatisfaction is determined by the judgement of the view each group has taken. Since the groups differ in the angle of their view, the results reflect this difference.

The analysis of results begins with Research question A about strategy.

5.2 Research question A – Strategy

Research question A addressed *‘Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership Vision?’* Research question A aimed to find out about the government strategy to meet the Vision agenda. Referring back to the determinants of a VET reform strategy, Cave et. al. (2019) indicated three categories of determinants: Content, Context and Commitment that were important when embedding a VET reform in a VET strategy and contained 17 descriptors. Three of those descriptors were prominent in this research: strategy, including visions, a strong economy and political will. Research question A, Strategy was the first main determinant of this research and addressed seven questions about: communication, strategy, curriculum, digital resources, mathematics, computing and coding, and teacher’s competence.

5.2.1 Communication

Question 1 addressed the following:

1. To what extent are the tweets by the country leadership informative in relation to TVET?

Focus group result: Positive

- Leadership tweets are understood but are not specific to technical and vocational education.
- There is no consistent message about technical and vocational education in the UAE.

Questionnaire result: Inconclusive

- It was inconclusive whether tweets by the country leadership were informative.

Results for question 1 indicated that questionnaire results were inconclusive. Whereas, focus group results indicated that the tweets were understood. An explanation for inconclusiveness is that in focus group discussion probing brought out more detailed answers, providing a clearer picture.

This result shows clearly that using modern social media platforms reached the desired audience because all who were involved in focus groups knew about the country's leadership tweets. Being fast and inexpensive, this method of communication communicated the desired messages to followers. There has been no research carried out in the UAE on tweets of the Leadership being informative. However, international research shows support from Jabnoun and Sedrani (2005) and Bealer and Bhanugopan (2013) who argue that communication by leadership is required to broaden and elevate the interest of followers. This is a method favoured by Sheikh Mohammed bin Rashid who is the only Arabic leader among the top 10 Twitter users who uses this approach (Jabnoun and Sedrani, 2005). Further, Bealer and Bhanugopan's (2013) research results indicate that positive communication generates awareness, and acceptance to the purpose and mission of the country and encourages citizens to go beyond self-interest for the good of the country. Therefore, the general use of tweets was a successful method of communicating with citizens. However, in terms of technical and vocational education, there were no tweets. Tweets that would raise awareness about TVET, keep the community informed of developments, and elevate the standing of technical and vocational education within the community, were not forthcoming. Further, there was

no consistent message about technical and vocational education. Therefore, tweets about technical and vocational education in the country and in support of the country's visions are not forthcoming. This leads to finding 1.

Finding 1: tweets about TVET are not communicated to the community.

5.2.2 Strategy

Question 2 addressed the following:

2. To what extent are the UAE Visions for the country's direction and development informative in relation to TVET?

Focus group result: Negative

- There is no road map available for the implementation of the country's visions.
- There is no technical and vocational educational strategy.
- There is a lack of understanding of the value and benefits of technical and vocational education.

Questionnaire result: Positive

- The UAE Visions for the country's direction and development were informative in relation to TVET.

The questionnaire returned a positive result that the UAE visions for the country's direction and development were informative in relation to TVET. It is important for the UAE to ensure that all citizens understand the requirements to meet the visions of the future. Visions should provide the roadmap for the country to meet economic growth, necessary for economic prosperity. There has not been any research carried out in the UAE about UAE Visions. However, international research indicates support, Bealer and Bhanugopan (2013) research results are in support, stating that visions, developed through research, and disseminated to all government departments and authorities, ensured awareness of vision requirements and the need to redirect operations to meet demand. Bealer and Bhanugopan (2013) stated that leadership broadens and elevates the interests of followers, generates awareness and acceptance among the followers important to the purpose and mission, for the leadership of the UAE to achieve transformation. Further the transformational leadership motivates followers to go beyond their self-interests for the good of the country (Bealer and Bhanugopan, 2013).

Amagoh's (2009) research results also supported this result stating that keeping citizens informed, inspires and motivates citizens in the workplace to perform well, despite change. Further, a hallmark of the UAE, is the ability to make decisions and communicate at speed, a necessary requirement in a rapidly changing technological environment. Therefore, Visions may be a successful method of communication the UAE decisions about the future direction and development of the country and tweeting information is exemplar practice at governmental level.

However, focus groups were not in agreement because results highlighted that there was a lack of a roadmap for implementation of the country's Visions. Visions are successfully directed towards Ministries and or Authorities who disseminate and operationalise the information down through organisations. However, technical and vocational education does not have a Ministry or an Authority to disseminate the information. Further, a lack of a Ministry or an Authority means there is no strategic plan for technical and vocational education. Therefore, there is no clear pathway or direction for stakeholders to follow which leads to uncertainty, misunderstanding and confusion. This leads to finding number 2.

Finding 2: A technical and vocational education strategy for the UAE does not exist.

5.2.3 Curriculum

Question 3 addressed the following:

3. To what extent are the general level of computing skills in the country sufficient for a knowledge economy?

Focus group result: Negative

- Students need more training in computing skills.

Questionnaire result: Positive

- The general level of computing skills in the country was sufficient for a knowledge economy.

Questionnaire results indicated that there is a general level of computing skills in the country, sufficient for a knowledge economy. Although the results presented represent

all the group responses, there were differences in judgement based on the angle that the question was viewed from. For example, teachers are judging their own performance to an extent and may consider their performance as good. Whereas, parents may not be aware of the skills required for future occupations in the country. However, industry does have a more informed idea. Therefore, different views are melded into two results, one each for the focus group and the questionnaire and are represented by one view. The MoCAF (2017) in a UAE government paper, states that adopting advanced technology transforms future challenges into opportunities which better serves the country. There is no research about this topic in the UAE. However, internationally Doyle's (2019) research findings was in support stating that ever-changing technologies requires employees to constantly stay abreast of the latest information and skills. Doyle (2019) and Khalaf's (2007) research findings support the two types of skills required for a knowledge economy. That is, firstly production, distribution and use of information and ideas and secondly, soft skills. For the country to succeed in developing a knowledge economy, computing skills are required and are deemed to be available in the country.

However, student focus group stated they needed more training in computing. Students also stated they needed more training in soft skills: the ability to communicate and collaborate, to work in teams, to discuss solutions, locally and internationally. Students themselves recognise that these skills are important for creating solutions for the knowledge economy. As a result, those skills should be included in the curriculum. Further, without those skills, the future generation will not be able to contribute to economic prosperity and development of artificial intelligence solutions, which contribute to a knowledge economy. It is therefore important that students have those skills. This point has been supported by Doyle (2019) whose research findings show that schools need to deliver the appropriate soft skills curriculum for the country to prepare itself for a knowledge economy. If not, the country will fail in its attempt to be at the forefront of the knowledge economy due to a lack of computer and soft skills being taught in schools. This leads to finding 3.

Finding 3: The technical and vocational education curriculum for computing skills in schools and institutes is not designed to meet the needs of a knowledge economy.

5.2.4 Digital resources

Question 4 addressed the following:

4. To what extent are the digital resources available in the UAE schools/institutes sufficient for a knowledge economy?

Focus group result: Negative

- Not enough technology is available in schools.
- Access to internet and fast internet speed is not available in schools.
- Artificial intelligence is not in the curriculum.

Questionnaire result: Positive

- The digital resources available in the UAE schools/institutes were sufficient for a knowledge economy.

Questionnaires results were positive that the digital resources available in UAE schools/institutions were sufficient for a knowledge economy. However, focus groups did not support this result. When this question was addressed to students they indicated that computers were broken and outdated, there was a lack of licensed software programmes and intermittent access to the Internet. Again conflicting results arise from the focus groups and the questionnaire. The results could have been very much swayed in the focus group by the student voice because students were able to express that the digital resources were not as good as they would have wanted. Therefore, as the user of the technology they have a more informed view than others.

According to the MoCAF, (2017) in a government paper, the UAE aims to become the first public and open lab in the world for investing and implementing technologies for a knowledge economy. However, there was no UAE research carried out about digital resources being available in schools/institutes sufficient for a knowledge economy, in the UAE. Internationally OECD's (2019) research agrees with the questionnaire result stating that training and upskilling is a must for digital transformation. Therefore, schools need to have the digital resources for students to be able to develop solutions for a knowledge economy. Further, digital literacy is required in the future for students to have the basics at school to be technically savvy in the workplace. Therefore, it is judged that the resources are not available for a knowledge economy. This leads to finding 4:

Finding 4: Digital resources in the UAE schools/institutes, are not sufficient for the development of knowledge economy solutions.

5.2.5 Mathematics

Question 5 addressed the following:

5. To what extent is the general level of mathematics in the country sufficient to develop artificial intelligence solutions?

Focus group result: Negative

- Level of mathematics is not sufficient for a knowledge economy or artificial intelligence.

Questionnaire result: Neutral

- It was undecided whether the general level of mathematics in the country was sufficient to develop knowledge economy or artificial intelligence solutions.

Questionnaire results show a neutral return, indicating a balance of positive and negative about whether the general level of mathematics was sufficient to develop artificial intelligence. Therefore, no conclusion can be made about the questionnaire results. Focus groups on the other hand, determined that the level of mathematics was not sufficient for artificial intelligence. There was no UAE research carried out about the general level of mathematics in the UAE being sufficient to develop artificial intelligence solutions. According to MoCAF (2017), a government paper, the curriculum needs to be designed to reflect the skills in schools to meet artificial intelligence solutions for the UAE. If the level of mathematics is not sufficient, then the requirements for artificial intelligence cannot be realised because the students themselves are not being educated to the level required.

This finding indicates there is a shortfall of ability in the UAE mathematically for the development and use of artificial intelligence. Computer Science (2018) web site states that it is necessary for the level of mathematics to include probability, statistics, algebra, calculus, logic and algorithms. Parbhkar's (2018) research results also supports Computer Science (2018) findings and states that mathematics should include linear algebra, vectors, calculus, and probability. Further, Aoun (2017) states that students must learn agility and adaptability for learning. Therefore, this finding shows that a

curriculum for mathematics that addresses artificial intelligence skills is not being developed and implemented in technical and vocational education. Therefore, it will be difficult for the country to realise its Vision agenda. This leads to finding 5.

Finding 5: Technical and vocational education schools needs a curriculum that addresses artificial intelligence, skill requirements and is implemented in schools/institutes by mathematics specialists.

5.2.6 Computing and coding

Question 6 addressed the following:

6. To what extent is the general level of computing programming and coding skills sufficient for developing Artificial Intelligence?

Focus group result: Negative

- Level of computing and coding skills is not sufficient for developing artificial intelligence.

Questionnaire result: Neutral

- It was undecided whether the general level of computing programming and coding skills was sufficient for developing Artificial Intelligence.

The questionnaire results were neutral showing there was neither a positive nor a negative balance of views about the general level of computing programming and coding skills sufficient to develop artificial intelligence. Conversely, focus group results showed that the level of computer and coding skills was not sufficient for developing artificial intelligence. There has not been research carried out in the UAE about the general level of computing programming and coding skills sufficient for developing artificial intelligence in the UAE. Wonder Workshop (2018) website, supports the result stating coding is the new literacy, and if students cannot code, students will not be able to develop solutions for artificial intelligence. The result would indicate that students need more computing and continued development of coding skills, to increase their ability to work with artificial intelligence solutions. Therefore, a lack of skill by the students means that the country will not reach its goals for developing artificial intelligence solutions. This leads to finding 6.

Finding 6: Computing and coding curriculum and student ability is insufficient for development of artificial intelligence.

5.2.7 Teacher's competence

Question 7 addressed the following:

7. To what extent are UAE students able to build robots?

Focus group result: Inconclusive

- It is inconclusive whether students have a basic knowledge of building robots.
- Teachers judge they are not sufficiently competent to teach robotics.

Questionnaire result: Neutral

- It was undecided whether UAE students were able to build robots

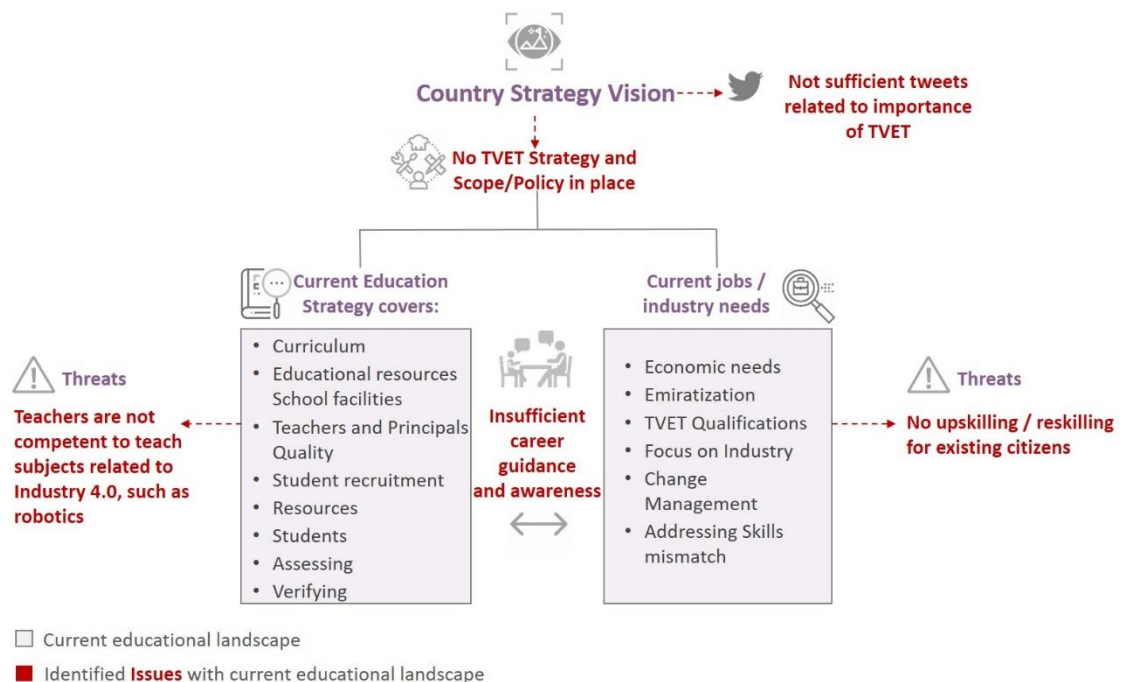
The questionnaire result showed a balance of positive and negative results about student's ability to build robots and returned a neutral result. Conversely, focus groups determined that students did have a basic knowledge of building robots. This is a positive result indicating that there was an ability by UAE students to perform tasks that could lead to solutions for artificial intelligence. There was no UAE research carried out about the extent that UAE students are able to build robots. This result was supported by OECD (2018a, 2018b) research findings that stated, automated technology is rapidly changing people's jobs and lives and it is likely some existing jobs will be automated. Further, this result supports Devlin's (2016) research findings who argues that artificial intelligence appears to be playing an increasing role in the future. Therefore, questionnaire results show that UAE students, the future workforce in the UAE, are able to build robots, a necessary part of artificial intelligence development.

However, teachers in the focus group judged they did not have sufficient competence to teach robotics. Therefore, because teachers are not sufficiently competent, they will be unable to develop student's abilities. This result indicates that teacher's knowledge of robotics and possibly artificial intelligence is not at a sufficiently high enough level to develop student's abilities. Wonder Workshop (2018) website contest this finding stating that 'those who cannot read and write' will be left out of the power structures, referring to the coding required for the building of robots. Therefore, teacher's competence in teaching robotics needs to be enhanced. This leads to finding number 7.

Finding 7: Teachers are not competent or skilled enough to teach students robotics.

To summarise, the findings from Research Question A are graphically demonstrated in Figure 5.2.

Figure 5.2 Issues – Strategy – Research question A



Source: developed for this research

5.2.8 Conclusion for Research question A

Next, findings for Research Question A are concluded. Research question A addressed the question ‘Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership Vision?’ The results show that the communication of the Vision agenda for the UAE is very clear. Messages that are tweeted are reaching citizens who say they are aware of the aims of each Vision agenda. Further, citizens are aware of the messages sent by tweets and understand those messages as they are clear in their intent. However, specific tweets about technical and vocational education were not forthcoming. This means that the benefits, value and successes of technical and vocational education were not promoted as a highly skilled technological route for students to follow. Therefore, the importance of technical and vocational for the knowledge economy and artificial intelligence is not widely known in the UAE.

Further, the Visions set the agenda for the country; the direction and the development required to meet the rapidly changing technological environment, in order to further the economic prosperity of the country. Vision agendas are received by each Ministry or Authority. Each Ministry or Authority then manage their own strategy to guide their operational processes to meet the needs of the country's Vision agenda for the services they offer. The absence of a Ministry or Authority responsible for Technical and Vocational Education and Training, participating in government discussion and decision making regarding government Visions, is required to implement the required transformation. If the information is not available then there is the possibility that due to the lack of participation in the discussion and decision making process that the implementation of the transformation may not be applied accurately, could be misinterpreted or missed. Thus, the need for a Ministry or Authority to represent technical and vocational education and training to translate visions into strategy and operational application.

Should there be a lack of strategy and direction for technical and vocational education, schools become affected. Because there is a need to cascade accurately the governments strategic Visions direction for technological use by the students, it is important that the regulator of the school conveys clear accurate messages about the strategy to avoid possible error. It is important that care must be taken when cascading strategy to the schools, as the further the entity is from the leadership decision making centres the higher the risk of incorrect strategy being applied.

The curriculum at school does not support the advanced technological requirements for a knowledge economy, artificial intelligence, or computing and coding. This means that the future generation is not developing the skills necessary to meet the country Visions. Further, results show that the digital resources are not available in schools. Therefore, students do not have the computer hardware or software to develop their abilities further. Additionally, findings show that teachers themselves stated that they were not competent enough to teach robotics. Therefore, teachers will not be able to maximise student's abilities in this area or be able to develop the skills they require for the country's economic prosperity.

In conclusion, to answer Research question A, that is, 'Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership Vision?' In this case, the results show that there is not a strategy for technical and vocational education in the UAE that effectively meets the advanced technological knowledge and skills required to meet Leadership Visions. This has implications for the leadership styles adopted at various levels in the UAE.

5.3 Research question B – Delivery

Next, research question B addressed '*Is there an approach in the UAE that can effectively deliver technical and vocational education and training?*' and considers the delivery of skills. Referring back to the determinants of a VET reform strategy, Cave et.al. (2019) indicated two categories of implementation determinants that included Capacity and Client and refers to 13 descriptors. Two of those descriptors were prominent in this research: resources and delivery. Research question B, the second main determinant of this research addressed five questions about: teacher, English language, industry, skilling, national economy.

5.3.1 Teacher

The next four questions consider the teacher as part of the delivery of the technical and vocational education system.

Question 8 addressed the following:

8. To what extent are teachers able to teach the information needed for a knowledge economy?

Focus group result: Negative

- There is a lack of TVET strategy causing poor planning and implementation.
- There is no clear approach to TVET.
- Teachers are not knowledgeable enough about a knowledge economy.

Questionnaire result: Inconclusive

- It is inconclusive whether teachers are able to teach the information needed for a knowledge economy.

This question looked at the ability of the teacher to teach information needed for a knowledge economy. The questionnaire results show that there was no conclusive answer as to whether teachers were able to teach the information needed for a knowledge economy. This result shows that questionnaire results either; do not have a view about whether teachers can or cannot teach information technology or there is a lack of understanding of the requirements and skills required for the knowledge economy. No research has been carried out in the UAE about the extent that teachers are able to teach information needed for a knowledge economy. Internationally, Doyle's (2019) research findings argue that teachers must maintain their skills mainly through professional development to be competent enough to teach the information required for a knowledge economy. This point is supported by Gonzales (2004) whose research finds that because the knowledge of the world is doubling every 18 months due to rapid growth, knowledge has a shrinking half-life and therefore needs to be continually maintained.

On the other hand, focus groups considered that teachers were not knowledgeable enough about a knowledge economy to be able to teach competently. Teachers alluded that there was no clear strategy for technical and vocational education, and poor planning and implementation within the technical and vocational education sector. This result means that if teachers are unable to develop the abilities of students with the skills for a knowledge economy then this will result in country visions not being fulfilled. This leads to finding 8.

Finding 8: Teachers are not competent to teach information for knowledge economy.

This question addresses the teacher's use of computers to supplement teaching.

Question 9 addressed the following:

9. Teacher's knowledge is supplement by using computer search engines?

Focus group result: Positive

- All teachers supplement their teaching knowledge by using the internet.

Questionnaire result: Positive

- Teacher's knowledge is supplement by using computer search engines.

This result shows focus groups and questionnaires returned a positive result with teachers supplementing their knowledge by using computer search engines. No

research has been carried out in the UAE about teacher's use of computers to supplement teaching. The result was positive and supported by Siemens, (2005) whose research stated 'a right answer now, maybe wrong tomorrow due to alterations in the information climate affecting decisions'. Therefore, it is important for teachers to maintain access and use of the Internet for teaching purposes. Further, Wikan and Molster's (2011) research also supports results about teachers using the internet, judging that use of the internet now is an integral part of teaching and learning. Again teachers need to maintain their skills, mainly through professional development. Furthermore, Wikan and Molster (2011) support the use of digital skills as one of the five basic skills for teaching a modern curriculum and important for enhancing student learning. Additionally, the use of apps in education has grown exponentially and teachers need to be able to use apps to support teaching and learning. This leads to finding 9.

Finding 9: Teachers are using the internet and apps to maintain currency of knowledge in the learning environment.

Question 10 addressed the following:

10. To what extent are teachers in the UAE equipped to teach skills for development of artificial intelligence?

Focus group result: Negative

- Teachers are aware that they do not have the skills to teach artificial intelligence.
- The curriculum is not clear and not connected to artificial intelligence.

Questionnaire result: Positive

- Teachers in the UAE are equipped to teach skills for development of artificial intelligence.

This result shows that the questionnaire was positive that teachers were equipped in the UAE to teach skills for development of artificial intelligence. However, focus group results show that teachers are aware that they do not have the skills to teach artificial intelligence. The discrepancy of results could be that the teachers focus group allowed deeper discussion issues, thus a clearer picture of the practice in the classroom was better reflected. The same reflection would not have been deducted from the questionnaire. Therefore, the teachers practicing in the classroom had the better ability

to judge their own performance. No previous research has been carried out about the extent that teachers in the UAE are equipped to teach skills for development of artificial intelligence.

However, it is clear from the Visions 2021, 2030, 2071, and 2117, government papers, that students require foundation technology competencies for future technological use and teachers must be able to teach this. Although Luckin, et. al.'s (2016) research findings supports the view that teachers will not be replaced in the future, artificial intelligence is expected to affect how teachers will work, collaborate and communicate. Further, the role of the teacher will continue to evolve and transform, enabling teachers teaching to become more effective and efficient, with expertise better deployed, leveraged and augmented. Therefore, it can be deducted that teachers have been introduced to artificial intelligence but not trained to deliver artificial intelligence and are not clear about what they should teach. Additionally, Wikan and Molster's (2011) research findings supports that the curriculum constantly needs to be updated to reflect requirements for artificial intelligence. Therefore, if teachers are not equipped to teach the skills required for artificial intelligence, and the curriculum is not connected to artificial intelligence, students will not acquire the necessary skills. This leads to finding number 10.

Finding 10: A specific curriculum for artificial intelligence is not available.

The next question considers whether teachers are qualified in their teaching specialised subject.

Question 11 addressed the following:

11. To what extent do teachers have a specific teaching qualification?

Focus group result: Positive

- All teachers are qualified in their specialist subject but admit they require more training in artificial intelligence.
- Teachers need to improve their communication skills.
- Teacher judge that flipped classroom approaches are effective.
- Teachers aim for results not comprehension.

Questionnaire result: Positive

- Teachers have a specific teaching qualification.

This result shows that the questionnaires returned a positive result judging that teachers have specific teaching qualifications for their specialised subjects. Similarly, focus group results showed teachers were qualified in their specialist subject. This is positive in that the teachers are qualified to teach the subjects they teach to students. Results from ACTVET (2014) research contradicted this finding, indicating that teachers were not qualified as teachers to teach in schools. This is because teachers of Arabic origin traditionally have a degree in the subject area, but not a teaching degree. In light of the new Ministry of Education licensing of teachers, against national teachers' standards, it checks that teachers are qualified but also ensures that they teach to the national standard. However, this is for the academic teachers not technical and vocational teachers. Therefore, the licensing of technical and vocational teachers to technical and vocational education teaching standards requires to be developed. However, students in the focus groups made comments about the teacher's abilities. Students wanted the teachers to be able to communicate better with stronger communication skills because some students judged that they didn't understand the teacher. International research points to Wikan and Molster's (2011) research which supports findings that communication skills, verbally and in writing, were two of the five basic communication skills which teachers ought to have competence. Teachers indicated they wanted to change their teaching practice, a point supported by Guskey (2002) whose research indicates change is possible through Guskey's four step change model.

Additionally, teachers want to use the flipped classroom approach, where the student completes the reading/study at home and then are assisted by teachers to do the task work in the classroom. Further, students believed that the teachers' aimed for results and not comprehension, indicating that teachers were in favour of 'rote learning' whereas, students wanted comprehension. Devlin's (2016) research agreed with the students' result and stated that 'regurgitating' knowledge does not prepare children for the modern workforce. Therefore, the approach to curriculum, teaching and assessment strategies are not balanced between knowing, examination, application, competency in technical and vocational qualification.

5.3.2 English language

Next, English language ability and who should pay for failing students is discussed.

Question 12 considers English language and who should pay for those students who failed English-language in Grade 12.

Question 12 addressed the following:

12. To what extent should Post-school English language education be paid by parents?

Focus group result: Negative

- Parents are not responsible for paying for post school English language tuition for students failing Grade 12 requirements.

Questionnaire result: Neutral

- It was undecided whether post-school English language education should be paid by parents.

The questionnaires returned a neutral result showing there was a balance between positive and negative results regarding parents paying for English language. No research has been carried out in the UAE about parents being responsible for paying for post school English language tuition for failing students.

However, focus group results indicated quite clearly that the Ministry of Education is responsible for English language acquisition in post-school education. Further, the government takes responsibility for failing students and offers post-school foundation education to bring students ability up to standard. However, as Pennington (2017) points out, in a newspaper report, Foundation English takes up one third of the cost of the higher education budget and a method of reducing the costs is necessary. Further, English language is seen to be important in the UAE for communication in international business relationships and is the language of choice in most university programmes. Pennington, (2017) supports the results that the country requires students to communicate in English for collaboration internationally for business success. Therefore, this result indicates that the Ministry of Education is responsible for English language. This leads to finding 11.

Finding 11: School English language education needs to improve to reduce the requirement and financial cost of foundation programmes.

5.3.3 Industry

Next, the involvement of industry in the UAE education system was considered.

Question 13 addressed the following:

13 To what extent is industry involved in the UAE education system?

Focus group result: Negative

- There is very little involvement of industry in the UAE education system.
- Technical and vocational education is not meeting the needs of industry.

Questionnaire result: Inconclusive

- It is inconclusive whether industry is involved in the UAE education system.

This result was inconclusive for the questionnaires, indicating there was no clear answer whether industry was involved in the UAE education system. Conversely, focus group results showed that there was very little involvement of industry and the UAE education system and it was questioned whether technical and vocational education was meeting the needs of industry. No research has been carried out in the UAE to determine the extent of industry involvement in the education system. However, in the teacher questionnaire, teachers stated that approximately 50% of the students had experienced work placement. Therefore, schools have some contact with industry. Further, the NQA have established Recognised National Development Committees that involve industry in the development of qualifications. Therefore, industry is involved in setting occupational skill standards and qualifications. However, this information does not seem to be filtering down to the community. Additionally, because industry extensively employs expatriate labour, this labour costs are much cheaper than Emirati labour. As Forstenlechner & Rutledge's (2010) research findings support results that there is a heavy dependence on foreign labourers in the UAE. Internationally, Metcalf and Mimouni (2011) research supports Forstenlechner & Rutledge's (2010) findings. This result could also indicate that industry is not receiving new graduates with the skills that industry require. Further, if industry is not involved, technical and vocational education cannot prepare students for the workplace. Therefore, for technical and vocational education to meet workforce requirements, industry and education need to collaborate together to determine the skill sets required for specific, present and future jobs, to meet industry and economic needs. This leads to finding 12.

Finding 12: Industry and education are not working closely enough together to determine the skills required for jobs that meet the need of industry and the economy.

5.3.4 Skilling

The next question considers the skills of the UAE unemployed who are looking for work.

Question 14 addressed the following:

14 To what extent do all UAE unemployed, of working age (who are looking for work) need to undergo skill upskilling?

Focus group result: Positive

- Unemployed need to be reskilled or upskilled for employment purposes.

Questionnaire result: Positive

- UAE unemployed of working age (who are looking for work) need to undergo skill upskilling.

This result was positive because both focus groups and questionnaire results showed that UAE unemployed, who are looking for work, need to undergo skills training for upskilling. No research has been carried out in the UAE about the need of the unemployed, of working age (who are looking for work) need to undergo skill upskilling. International research by Sebugwaawo (2017) supported finding stating that skills mismatch, overqualified or underqualified outcomes of education leads to unemployment. This view is widely accepted by the community, that upskilling actively reduces the unemployment rate, by training for current and future job vacancies. Nasir (2017), in a newspaper report, supports results stating ‘there are thousands of job vacancies in the UAE but still positions remain unoccupied particularly in the private sector, in hospitality and retail sectors, because students do not find these jobs attractive’. Therefore, result show a need and receptiveness by the Emirati unemployed, who are looking for work, need to undergo skills training for upskilling for present vacancies. This leads to finding number 13.

Finding 13: Unemployed UAE citizens who are looking for work, are not undergoing upskilling.

5.3.5 National economy

This next question considers whether the technical and vocational education provided currently, meets the needs of the national economy.

Question 15 addressed the following:

- 15 To what extent does the present UAE technical and vocational education system meet the needs of the national economy?

Focus group result: Negative

- There is no data on the outcomes of technical and vocational education to make judgement about technical and vocational educations effectiveness.
- Academic qualifications are preferred to technical and qualifications.
- There needs to be a clear distinction between academic and technical and vocational education.
- Educational entities like HCT and NQA need to radically collaborate for efficiency in the education system.

Questionnaire result: Inconclusive

- It is inconclusive whether the present UAE technical and vocational education system meets the needs of the national economy.

The questionnaire returned an inconclusive result as to whether the present UAE technical and vocational education system meets the needs of the national economy. Conversely, focus groups stated there was no data on the outcomes of technical and vocational education to make a judgement about its effectiveness in meeting national economy. No research has been carried out in the UAE about the present UAE technical and vocational education system meeting the needs of the national economy. Realistically, to determine whether students have the skills for the workforce, the programmes and qualifications that students studied before graduation and student's post-graduation destination needs to be tracked. This means, alumni tracking is essential to find out if programmes and qualifications on offer meet market need. This leads to finding 14.

Finding 14: Post school educational entities are not successfully undertaking annually, alumni tracking to establish employment destination.

Many topics were raised in focus groups around the topic of technical and vocational education meeting the economic need. Questions led to much discussion particularly regarding a lack of collaboration between entities such as HCT, ADVETI, MoE and NQA in determining what is needed to be taught, to meet national economic need. This is because all higher education entities are aiming to recruit the same Grade 12 graduates. Further, unlike other countries, a streaming system for students does not exist for selection into further and higher education, except for foundation programmes. However, even after finishing foundation programmes students can progress onto higher education courses to complete a degree mainly in general courses. Therefore, there requires to be a streaming system for all education in the UAE. This leads to finding 15.

Finding 15: Students are not channelled into the appropriate post school education based on academic or technical and vocational education results.

Further, there needs to be a distinction between academic and technical and vocational education, about the role, and the outcome of NQA qualifications. Only technical and vocational educational knowledge, skill and application qualifications, ensure students *competence* for the workplace. Academic programmes and knowledge and skill only NQA qualifications only *prepare* students for the workplace. However, the NQA does not have a clear enough distinction between academic and technical and vocational education pathways, this leads to confusion for both students and employers. Presently, as raised in the focus groups, academic qualifications are preferred by employers to technical and vocational qualifications even though, those with academic qualifications are not as competent to undertake the work as technical and vocational education graduates, but still they receive the employment. Therefore, because of this imbalance between academic and technical and vocational programmes/qualifications there needs to be an agreed articulation pathway between academic and technical and vocational education for students to proceed to higher levels of education or further occupational competence. This leads to finding 16.

Finding 16: Articulation agreements are not in place between academic programmes and technical and vocational qualifications on the National Qualification Framework for harmonisation in the educational system.

Question 16 addressed the following:

16 To what extent are skills that are not needed in the economy being provided for in post school education?

Focus group result: Positive

- Some programmes that are not needed in the economy are being offered and delivered in government post school institutions.
- Programmes need to be reconstructed for harmonisation in the educational landscape to meet economic need.

Questionnaire result: Neutral

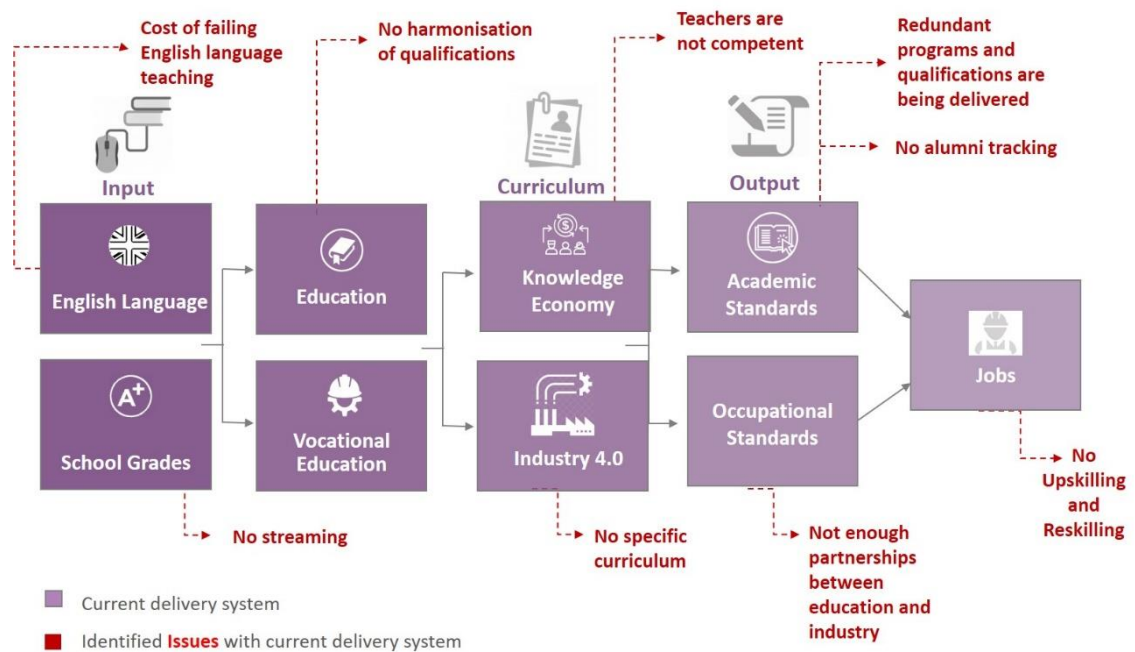
- It was undecided whether skills that are not needed in the economy are being provided for in post-school education?

The results of the questionnaire returned a neutral result in that there was neither a positive nor a negative view that skills that are not needed in the economy are being provided for post-school education. However, the results of the focus group showed that some programmes that are not needed in the economy are being offered and delivered in government post school institutions. No research has been carried out in the UAE on the extent that skills are not needed in the economy are being provided for in post school education. Doyle's (2019) research findings support results and points out the knowledge economy is fast-paced, and to survive, people are developing and upgrading skill sets with a lifelong learning mind-set. Therefore, qualifications/programmes require regular evaluation for applicability in the workplace. Further, the focus group results suggested that programmes need to have clarity for academic and technical and vocational education to meet the economic need. Therefore, post-school programmes need to justify their funding and those that do not meet economic need, withdrawn for greater effectiveness. This leads to finding 17.

Finding 17: Post-school entities do not justify their programmes to receive funding to ensure they meet economic need.

Next, the issues for Research question B are graphically displayed in Figure 5.3.

Figure 5.3 Issues – Delivery – Research question B



Source: developed for this research

5.3.6 Conclusion for Research question B

Results for Research Question B which asks: *'Is there an approach in the UAE that can effectively deliver technical and vocational education and training?'* and is discussed next.

5.3.6.1 Teacher

The results show that teachers have challenges in the school environment. It was found that teachers were not competent to teach information for a knowledge economy. However, teachers use 'rote' learning as a delivery method in order to ensure students pass examinations, although students would prefer to comprehend. This means that teachers do not understand the fundamental difference between general education, that is, based on cognitive abilities and examination and behavioural, the application of technical and vocational education, skill development, learning and competence. Since this is one of the foundations required for Visions of the country, the present generation, being taught by the majority of existing teachers, will not be prepared for

the requirements in the workplace.

Being the case, teachers need to be re-educated on the requirements for technical and vocational education, and new assessment strategies for competence be applied rather than examination for cognition. Leadership have a role in ensuring that the leadership vision requirements are addressed whether upskilling teachers or replacing teachers with qualified and experienced teachers. Failure to do so could result in the teaching being irrelevant to the strategic direction of the country.

Further, the curriculum needs to reflect technical and vocational education content, delivery methods and a need to work closely with industry for the development, delivery and assessment of occupational skills. Furthermore, the curriculum was not specifically designed to include the requirements for artificial intelligence, a challenge for teachers. Teachers also stated that the curriculum and assessment strategies were not balanced between knowing, examination, application, or competency in technical and vocational education. It was also unknown whether teachers understood the requirements for a knowledge economy or for artificial intelligence. It is conceivable that teachers may have a different understanding of requirements of the Vision agenda. Again, it is the leadership that is required to interpret the Vision and the technological requirements for application in the technical and vocational education schools. Leadership needs to ensure that the curriculum remains relevant to meet the Visions for the country. Therefore, when new visions are announced, leadership ought to lead the evaluation of the curriculum to understand where subject areas are irrelevant and to insert subject areas that are irrelevant.

This may explain why teachers currently use internet and apps to maintain the currency of the knowledge and the learning environment. The use of apps is becoming the norm in education, assisting in the teaching and learning environment. Blended learning, using online study, is also a feature of artificial intelligence. Similarly, flipped classrooms, is an approach where a student studies at home and completes course work in the classroom. This indicates that artificial intelligence is disrupting educational practice and if teachers use online search engines, this is positive. However, a strategy needs to be developed for technical and vocational education that includes requirements for a knowledge economy and artificial intelligence. Furthermore, the assessment strategy

for a knowledge economy and artificial intelligence skills needs to be explicit. This is because student ability needs to be tested to determine the degree by which students are capable of meeting the requirements of a knowledge economy and to apply artificial intelligence solutions. Therefore, if teachers are not able to instruct students on how to develop solutions, the country will not achieve the goal of its Visions.

Findings also showed that teachers are qualified in their own area of specialism from their country of origin. However, since teachers come from many different countries to the UAE to teach, there is a general educational teaching standard and a licensing system for teachers but not for technical and vocational education. In order to standardise teacher's levels of performance, an occupational teaching standard needs to be developed for technical and vocational education, and technical and vocational education teachers need to be recruited to meet the standard. Further, teachers' competency needs to be measured against the standard therefore teacher licensing is required. Licensing of technical and vocational education teachers, will support quality assurance and will support minimum quality standards of teacher performance. Therefore, to enhance technical and vocational education teaching standards, teacher performance evaluation and licensing needs to be introduced to maintain and improve quality standards.

5.3.6.2 English-language

Next, English language is considered. The finding shows that parents should not pay for English language, post school education. Even though students may have passed grade 12 education but failed in English, the Ministry of Education takes responsibility for their English language attainment. This means that English-language teaching continues post school in foundation programmes at vast cost to the country. Therefore, English-language teaching standards need to improve. Further, testing of English language using EmSaT examinations, will provide a UAE constructed language test to be uniformly applied to all students in the UAE. This is because a level of English-language necessary for international communication and collaboration of knowledge economy and artificial intelligence fields is required. However, due to the amount of educational budget being attributed to English language attainment and timing, a new approach needs to be considered.

5.3.6.3 Industry

The findings indicate that education is working independently of industry and the development of occupational skills. This is an issue that needs to be addressed to the leadership of the country. The government Ministries and Authorities are very well informed of the Vision requirements. However, industry, particularly private industry is motivated by profit and so may have a different agenda than the country agenda. Additionally, there is doubt whether the skills taught are meeting the needs of industry and the economy.

It was industry, in the focus group, that indicated that even though students were not skilled on entry into the workforce, they would retrain students to meet companies' requirements. This comment would indicate that students are not meeting occupational needs or standards for the job market in which they are employed. Further, it indicates that redundant or inappropriate skills are being taught. This means that students on those qualifications/programmes are not likely to find employment. As a result, the government is spending money with little return of investments and students are attending qualifications/programmes that will not lead to employment. Therefore, there needs to be a rationale for qualifications/programmes to be delivered in post school, further education and higher education entities. Further, post school, further education and higher education entities ought to justify the qualification/programme selections by matching the programme to industry and workforce demand. Therefore, it can be determined that the curriculum being delivered to students has not been developed with the collaboration of industry, and does not meet industry requirements. Again, there is a requirement for the leadership of the country to state the requirements of industry. The country is investing heavily in the education system and it is important that the maximum return of investment be extracted. Industry needs to be actively involved as the outcome of the education system which is the product that industry receives. If technical and vocational education is to become more relevant to industries requirements, then industry must be guided by the country leadership to actively participate in qualification and curriculum development.

The findings of this research indicated that all UAE unemployed of working age (who are looking for work) need to undergo skills upskilling. This indicates an acknowledgement

that students are not meeting the requirements of the workforce. Further, it indicates that students are not occupationally skilled enough to meet economic and workforce requirements to meet the country's visions. The finding being that students do not gain employment, or if they do gain employment, they still need to be retrained. Again, leadership has a voice in leading this strategy to ensure that industry plays its role in the country's endeavor to enhance the economy. Therefore, there is a requirement to be proactive and seek out the unemployed who are looking for work and to reskill them for the workforce.

5.3.6.4 National economy

Students that enter foundation programmes progress automatically onto Further or Higher Education on attainment of English language scores. Most students, and their parents, aim to achieve a degree and progress on to a masters and doctoral degree. Because students are not streamed, any student can obtain a degree giving them better pay and promotion opportunities. Additionally, due to the lack of articulation agreements between technical and vocational and higher education, students prefer the academic route. This means students are able to complete a degree at National Qualification Framework (NQF) Level 7. However, because the technical and vocational education route for a National Qualifications ends at NQF level 6, and students cannot gain degrees because there is no agreed articulation. As found in South Korea, by Small (2015) and Lee Ji-Yeon (2014), too many general education graduates leads to higher levels of unemployment and become a financial burden on the country. Further, re-skilling is required for degree holders, who were not appropriately educated and as a result are unable to secure employment.

Student's who undertake academic courses, do not develop occupational competence and therefore, do not provide the skills necessary to support the national economy. Students coming through the lower level of technical and vocational skills qualifications are unable to access higher technical degree programmes due to the lack of articulation. The Swiss education system that has more technical and vocational education students, and has articulation agreements between technical and vocational education and general education, has less unemployment (Swissinfo, 2017). Further, there is a general lack of understanding that technical and vocational education is about occupational skill

development to perform skills to a higher level of competency up to NQF level 5 and to progress onto the applied degree programmes that develop specialised skills for the knowledge economy and development of artificial intelligence solutions. Therefore, preventing technical and vocational education students from progressing onto further specialised programmes means that some of the workforce is prevented from providing the skills that the country needs for a knowledge economy. The lack of understanding of the difference between technical and vocational education and general education, the lack of articulation of qualifications between technical and vocational education and general education and the lack of streaming in education in school and post school, is a challenge.

Therefore, to answer Research question B, that is, 'Is there an approach in the UAE that can effectively deliver technical and vocational education and training?' In this case, the results shows that there is not an effective approach in the UAE that can effectively deliver technical and vocational education and training and leadership may wish to reconsider the current approach.

5.4 Research question C - Employment

Next Research Question C addressed '*Is there a system in the UAE that effectively engages the unemployed in jobs in successful occupations?*' and considered employment. Referring back to the determinants of a VET reform strategy, Cave et.al. (2019) indicated one category of determinant: Client and refers to eight descriptors. Three of those descriptors were prominent in this research: employer engagement, educator engagement and community. Research question C, the third main determinant of this research addressed career pathways, job vacancies, employment processes.

5.4.1 Career pathways

Question 17 addressed the following:

17. To what extent can knowledge of career pathways help learners shape their educational pathway?

Focus group results: Positive

- Knowledge of career pathways would help students in their choice of career.

Questionnaire results: Positive

- Knowledge of career pathways help a learner shape their educational pathway

The focus group and questionnaire results indicate that there is a positive view that knowledge of career pathways help a learner shape their educational pathway. No research has been carried out in the UAE regarding career pathways helping learners shape their educational pathways. This result was supported by CEDEFOP (2010) and World Economic Forum, (2015) who's research indicated a general lack of occupational choices and information about opportunities in the labour market. Deleure et. Al.'s (2014) research also suggests that post-secondary institutions and schools must create initiatives that raise awareness among students and their families about the demands of the workplace in a modern knowledge economy. Therefore, there is a receptive view to school and further education entities having career education as part of the technical and vocational education curriculum. This leads to finding 18.

Finding 18: Career education needs more attention and ought to be an integral part of the technical and vocational education curriculum.

5.4.2 Job vacancies

The next questions considers job vacancies.

Question 18 addressed the following:

18. To what extent are job vacancies made aware to Emiratis that are looking for work?

Focus group results: Negative

- Job vacancies, in general, are not made available to Emiratis.

Questionnaire results: Neutral

- It was undecided if job vacancies are made aware to Emiratis looking for work.

The questionnaire results were neutral indicating a balance between negative and positive responses. However, the focus groups results indicated that job vacancies, in general, were not made available to Emiratis. This result indicates that there is not enough advertising of job vacancies in the Emirati market. Therefore, students are unaware of the range of jobs that are available in the job market. Deleure et. al., (2014)

in international research, supports this point of view suggesting that partnership need to be forged between institutions and the labour market to ensure better availability of information about available jobs. Therefore, industry needs to change their method of advertising jobs to ensure Emiratis have access to their employment. This leads to finding 19.

Finding 19: Industry do not publically advertise their job vacancies.

5.4.3 Employment process

Question 19 addressed the following:

19. To what extent is there a seamless government process to get the Emirati unemployed into employment?

Focus group results: Negative

- There is no seamless system in place to assist Emiratis into work and the present method is inefficient and ineffective.
- More employment is needed in the private sector.

Questionnaire results: Neutral

- It was undecided if there is a seamless government process to get the Emirati unemployed into employment.

Questionnaire results returned a neutral response to whether there is a seamless government process to get the Emirati unemployed into employment. The result means there was not a majority positive or negative result. However, focus group results indicated there was not a seamless system in place to assist Emiratis to find work, into work. Therefore, this result indicates that there is no employment system to follow. In international research South Korea's South Korean Employment Insurance Act, according to Jiaxin (2018), states that it aims to provide unemployment benefit for job seekers, prevent unemployment and promote employment as well as improving technical and vocational education skills. Further, according to Smartexpat (2017), Swissinfo (2017) and Trading Economics (2018) research in Switzerland, unemployment insurance is paid by employer and employee to provide unemployment benefit for job seekers through the Ausgleichskasse fund. These systems are well developed and work to reduce the number of unemployed in the country. Therefore, if best practice is to be

followed, then the government needs to provide a system that allows Emiratis to access job vacancies, gain training opportunities or training to apply for work. This leads to finding 20.

Finding 20: The government does not have a seamless system for the registration of unemployed looking for work or training to support Emiratis to find employment.

Question 20 addressed the following:

20. To what extent can the General Pension Fund and Federal Authority for Identity and Citizenship play a part in assisting Emiratis to find employment?

Focus group results: Negative

- The General Pension Fund and Federal Authority for Identity and Citizenship have databases that would be useful, but they are not shared.

Questionnaire results: Inconclusive.

- It was inconclusive whether the General Pension Fund and the Federal Authority for Identity and Citizenship play a part in assisting Emiratis to find employment.

The questionnaire result for this question was inconclusive. However, the focus group result indicates that the General Pension Fund and Federal Authority for Identity and Citizenship do not take part in assisting Emiratis to find work, but have databases that could be shared to support unemployed systems. Those databases have knowledge of every expatriates in the UAE, where they work, what they do for work, as well as number of Emiratis in jobs, and Emiratis ready to retire. Further, the information within the systems is very comprehensive and could be used to identify where unemployed Emiratis exist by: geographical location, highest level of qualification, age and gender. This information could be used positively to assist Emiratis to find work. Therefore, General Pension Fund and Federal Authority for Identity and Citizenship and other Authorities could contribute to a process to support Emiratis find employment. This leads to finding 21.

Finding 21: Government databases are not fully utilised and integrated to support and assist Emiratis back into employment.

5.4.4 Conclusion for Research question C

Conclusions about Research question C which asks: *'Is there a system in the UAE that effectively engages the unemployed in jobs in successful occupations?'* follows.

5.4.4.1 Career pathways

Career education and career pathways, in the age of automation, will become more relevant. It is predicted that some Emiratis jobs will be automated and new technological skills will be required. For that reason, Emiratis need to have a point of contact to gain information about the future vacancies expected in the UAE, the type of qualifications and where to source and attend those qualification programmes. This will be required in order to stay relevant and qualified for the employment market. Similarly, career education needs to be given in schools, at an early age, to prepare students' future career pathways, prior to entering post school education. This is to prevent mismatch, under and over educating and outdated skilling that can lead to unemployment.

5.4.4.2 Job vacancies

Further, industry is not compelled to advertise job vacancies. This means that job opportunities are not circulated in the public domain and are not visible to Emiratis looking for employment. Emiratis looking for work need to know how and where to find vacancies to apply for. Therefore, there needs to be a mechanism where jobs in industry are advertised.

5.4.4.3 Employment process

Findings shows there is no system of registration of unemployed for existing job vacancies. That means the services of a job centre, as found in South Korea and Switzerland, to assist unemployed find either: employment or receive skills training for vacant positions in the job market, does not exist in the UAE. This means that Emiratis that have gone through the UAE education system, find it challenging to secure employment or receive upskilling. Further, the findings of this research indicates that a system for employment and reskilling needs to be established in order to assist existing unemployed Emiratis, or those who will become unemployed due to job automation, in the near future. This research found that there was support for government agencies to be involved in the employment process. Further, information about Emirati employed and unemployed, expatriates and the level of the job position was available on databases. However, there was no sharing of information to target: unemployed,

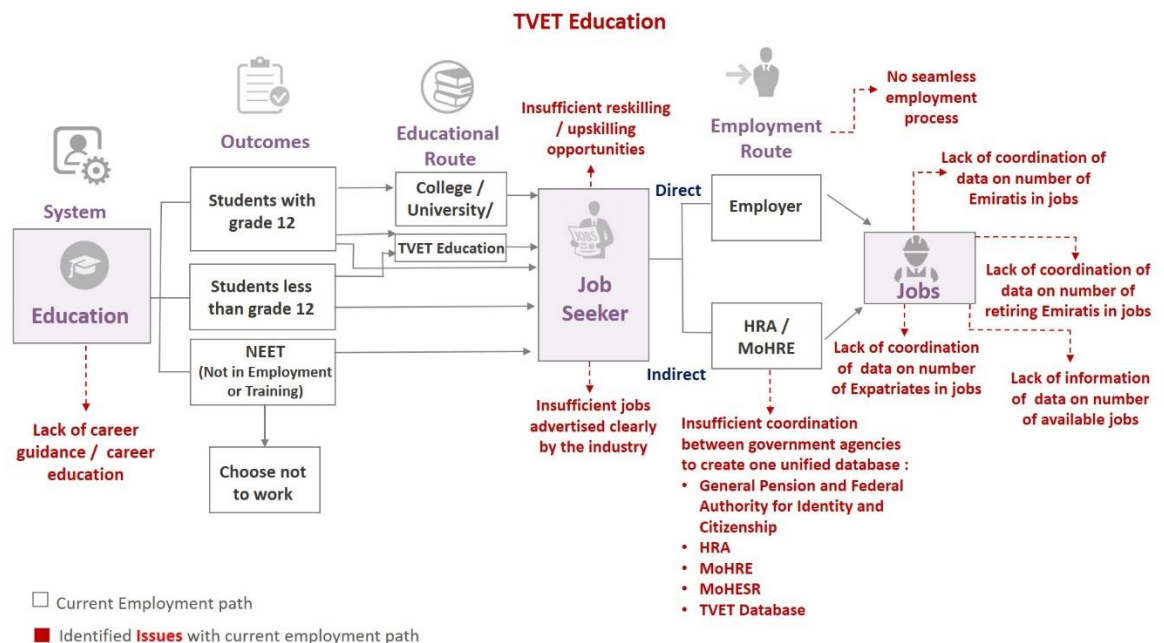
vacancies, expatriate workers, and expatriate positions that can be Emiratised. This information would help to provide a seamless process for Emiratis to register for employment, receive re-skilling and source employment opportunities.

In conclusion, to answer Research Question C, that is:

‘Is there a system in the UAE that effectively engages the unemployed in jobs in successful occupations?’

In this case, there is not a system that effectively engages the unemployed in jobs or databases that gather information from various Authorities, to find out the employment landscape of the UAE. The issues are shown in Figure 5.4. Further, there is no seamless process in the UAE for Emiratis to register, apply and secure employment, upskill or re-skill for the labour market. Therefore, there is not a system in the UAE that effectively engages the unemployed in jobs in successful occupations and is a consideration for the leadership of the country to develop to further meet the needs of their visions.

Figure 5.4 Issues – Employment – Research question C



Source: developed for this research

5.5 Conclusions

On reflection, the 5C causal cluster framework of determinants was used by Cave et. al. (2019) because it 'synthesised implementation research without focusing on a specific context or domain' (Cave et. al., 2019 p.3). The five domains represented the *content* of the policy, the *context* or process for policy approval. The *commitment* or the willingness to implement the policy, the *capacity* referring to those with the ability to implement the policy and the *clients* representing those that would operationalise the policy. Therefore, the framework is a process for policy form development to implementation. In the case of this research, Cave et. al.'s (2019) determinants were a useful framework for researching the development of a VET strategy, which subsequently has emerged from this research. However, Cave et. al.'s (2019) determinants did not consider the output of the policy as a determinant and as demonstrated in this research, delivery and career pathways are an important reflection of a successful policy.

To conclude this chapter, the three Research questions, A, B and C have been asked and answered and conclusions made. It has been found that there are major opportunities for the country to improve its education and employment system to meet the challenges of the future. Thirty eight issues from the focus group and 20 from the questionnaires were identified and comparisons resulted in 21 findings. The final chapter, Chapter 6, briefly reviews the findings in the light of the theories of leadership outlined in Chapter 1, and then outlines recommendations and implications of this research for the wider technical and vocational education landscape.

Chapter 6 Recommendations and implication

6.0 Introduction

Chapter six considers the findings for the six sample groups for the focus group and the questionnaire and makes recommendations. Further, three new models emerge for strategy, delivery and employment for the UAE. Finally, the research concludes with ten recommendations are made for the improvement of technical and vocational education in the UAE.

6.1 Plan of this chapter

Table 6.1 Plan of this chapter		
6.0	Introduction	
6.1	Plan of this chapter	
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	6.7.3	Relevance of the study
6.5	Conclusions	

Chapter 1 introduced this thesis: the research problem was defined and the importance of the research was identified. Chapter 2 reviewed the literature of the theories of country leadership, technical and the vocational education strategy and delivery and the system to assist Emiratis to find employment. From this understanding, based on the extant literature, an initial conceptual framework for the research and its three related research questions, A, B and C were developed. Chapter 3 described and justified the Phase 1 qualitative research using Stage 1 and 2 Initial Focus Group and Large Focus Group research. Reports were developed about the emerging themes from analyses of the focus group results. Chapter 4 justified the use of the Phase 2 quantitative surveys and discussed steps taken to collect and process survey data in Stage 3 of this research using questionnaires. Chapter 5 discussed and identified the findings about each of the three research questions. Findings were compared with Chapter 2 to identify the extent of contributions to knowledge made from this research. Chapter 5 identified 21 findings arising from this research. The recommendations and conclusions about the overall research problem are presented in this chapter, Chapter 6, with areas of further research, recommendations and implications drawn for technical and vocational education in the UAE for other Gulf countries.

6.2 Role of leadership styles in the development of technical and vocational education in the UAE

The leadership role has been important for the success of the technical and vocational education and training system in the UAE. Leadership is necessary for the country to realise the UAE government Visions. Two styles are predominantly applied by the leadership of the UAE that is: transformational leadership and participative leadership.

Transformational leadership style, applied by the country leadership essentially aims to effectively communicate the transformation requirements for successful technical and vocational education. The compelling Visions for the future, including establishing a city on Mars, is generally understood by the citizens. However, the application of the strategy had not been disseminated for transforming the Vision on the ground. Therefore, there has been a lack of effective transformational leadership of technical and vocational education, leaving the visions open to misunderstanding of communication.

The participative style of leadership, applied by the country leadership, includes participation in government direction and decision making. Due to a lack of representation of technical and vocational education, participation in the decision making process has not been possible. As a result, participation in the decision making process about of technical and vocational education may have been overlooked. Therefore, vocational education and training may not be receiving the representation in government.

6.3 Findings, recommendations and conclusions

Next the findings are listed, recommendations and conclusions are drawn about this research. This research was designed to address the main research area:

“Development and reform of technical and vocational education in the UAE: the role and vision of the UAE leadership”.

The research centred on the country’s leadership Visions for the next 100 years. The Visions are published to prepare its citizens for the country’s development and direction as specified in the Visions 2021, 2030, 2071 and 2117. This research was designed to find out if the Visions for the country were translated into technical and vocational education strategies and applied in the technical and vocational education landscape as a reality, to lead to economic growth. To answer the main research area, three research questions were asked to enable investigation of the main research area and are:

Research Question A: ‘Is there a strategy for technical and technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership’s Visions?’

Research Question B: ‘Is there an approach in the UAE that can effectively deliver technical and vocational education and training?’

Research Question C: ‘Is there a system in the UAE that effectively engages the unemployed in jobs leading to successful occupations?’

Next, each research question was considered, the findings are presented as a reminder of the findings, recommendations emerged and conclusions were made. In

consideration, all findings are presented but have been re-numbered to allow for clarity of discussion, recommendations and conclusions to be made.

6.3.1 Research question A

Next, Research question A addressed the first question, and considered the Visions and the translation into practice, considering the communication approach and the application of a technical and vocational education strategy in the technical and vocational education landscape. The research question was:

Research Question A: 'Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership's Visions?'

6.3.1.1 Communication

To answer Research question A, one finding and one recommendation resulted, as follows:

Finding 1: Tweets about TVET are not communicated to the community.

This research found that tweets were a very effective way of communication to the population of the UAE and this leads to recommendation 1:

Recommendation 1: The leadership needs to send tweets about technical and vocational education and have a year dedicated to technical and vocational education to raise awareness of its importance.

As established in this research, tweets about technical and vocational education were not circulated and this led to a lack of awareness about the value and benefits of technical and vocational education in the Emirati community. In line with the country leadership, use of tweets has been very effective in informing the citizens of the UAE, about government information. Further, because of the speed of communication and the reach of social media, the message effectively inform UAE citizens. Consequently, using tweets as a style of communication is efficient and effective and ought to be applied, by the government, for technical and vocational education. Therefore, it is recommended that tweets are communicated, by the leadership of the country, to the population regarding technical and vocational education, to give value in the community. Tweets would also be able to publicise the latest high technology

programmes being offered in post school technical and vocational education so that stakeholders, particularly students, are able to see the choices and opportunities available for study. Further, it is recommended that tweets about world class events, hosted in the Emirates, are tweeted to the community to raise awareness and to attract young Emiratis to technical and vocational education. Furthermore, world class events demonstrate the world's best practice such as: WorldSkills 2017, WorldSkills Asia 2018, WorldSkills Asia 2020 and Expo-Science International 2019 events held in Abu Dhabi. More importantly, tweets would give status and work toward eradicating the view that technical and vocational education is a 'second class' educational option, and highlight the highly technical skills required for cutting edge study and application in areas such as artificial intelligence. Therefore, it is recommended that tweeting would enhance the benefits and value of technical and vocational education within the community and having a year dedicated to Technical and Vocational Education would raise awareness to its value and benefits.

6.3.1.2 Strategy

Next strategy for technical and vocational education was considered, one finding and one recommendation resulted, as follows:

Finding 2: A technical and vocational education strategy for the UAE does not exist.

Finding two considered the strategy to achieve technical and vocational education goals required to meet the country Visions was important and this led to recommendation 2.

Recommendation 2: A Ministry of Technical and Vocational Education or an Authority, and technical and vocational strategy needs to be established and developed, applied and clearly communicated, to ensure the skills required in the country, supports the achievement of Leadership Visions.

This research has established that due to the lack of a Ministry or Authority for Technical and Vocational Education, strategic messages from the leadership had not been translated into action. This is because the transformational leadership style applied by the country leadership has not been able to effectively communicate down to the application of technical and vocational education. The compelling Visions for the future, in general had been understood. However, the application of the strategy had not been disseminated to application on the ground and therefore there has been a lack of

effective transformation of technical and vocational education. As a result, there has been a disconnect.

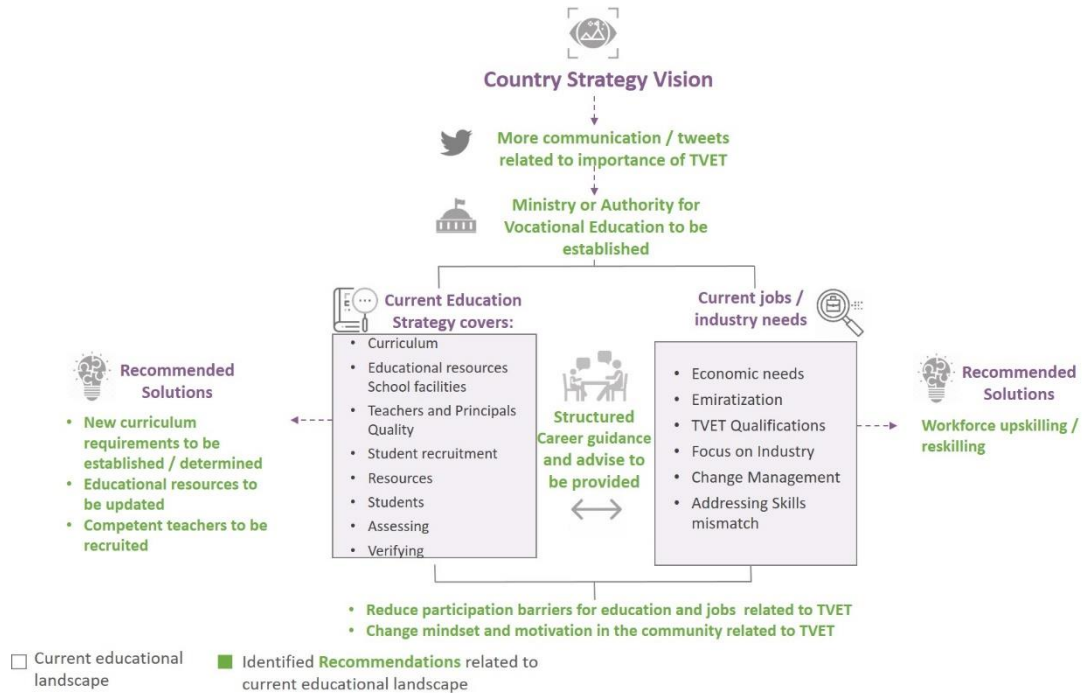
Further, the participative style of leadership applied by the country leadership has not been possible due to a lack of a Ministry or Director General of a Federal Authority to participate in the decision making process. As a result, decisions about of technical and vocational education may have been overlooked. Therefore, it is recommended that a Ministry of Technical and Vocational Education or an Authority be established to oversee the regulation, strategy and policy for technical and vocational education for the country. This is because the tweets and Visions communicated by the country are not being translated into strategy and policy for implementation in technical and vocational education. Therefore, a gap in communication is created resulting in appropriate and applicable provision for the community not being transmitted. Further, a strategy for technical and vocational education would be developed and communicated to school, post school, further and higher education to give the direction to arrive at solutions that progress the countries ambitions.

6.3.1.3 Conclusion for research question A

The Research Question A asked: *'Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership's Visions?'*

In conclusion, to Research question A, this research recommends the circulation of tweets about technical and vocational education. Further, it is recommended that the establishment of a Ministry of Education or Authority, would address and communicate the advanced technological skills required to translate the Visions of the country into a technical and vocational education strategy and to regulate TVET across the UAE as shown in Figure 6.1.

Figure 6.1 Recommendations – Strategy – Research question A



Source: developed for this research

6.3.2 Research question B

Next Research Question B considers the delivery of technical and vocational education and whether it effectively delivers the strategic requirements of the Visions in the technical and vocational education landscape. Research Question B asks:

‘Is there an approach in the UAE that can effectively deliver technical and vocational education and training?’

Eight findings and three recommendation emerged.

6.3.2.1 Curriculum

Four findings about the curriculum emerged leading to recommendation three.

Finding 3: A specific curriculum for artificial intelligence is not available.

Finding 4: The technical and vocational education curriculum for computing skills in schools and institutes is not designed to meet the needs of a knowledge economy.

Finding 5: Computing and coding curriculum and student ability is insufficient for development of artificial intelligence.

Finding 6: Technical and vocational education schools needs a mathematical curriculum that addresses artificial intelligence, skill requirements and is implemented in schools/institutes by mathematics specialist.

It is important that the curriculum supports the Vision requirements and this leads to recommendation 3.

Recommendation 3: The curriculum, delivery method, and assessment strategies for technical and vocational education needs to reflect the requirements of the knowledge economy and the fourth industrial revolution, including artificial intelligence.

It is recommended that the curriculum in schools and post school education be redesigned to reflect the requirements of a knowledge economy and artificial intelligence such as soft skills, computing, coding and mathematics. Judging by the Vision requirements, a concentration on high technological skills and soft skills development is required. With the appropriate curriculum being delivered, students would be far better educated to address the challenges of Vision requirements. Further, it is recommended that the assessment strategy for technical and vocational education qualifications, ought to move away from examination of cognitive abilities to the assessment of competence for the skills required in the workforce. The implication of the assessment route is that teaching staff would need to become qualified assessors and some qualified internal verifiers. By assessing competence, students will be occupationally competent and work ready for the workforce, thus cutting down the amount of re-training required by industry. In order to achieve the aims of high technology education, resources need to be provided. This leads to finding eight and recommendation 4.

6.3.2.2 Digital resources

One finding and one recommendation emerged about digital resources as follows:

Finding 7: Up to date digital resources required for developing knowledge economy and artificial intelligence solutions are not available in schools/institutes. This led to recommendation 4.

Recommendation 4: Technical and vocational education schools and post school institutes need to be equipped with the digital resources for developing solutions for the knowledge economy and artificial intelligence.

It is recommended that schools and post school institutes have the necessary digital resource, hardware and software for all needs associated with computing and coding for a knowledge economy and artificial intelligence. With the digital resources available, students would be able to exploit their full potential and the country would gain the opportunity for the creation of artificial intelligence solutions that could lead to the new high tech jobs that the country needs for future prosperity. With the curriculum and resources in place, teaching needs to be considered.

6.3.2.3 Teacher's competence

Three findings and a recommendation emerged regarding teacher competence and are:

Finding 8: Teachers are not competent or skilled enough to teach students robotics.

Finding 9: Teachers are using the internet and apps to maintain currency of knowledge in the learning environment.

Finding 10: Teachers are not competent to teach information for a knowledge economy.

Teacher competence and the standard of teaching is important for the transmission of information. This leads to recommendation 5.

Recommendation 5: Standards for a technical and vocational education teacher's needs to be established and technical and vocational education teachers need to be licensed for quality assurance of technical and vocational education.

It is recommended that teachers be fully supported to use the internet for teaching purposes. Use of the internet supports teachers to create materials for the delivery of the curriculum to students. This is important because teachers are constantly searching for the latest/suitable information to give students accurate data on the latest technological developments. Further, teachers need to be encouraged to use apps and have students develop apps that would enrich the learning environment. More importantly, it is recommended that teachers are competent enough to teach

requirements of a knowledge economy and robotics. Teachers should be able to pass on knowledge that is in advance of the students' knowledge to support further student learning. Therefore, it is recommended that competent teachers are employed to teach skills of the knowledge economy, artificial intelligence and robotics. Additionally, it is recommended that to ensure standards of competence in technical and vocational education are met, teachers need to be licensed. Licensing considers the qualification, knowledge and competence of a teacher against a national standard for technical and vocational education. Teachers would need to be qualified in their specialised subject as well as qualified Assessors and some qualified as Internal Verifiers. Therefore, it is recommended that the standard for technical and vocational education teachers be developed. Teachers ought to be judged against standard of performance to judge competence and decisions for issuing a technical and vocational teacher license. Next, English language education is considered.

6.3.2.4 English language

One finding about post school English language led to one recommendation as follows:

Finding 11: School English language education needs to improve to reduce the requirement and financial cost of foundation programmes.

English language competence plays a central role in the UAE education system, but due to the number of students failing to meet requirements for entry into post school education, the cost of foundation programme provision is prohibitive. This leads to recommendation 6.

Recommendation 6: Students failing post school entry requirements, need to undertake self-study, online English language programmes, to attain the required level.

It is recommended that the cost of post school English language education be reduced dramatically due to the proportion of the post school budget used for this purpose. It is recommended that teachers delivery of the English language improves, that students become responsible for their own learning and that the Ministry of Education provide passwords for online English language learning in order to facilitate student's language learning. This would put the responsibility jointly, between the Ministry of Education to provide the platform and password for the online learning, and the student who would

take responsibility for their own learning. Therefore, provision of online English language learning would cut the cost of post school English language provision dramatically, reduce the number of teachers required and reduce the material development needed for English language learning. Students would then prepare themselves for EmSaT English language examination in preparation for entry into post school education. It is also recommended that students, continue to improve their English language ability, even once entered into post school education and employment, by using the online learning platform. Next, post school education is considered.

6.3.2.5 Post school education

Five findings about post school technical and vocational education led to one recommendation. The five findings and one recommendation are as follows:

Finding 12: Students are not channelled into the appropriate post school education based on academic or technical and vocational education results.

Finding 13: Career guidance needs more attention and ought to be an integral part of the technical and vocational education curriculum.

Finding 14: Post school educational entities are not successfully undertaking annually, alumni tracking to establish employment destination.

Finding 15: Post-school entities do not justify their programmes to receive funding to ensure they meet economic need.

Finding 16: Articulation agreements are not in place between academic programmes and technical and vocational qualifications on the National Qualification Framework for harmonisation of the educational system.

Post school education prepares students for the workplace. However, the UAE does not have a sorting or streaming system to channel students into provision based on their ability. This leads to recommendation 7:

Recommendation 7: Post school technical and vocational education ought to stream students into appropriate levels of school qualification/programmes that are suitable for future occupational skills acquisition and further educational opportunities.

It is recommended that students in school and post school and higher education have integrated career education in the curriculum. This would mean that students are aware of career pathways and can select the appropriate subject, courses and qualifications to achieve their desired occupation. Additionally, streaming of students takes place to ensure that the education budget is used effectively.

It is recommended that students at the end of cycle 2 enter into cycle 3 in Grade 9 for a four year cycle. Further, it is recommended that Technical and Vocational students in Grade 10 attend industrial work placements for two weeks per academic year, in Grade 11 half a semester per academic year, and in Grade 12 for one semester per academic year. Students would then be responsible for portfolio building and workplace Supervisors would assess student's abilities and competence supported by teacher/assessors. Thus increasing students experience in the workplace and building in the practical components of competence based learning.

Further, it is recommended that students be channeled into post school programmes suitable for their level of educational ability in three ability levels supported by career education. This would mean that those with lowest ability in Grade 12 or who fail Grade 12 would be channeled into level 4 qualification programmes that would lead to employment at first line level. Students with the next level of achievement in Grade 12 would be channeled into Diploma or Advanced Diploma level programmes that would allow employment at a technician level. Further, those with the highest results would be channeled into degree programmes.

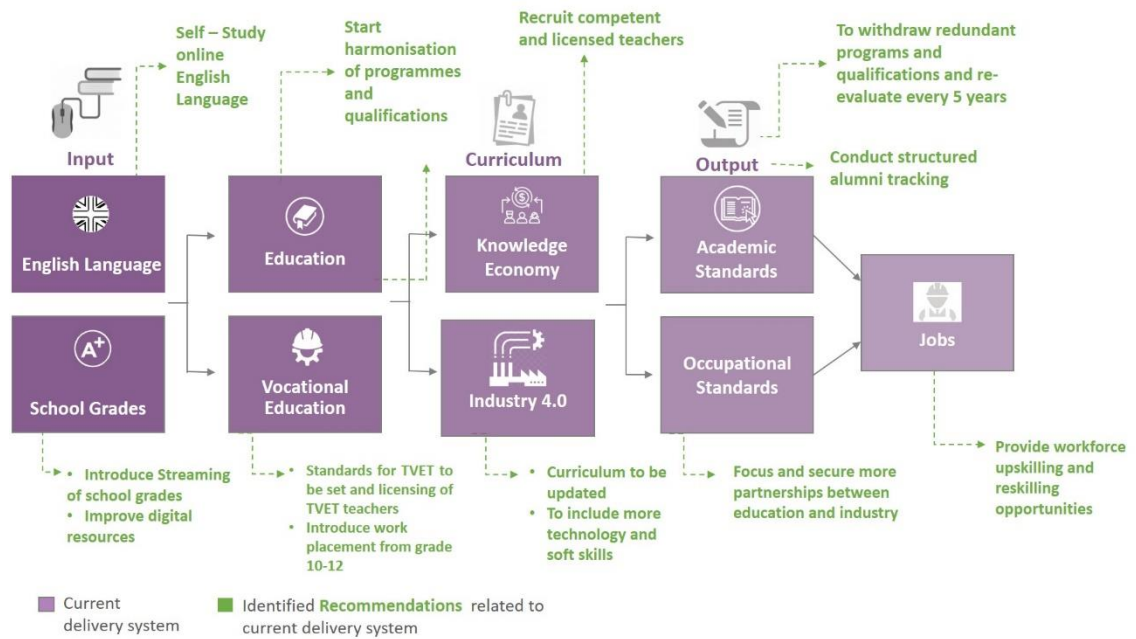
However, it is recommended that students can move upward in their career by satisfying conditions for re-entry into further education. For example, having worked in the workplace for one year as is found in the Swiss system, students could progress to further education. A further recommendation is that the employment destination of students be tracked to establish where a student gained employment. This would consider which programmes were studied and led to employment, as opposed to those programmes that did not lead to employment. By understanding student employment destinations, better planning and quicker responses can be made to withdraw programmes that do not lead to employment. For this reason, it is recommended that post school entities justify their programme offerings. Funding applications applied for annually would include analyses of student destination and prediction of employment

per programme, to justify the financial requirements to run a programme. This would reduce the number of redundant programmes being offered. At a minimum, programmes need to be re-evaluated every five years for applicability to current and future jobs. A further recommendation is that students that follow one pathway can articulate from technical and vocational to academic and vice versa for progression up the qualification framework. This would allow technical and vocational education students to study supervisory and managerial qualifications at level 7 and 8. Students who are unsuccessful in completing university programmes ought to be directed to a central point for reskilling. Additionally, it would allow academic students that find themselves unable to find employment, an opportunity to reskill and follow a technical and vocational pathway.

6.3.2.6 Conclusions for Research question B

In conclusion to Research Question B, which asked: *'Is there an approach in the UAE that can effectively deliver technical and vocational education and training?'* This research found that providing competent teachers, and designing an appropriate curriculum would prepare the foundation for skill improvement to occur. Students supported by online English language learning, streaming of students by ability, career education, alumni employment destination tracking, justification of post school programmes and articulation between educational pathways would provide an approach that could effectively deliver technical and vocational education and training in the UAE, as shown in Figure 6.2.

Figure 6.2 Recommendations – Delivery – Research question B



Source: developed for this research

Next, Research question C is considered.

6.3.3 Research question C

The third question, Research question C considered the employment as an outcome of the strategy and delivery of technical and vocational education.

Research Question C asked: 'Is there a system in the UAE that effectively engages the unemployed in jobs leading to successful occupations?' This question addressed industry and the employment process.

6.3.3.1 Industry

Next, two findings and two recommendations were made about industry, as follows:

Finding 17: Industry do not publically advertise their job vacancies.

Having access to the advertised jobs in the job market is important for graduating students to know the type and availability of jobs. This leads to recommendation 8.

Recommendation 8: Industry must be compelled to advertise their job opportunities.

It is recommended that industry advertise their posts openly on a government platform to ensure all Emiratis have access to the advertised jobs. This would mean that students would have a one stop shop to go to find suitable employment and would also be able

to access the type of qualifications and the years of experience necessary to apply for a post. This led to finding 18.

Finding 18: Industry and education are not working closely enough together to determine the skills required for jobs that meet the need of industry and the economy.

Industry is the receivers of the education process and as such their input into setting of skill standards, curriculum and qualifications is important for having work ready graduates. This leads to recommendation 9.

Recommendation 9: Industry and education must collaborate on the development of occupational skills/qualifications and programmes.

It is recommended that closer working arrangements are made between industry and technical and vocational education in three main areas:

- Development of occupational skills
- Employment of nationals
- Work placements for trainees.

Involving industry more in the education sector would lead to four outputs.

- Firstly, it would ensure that occupational skills standards set for the workforce are developed and reflect those standards.
- Secondly, it would ensure that qualification programmes, built on skill standards, delivered in school and post school institutes, would deliver the skills needed for the workforce.
- Thirdly, the cost of qualification development and work placement would be shared between industry and education.
- Fourthly, direct cooperation between industry and education would reduce the number of redundant programmes being offered.

Importantly, the education process is in place to serve industry, and with their involvement, planning of present and future workforce requirements would result in better designed programmes being delivered. Therefore, collaboration between industry and education would lead to better outcomes for technical and vocational education and employment and less unemployment.

6.3.3.2 Employment process

This research considered the employment process. Three findings and one recommendation emerged as follows:

Finding 19: Unemployed UAE citizens who are looking for work, are not undergoing upskilling.

Finding 20: Government databases are not fully utilised and integrated to support and assist Emiratis back into employment.

Finding 21: The government does not have a seamless system for the registration of unemployed looking for work or training to support Emiratis to find employment.

The UAE has many databases with different information in them such as the Human Resource Authority in Abu Dhabi, Ministry of Human Resources and Emiratisation, Ministry of Higher Education Science and Research, General Pensions Fund and Federal Authority for Identity and Citizenship. Further, different scholarship databases exist regarding students abroad on scholarship and returners from overseas studies and those databases need to be amalgamated within a central database. However, merging databases together would give a better indication of vacancies, training and re-skilling opportunities. This lead to recommendation 10:

Recommendation 10: A system to gather database information from various Authorities needs to be developed in order to register all Emiratis looking for work, assist Emiratis find employment, upskilling or re-skilling for entry into the UAE workforce.

It is recommended that unemployed Emiratis who are looking for employment be offered the availability of retraining to become appropriately skilled for the jobs available in the work place. Thus allowing Emiratis to re-enter the workforce. This service would also be necessary to retrain Emiratis whose jobs disappear due to automation.

Further, it is recommended that government databases are combined to identify the work landscape. This would include: the number of Emiratis about to graduate from post school education, the number of Emiratis unemployed of working age; the number of expatriates employed in the UAE by name; the positions that Emiratis hold; the

positions that expatriates hold; the positions unfilled and vacant in Ministries and Authorities; names and positions of Emiratis about to retire; and vacant positions in industry. By securing this information, the country can better address succession plans to replace: expatriates holding first level employment opportunities in the public and private sector that can be Emiratised; upcoming retirement of personnel from the public and the private sector; and redundant jobs due to automation. It is recommended that securing such information increases the efficiency of the country to identify better employment opportunities for Emiratis. Additionally, it is recommended that the government create a seamless process for Emiratis to register for employment and for the public and private sector to advertise their vacant positions. This would mean that Emiratis registering could be matched to jobs, based on their skill, qualifications and experience. Emiratis could then apply for vacant positions, as a job seeker, and go through the employment process. This process would ensure equal opportunities for all in the employment market. Further, having a seamless system will regulate and systemise the employment process. Therefore, creating a more efficient process for employment. Next, conclusions to Research Question C are made.

6.3.2.3.3 Conclusion to Research question C

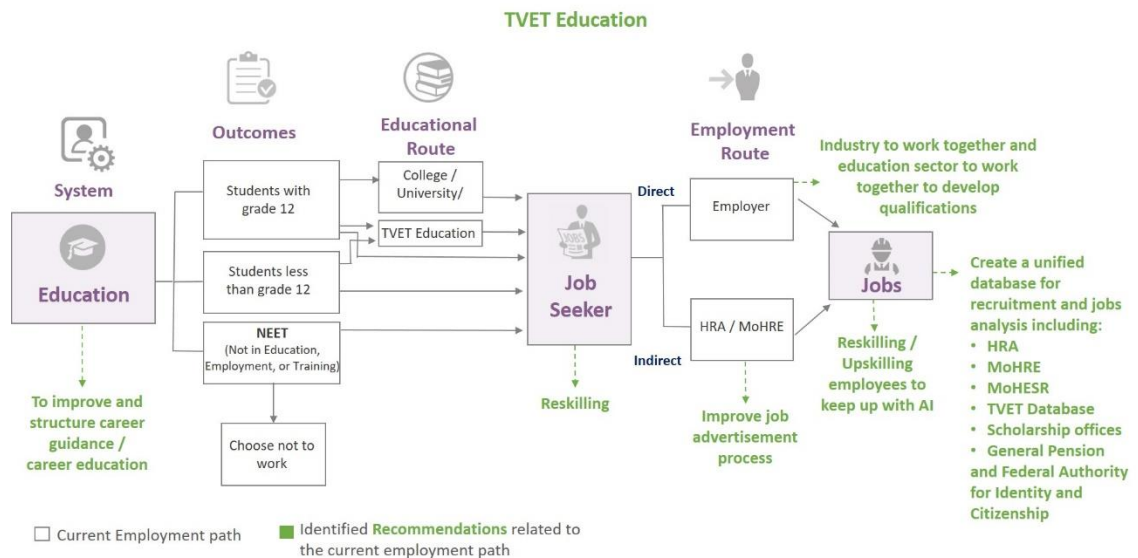
In conclusion to Research question C, which asked:

‘Is there a system in the UAE that effectively engages the unemployed in jobs leading to successful occupations?’

This research found that providing career guidance would greatly enhance the student’s ability to choose appropriate careers for their level of ability and interest. Further, by developing close relationships with industry, the education sector benefits. Industry need to open up their recruitment to the open market by advertising jobs. This allows Emiratis the opportunity to see the current positions on the market. Further, industry need to collaborate on the development of qualifications to reflect the occupational qualifications required for the workforce, thus allowing educational institutes to develop programmes resulting in a better ‘fit’ of graduates for the job market. Additionally, the amalgamation of available databases coupled with a systematic approach for registration for employment, advertising of jobs, retraining or upskilling opportunities would better address the employment market. As a result, a more

inclusive and efficient employment process would emerge, as shown in Figure 6.3. Next, the main research question is addressed.

Figure 6.3 Recommendations – Employment – Research question C



Source: developed for this research

6.4 Implication for strategy and practice

The main research question asked 'Development and reform of technical and vocational education in the UAE: the role and vision of the UAE leadership'.

Ten recommendations emerged from the findings for implementation at country level;

Recommendation 1: The leadership needs to send tweets about technical and vocational education and have a year dedicated to technical and vocational education to raise awareness of its importance.

Recommendation 2: A Ministry of Technical and Vocational Education or an Authority, and technical and vocational strategy needs to be established and developed, applied and clearly communicated, to ensure the skills required in the country, supports the achievement of Leadership Visions.

Recommendation 3: The curriculum, delivery method, and assessment strategies for technical and vocational education needs to reflect the requirements of the knowledge economy and the fourth industrial revolution, including artificial intelligence.

Recommendation 4: Technical and vocational education schools and post school institutes need to be equipped with the digital resources for developing solutions for the knowledge economy and artificial intelligence.

Recommendation 5: Standards for a technical and vocational education teacher's needs to be established and technical and vocational education teachers need to be licensed for quality assurance of technical and vocational education.

Recommendation 6: Students failing post school entry requirements, need to undertake self-study, online English language programmes, to attain the required level.

Recommendation 7: Post school technical and vocational education ought to stream students into appropriate levels of school qualification/programmes that are suitable for future occupational skills acquisition and further educational opportunities.

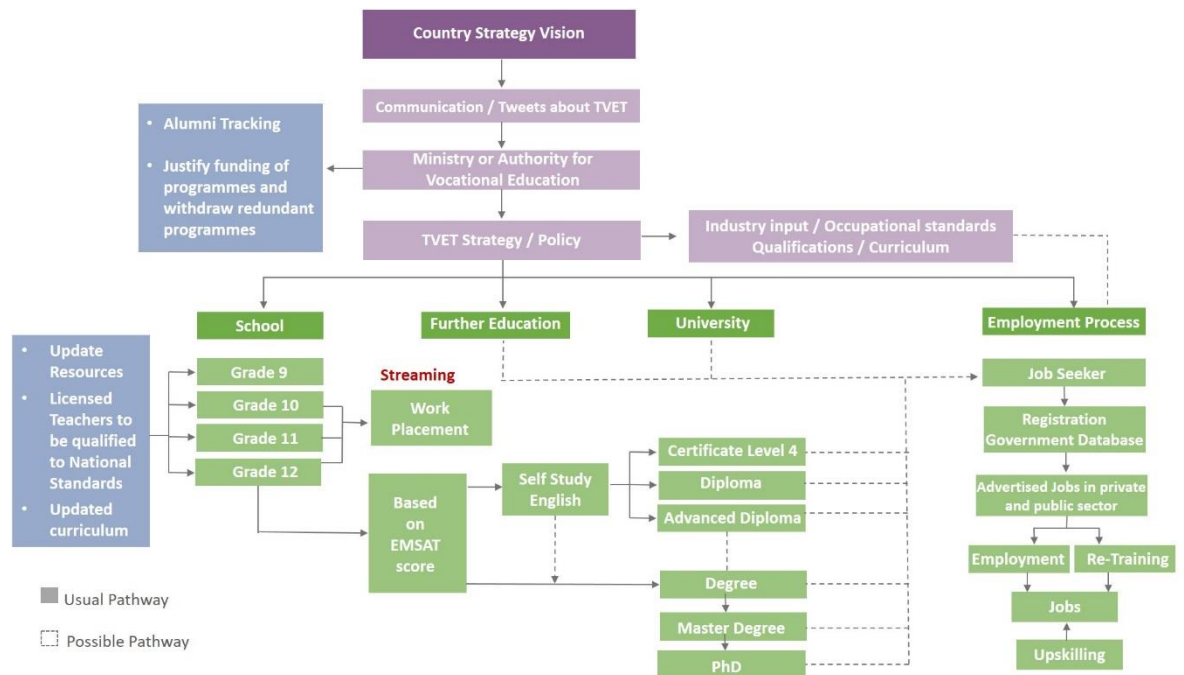
Recommendation 8: Industry must be compelled to advertise their job opportunities.

Recommendation 9: Industry and education must collaborate on the development of occupational skills/qualifications and programmes.

Recommendation 10: A system to gather database information from various Authorities needs to be developed in order to register all Emiratis looking for work, assist Emiratis find employment, upskilling or re-skilling for entry into the UAE workforce.

As a result, a new model for the UAE is established for technical and vocational education, as shown in Figure 6.4.

Figure 6.4 New model for Technical and Vocational Education strategy, delivery and employment



Source: developed for this research

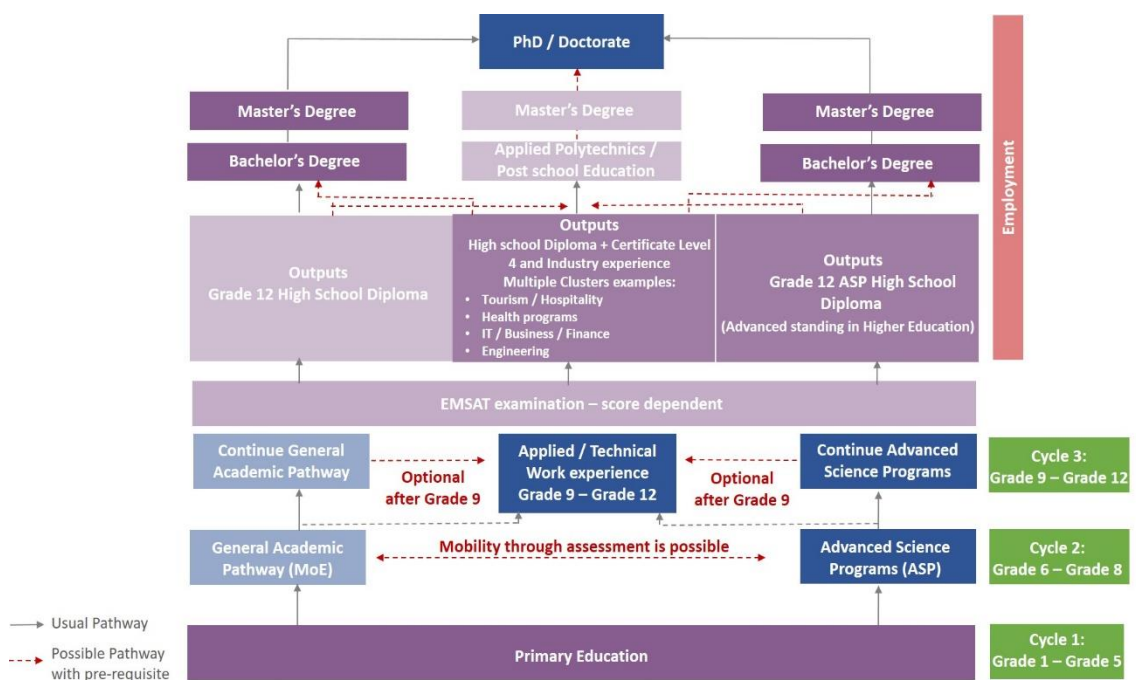
The new model connects the Visions of the country to the Chapter 5 Findings:

- Technical and vocational education to receive government Visions. The Ministry or Authority for Technical and Vocational Education would then receive the Visions and create a strategy for application to the technical and vocational education sector.
- Licensing technical and vocational education teachers by setting a national standard and ensuring teachers are qualified and perform to standard.
- Streaming of technical and vocational education students by ability and choice from Grade 10 through to Grade 12 to guide their development into post school education.
- Work placement for all vocational education from Grade 10 onwards.
- Resourcing schools with digital hardware and software.
- Reducing the cost of foundation programmes by introducing online English language learning programmes that allow students to study and progress at their own pace. Once they achieve the desired level of English language they can progress into the Certificate 4 qualification route. Students achieving higher results in Grade 12 can continue into Diploma or Degree programmes.

- Justifying post school education institutes programmes - requiring institutes to apply for funding for programmes, track graduate employment destinations and withdraw redundant programmes for a more efficient technical and vocational education system.
- Working with industry to develop occupational standards and qualification.
- Advertising job vacancies that match the marked requirement to the public.
- Gathering information from many government databases to provide comprehensive information about the employment landscape for greater efficiency and predictive analytics.
- Registering all job seekers and job vacancies in the public and private sector on a master database open to all and giving equal access to EmiratIs for employment.
- Training and re-training opportunities, possibly online, for unemployed national or for those nationals whose job has become automated, to re-skill for the vacant positions in the labour market.

The new model provides the solution for translation of country vision into reality. In more detail, a model for the proposed UAE Technical and Vocational Education system, is shown in Figure 6.5.

Figure 6.5 Proposed UAE TVET Education system



Source: developed for this research

The main research area was: *“Development and reform of technical and vocational education in the UAE: the role and vision of the UAE leadership”*.

In answer, the findings from this research would indicate that the present system does not translate the country visions into technical and vocational education reality. However, if the ten recommendations were added to the present technical and vocational landscape then the country Visions could be addressed and applied to become a reality.

6.5 Implications for theory and practice

Four *ascending* levels of contribution to literature for the 21 findings are summarised in the third column of Table 6.2, 6.3, and 6.4, and they form the foundations for this chapter. To begin some of this research’s findings concur with the expectations from the empirically established literature about some characteristics of strategy, delivery in technical and vocational education and employment, but the findings are the *first time* that this work has been studied in UAE.

- For finding that are considered as being the first time studied they are considered to be of a low level – a mere *extension* of the previous research and is listed as an ‘extension’ in column (iii) of Table 6.2, 6.3, and 6.4.

But more important *contributions* or *additions* to the body of knowledge (in ascending levels of basic/medium/major contribution) about strategy, delivery in vocational education and employment arise from the findings. These include:

- Areas where there was serious attention in the literature but no **empirical** studies, as would have been indicated by ‘*To some extent*’ in column (iv) of Table 6.2, 6.3, and 6.4 if any of this **basic** type of contribution exists in column (v).
- Areas about which there were only **speculations** or **mentions in passing** in the literature, that is, they received very little attention in the literature (including no empirical attention), as indicated by ‘*To a limited extent*’ in column (iv) of Table 6.2, 6.3, and 6.4 – a **medium** contribution in column (v).
- New areas where **no previous research at all** has been conducted, that is, where there is a quite significant gap and there is ‘*No*’ in column (iv) of Table 6.2, 6.3, and 6.4 – a **major** contribution in column (v).

In addressing Research question A – Strategy, that is, *‘Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership’s Visions?’*

Seven of this research findings indicated that there had not been any research in the UAE on the strategy of technical and vocational education in the UAE and therefore, findings in this research were extensions to research in this field. Further, seven findings resulted in seven major contributions to the body of knowledge, as shown in Table 6.2. Findings indicate there was no previous research and a serious gap in the body of knowledge in this area of study.

Table 6.2 Table of findings for the Research question A				
Finding Number	Finding	Made explicit in the extant literature	Previous research	Contribution / Addition
Column (i)	Column (ii)	(iii)	(iv)	(v)
Research question A: Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership’s Visions?’				
1.	Finding 1: Tweets about TVET are not communicated to the community.	Extension	No	Major
2.	Finding 2: A technical and vocational education strategy for the UAE does not exist.	Extension	No	Major
Source: developed for this research.				

In addressing Research question B – delivery which asks: *‘Is there an approach in the UAE that can effectively deliver technical and technical and vocational education and training.*

Ten research findings were returned. Nine findings indicated that no research had been carried out in those areas. Therefore, this research provides extensions to the body of knowledge in this research field with the nine findings having no previous research and providing a major contribution to the body of knowledge. One finding added to the body of knowledge ‘to some extent’ and the contribution to the body of knowledge was basic as shown in Table 6.3. Findings indicate there was a gap in the body of knowledge in this area of study.

Table 6.3 Table of findings for the Research question B				
Finding Number	Finding	Made explicit in the extant literature	Previous research	Contribution / Addition
Column (i)	Column (ii)	(iii)	(iv)	(v)
Research question B. 'Is there an approach in the UAE that can effectively deliver technical and vocational education and training?'				
1.	Finding 3: A specific curriculum for artificial intelligence is not available.	Extension	No	Major
2.	Finding 4: The technical and vocational education curriculum for computing skills in schools and institutes is not designed to meet the needs of a knowledge economy.	Extension	No	Major
3.	Finding 5: Computing and coding curriculum and student ability is insufficient for development of artificial intelligence.	Extension	No	Major
4.	Finding 6: Technical and vocational education schools needs a mathematical curriculum that addresses artificial intelligence, skill requirements and is implemented in schools/institutes by mathematics specialist.	Extension	No	Major
5.	Finding 7: Up to date digital resources required for developing knowledge economy and artificial intelligence solutions are not available in schools/institutes.	Extension	No	Major
6.	Finding 8: Teachers are not competent or skilled enough to teach students robotics..	Extension	No	Major
7.	Finding 9: Teachers are using the internet and apps to maintain currency of knowledge in the learning environment.		To some extend	Basic
8.	Finding 10: Teachers are not competent to teach information for knowledge economy.	Extension	No	Major
9.	Finding 11: School English language education needs to improve to reduce the requirement and financial cost of foundation programmes.	Extension	No	Major
10.	Finding 12: Students are not channelled into the appropriate post school education based on academic or technical and vocational education results.	Extension	No	Major
11.	Finding 13: Career guidance needs more attention and ought to be an integral part of the technical and vocational education curriculum.	Extension	No	Major
12.	Finding 14: Post- school educational entities are not successfully undertaking annually, alumni tracking to establish employment destination		To some extend	Basic
13.	Finding 15: Post-school entities do not justify their programmes to receive funding to ensure they meet economic need.	Extension	No	Major
14.	Finding 16: Articulation agreements are not in place between academic programmes and technical and vocational qualifications on the National Qualification Framework for harmonisation in the educational system.	Extension	No	Major

In addressing Research Question C – employment, which asks:

‘Is there a system in the UAE that effectively engages the unemployed in jobs leading to successful occupations?’

Four research findings indicated that there had not been any research in the UAE on the employment of technical and vocational education and therefore, findings in this research was extensions to research in this field. Further, four findings resulted in four major contributions to the body of knowledge, as shown in Table 6.4. Findings indicate there was a serious gap in the body of knowledge and no previous research in this area of study.

Table 6.4 Table of findings for the Research question C				
Finding Number	Finding	Made explicit in the extant literature	Previous research	Contribution / Addition
Column (i)	Column (ii)	(iii)	(iv)	(v)
Research question C:				
1.	Finding 17: Industry do not publically advertise their job vacancies.	Extension	No	Major
2.	Finding 18: Industry and education are not working closely enough together to determine the skills required for jobs that meet the need of industry and the economy.	Extension	No	Major
3.	Finding 19: Unemployed UAE citizens who are looking for work, are not undergoing upskilling.	Extension	No	Major
4.	Finding 20: Government databases are not fully utilised and integrated to support and assist Emiratis back into employment.	Extension	No	Major
5.	Finding 21: The government does not have a seamless system for the registration of unemployed looking for work or training to support Emiratis to find employment.	Extension	No	Major
Source: developed for this research.				

6.6 Limitations of this research

This research was limited by the initial focus group scope of study. The large focus group discussion raised many issues that surrounded the main research question and the three research questions, A, B and C, were of great interest and importance to technical and vocational education. However, there were parameters placed on the scope of the research to avoid too wide a study being attempted.

Additionally, this research was limited by time frame – because this research was carried out as a cross sectional rather than a longitudinal study. Therefore, it did not address a change of views over time. This research could have been addressed as a longitudinal study, studying the effects of artificial intelligence and automation on the workforce and changes reported. However, this research did not aim to test changes in employment over time.

Further, this research was limited by the availability of Ministers able to attend focus group discussions. Their heavy schedules and the importance of their work meant that focus group discussions had to fit in to their time schedules. Further, not all were available to meet at the same time to allow one focus group to be conducted. Therefore, Ministers had to be interviewed separately. This proved to be a limitation on the amount of time that the research took to conduct. However, the researcher is satisfied that views gathered reflected the general understanding of the research area.

Furthermore, this research was limited by availability of personnel from industry. Although industrial partners were invited to participate in this research, not all those invited for the focus groups attended. Furthermore, the questionnaire results from industry were the lowest rate of return from all groups. Thus highlighting the lack of involvement and/or interest that industry has in the technical and vocational education sector. However, it was accepted that those that participated, represented the views of industry.

6.7 Implications for further research areas

This research demonstrated that new areas of study in technical and vocational education strategy, delivery and employment, in the UAE were addressed. The study considered the development of the knowledge economy and the rapid development of artificial intelligence that has, and will have impact on technical and vocational education, curriculum and teaching and employment, as a result of strategy and delivery.

This research indicated that to a large extent the area of strategy, delivery and employment in the UAE has not been widely researched. Twenty-one findings were made with ten recommendations that raise implications for further research.

6.7.1 Areas of further research

As discussed in the research findings, areas were identified for further research, and are:

- Are teachers able to teach the information required for a knowledge economy?
- Does the present technical and vocational education system meet the needs of the economy?

6.7.2 Impact of Artificial Intelligence

In addition to the areas of further research, identified in this research, consideration would be the impact of artificial intelligence on the jobs that are presently in the workplace, those that are disappearing and those that are being created. This information has importance for the employment market in the UAE. It is important for countries to determine how their population of working age and their future generations will be affected by the changing nature of jobs. This information will also trigger further research in the future in areas such as:

- Would there be a need for an increase in re-training of workers, whose jobs have been replaced by automated machinery, and will it affect the education sector?
- How would the increase in unemployed affect the financial health of citizens in the UAE?
- Would an increase in part time working hours spread employment and family income across citizens?
- Would there be a need for increased provision of leisure facilities to provide for those who are unemployed?

6.7.3 Relevance of the study

A further implication for further research would be to consider whether this research applies to other countries in the Gulf Region and further afield. Other countries may not be as aware as the UAE of the need to consider changes in the nature of the workforce, and the impact it will have on its citizens and their economy.

6.8 Conclusions

This final chapter discussed the three research questions A, B and C, twentyone findings and the ten recommendations. Twenty findings extended the body of knowledge in

research in this field to a 'major extent', and one finding extended 'to some extent' research in this field and was to a 'basic extent'. Ten recommendations were made for an improved new model of technical and vocational education to enhance the effectiveness and to translate the country Visions into a reality. A new, more detailed proposed model for the UAE technical and vocational education and training system was presented (see Figure 6.5). Implications for strategy and practice was discussed followed by implications for theory and practice. Then, limitations to research was followed by conclusions.

In conclusion, this research has established that a Ministry or Authority for Technical and Vocational Education is necessary to communicate strategic messages from the leadership to the technical and vocational education community. Therefore, the present technical and vocational education landscape is not fully informed or involved in the participation in the transformation of the country leadership Visions that have been set out for the next one hundred years. However, ten recommendations could improve the technical and vocational education landscape to better serve the future economic prosperity of the country.

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Appendices

Appendix A: Ethical approvals for this research

UAE government

UNITED ARAB EMIRATES
MINISTRY OF EDUCATION
OFFICE OF THE MINISTER



الإمارات العربية المتحدة
وزارة التربية والتعليم
مكتب الوزير

الرقم: م و / 230

التاريخ: 2017/12/14م

To whom it may concern

إلى من يهمه الأمر

Ref: Collaborating Organisation and Ethical Approval Letter

Title of Research Study: "Translation of UAE Leadership Vision and Educational Policy to Reality: An investigation into Harmonisation of Youth Skills and Market Demands"

Designate Researcher or Author:

Mubarak Saeed Ali Hamad Al Shamsi

Researcher Mubarak Saeed Al Shamsi is conducting a research on the above subject, which requires the collection of data and information from various educational institutions in the country.

The researcher has undertaken to adhere to the ethics of research in terms of privacy, confidentiality, professionalism, objectivity and accuracy, and the right to withdraw. The participant's subjects and samples will be also briefed on health and safety procedures while conducting this research.

Based on the above, please facilitate the researcher's task in obtaining the information and data required for the research.

عنوان البحث: "ترجمة رؤية القيادة للسياسات التعليمية إلى واقع: تحقيق في مدى مواءمة مهارات الشباب مع متطلبات سوق العمل في دولة الإمارات"

الباحث: مبارك سعيد علي حمد الشامسي

يقوم الباحث مبارك سعيد الشامسي بإعداد بحث حول الموضوع المذكور أعلاه، والذي يتطلب جمع بيانات ومعلومات من مختلف المؤسسات التعليمية في الدولة.

ولقد تعهد الباحث بأن يلتزم بأخلاقيات البحث من حيث الخصوصية، والسرية، والمهنية والموضوعية والدقة، والحق في الانسحاب، وإطلاع المشاركين على إجراءات الصحة والسلامة أثناء إجراء هذا البحث عند الحاجة لذلك.

بناءً على ما تقدم، يرجى من المعنيين تسهيل مهمة الباحث في الحصول على المعلومات والبيانات المطلوبة لغايات البحث.

حسين بن إبراهيم الحمادي
وزير التربية والتعليم

For all categories, details of the application and review outcome should be minuted using the agreed format and forwarded to the Research Governance section

Please complete the following

The application should be accompanied by an appropriate and favourable Peer Review Report Form (if not, the Filter Committee should be prepared to address this as part of its review). Please comment on the peer review (include whether or not there is evidence that the comments of the peer reviewers have been addressed).

A favourable review was received from the School of Psychology Filter Committee; the recommended changes have been made to all of the relevant documentation.

Please provide an assessment of all component parts of the application, including questionnaires, interview schedules or outline areas for group discussion/unstructured interviews.

The design and questions are appropriate for the aims and objectives of the project

Please comment on the consent form and information sheet, in particular the level of language and accessibility.

Information sheet and consent form have been included within the documentation, they have an appropriate level of language.

Please comment on the qualifications of the Chief and other Investigators.

Prof Leslie has a wealth of relevant research experience and is a member of the Psychology RI, Mubarak Al Shamsi is a PhD researcher in Psychology

Please comment on the risks present in conducting the study and whether or not they have been addressed.

The potential risks have been assessed and thus deemed to be low

Please indicate whether or not the ethical issues have been identified and addressed.

They have been identified and are not a cause for concern

Please comment on whether or not the subjects are appropriate to the study and the inclusion/exclusion criteria have been identified and listed

The participants are appropriate given the aims and objectives of the study. Inclusion and exclusion criteria have been identified.

Appendix B: Initial Focus Group

Appendix B Initial Focus Group Recording – determining the scope of the research				
Group construction	1 = Moderator – Lindsey McPherson, European Expat 2 = Researcher – Mubarak Al Shamsi, Emirati 3 = Focus group participant with in strategy and policy in education doctorate – Eva Beens, European Expat 4 = Focus group participant with experience in vocational education – Ziad Abu Sal, Arabic Expat 5 = Focus group participant with experience in vocational education – Ali Al Marzouqi, Emirati 6 = Focus group participant with experience in vocational education – Naeema Al Menhali, Emirati		Date of Focus Group: 2016	
			Focus group start time: 01:00 pm	Focus group finish time: 03:00 pm
Group Member Number	Moderator questions	Group Member Number	Response	Action - Outcome
2	Thank you for taking part in this focus group. The aim of the interview is to discuss the area that I intend to study for my PhD. I aim to research vocational education in the UAE			
1	In what area specifically?	2	I was looking at leadership in vocational education.	
1	Your leadership or the country leadership?	2	My own leadership style.	
		3	But you work at a higher level of leadership. You are leading vocational education. Would it not be more applicable to consider the country level, especially in line with all the Visions in the country?	
		2	Yes that would be good. Do we want to look at country leadership style in vocational education?	
			I was thinking about how vocational education contributes to the fulfilment of the countries Visions.	
1	Yes that is very good. Then we could analyse the skills needed to meet the Visions. For example we could look at Industry 4.0 and Artificial Intelligence and the skills required.	3	Yes that would be good and I would say necessary for the country to know in order to meet the Visions for 2021 and 2030.	

		2	Yes we could determine what skills should be delivered in the schools and institutes in order to meet those needs. This would influence and direct the content of the programmes on offer in the technical and vocational schools. We should also consider the Visions 2071 and 2117 the Mars mission, so we can prepare Emiratis for the work that's coming.	
		4	Yes this sounds like something the country needs	
		3, 5	Yes, to know the requirements is really important because if we don't move now it will be too late. The speed of change is coming really fast.	
		2	We need to look into more of the requirements of the Industry 4.0 agenda so that we can direct programmes in the future.	
1	So we are looking at advanced skills?	2,3 and 4, 5 & 6	Yes, agreed. But what about getting the Emiratis into these jobs? They will be high skilled jobs in some cases.	
		2	Yes we need to be able to support Emiratis to study then transfer to the right employer. Maybe we need to consider the role of industry? We definitely need to partner with industry.	
		3	Yes, industry plays a big role but maybe we need to involve them more in the sponsoring of students and student work placements.	
		2	Yes I agree. Also we need to look at the process involved in Emiratis finding employment?	
1	What do you mean?	2	Well, there is no formal employment system	

			here like there is in other countries.	
		3 and 6	Yes, that's true. In the UK all unemployed people get benefits of some kind but they have to be registered to receive the benefits and also they are checked to make sure they don't have savings or an independent source of income. Then they get the benefits they are entitled to. But they still have to be a job seeker.	
		2	Here we do not have a system where they have to register. They can register at HRA and apply for the jobs advertised but it's not very well structured. For example an Emirati can sign up for any job regardless of their qualifications and they have to be interviewed.	
		3	Yes we have had to interview Emiratis that did not have the qualifications or the experience for the job. I don't know if this gives false hope or not. Would there be a chance that the government would put in a more structured approach to employment systems in the UAE?	
1	That looks like a pretty good areas of research. We need to now refine the main research problem and the sub main research questions.	2, 3, 4, 5 & 6	Ok.	
1	First we need to look at the main research problem. We need this to form the boundaries or parameters for the research.	2, 3, 4, 5 & 6	Ok.	
1	It needs to have the Visions and the leadership involved and education.	2	Yes, those three elements are the key focus. What about realising the leadership Visions of the UAE for education?	
		3	Yes, that's good but what about re-wording to How do you translate	

			the leadership's Visions into reality? But we haven't put in education. So we could enlarge it to 'How do you translate Leadership Vision and education into reality'?	
		4	Yes it would be UAE Educational Policy?	
1	Ok, Then what about 'How do you translate Leadership Vision and UAE educational policy into reality'?	2, 3, 4, 5 & 6	Yes, I think that is good and it would work.	Research problem established in draft.
1	Ok do we all agree? 'How do you translate Leadership Vision and UAE educational policy into reality'?	2, 3, 4, 5 & 6	Yes that's good	Research problem confirmed.
1	Ok now let's look at the areas that we discussed. The three main areas are leadership of visions, skills for Industry 4.0 and finding jobs for Emiratis.	2	Yes those are the key areas.	
		3	Yes, strategy, delivery and employability?	
		2	Yes, but for the first question I think we need to have the strategy for the leadership visions and what skills would be needed.	
1	Ok so now we have a strategy for the leadership of the country's visions using vocational education. Can we expand to make it clearer?	4	What about 'How can the countries leadership strategy meet the visions of the UAE through vocational education'?	
1	Can this be refined?	3	I think we are getting closer to the actual essence of the research question.	
1	Ok Can we refine this?	2	What about "Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership's Visions?"	First research question established in draft.
1	What does everyone think?	3	Yes, I think it captured what we are trying to say and it will have great impact on the education system if we can find the answers.	
		4	Yes, I think it's good. This will change technical and vocational education in the UAE. This will have a	

			big effect on the education system	
1	Ok can we just agree on the first question, that is, “Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership’s Visions’?”	3, 4, 5 & 6	Yes I think that would work.	First research question agreed
		2	Yes, I think it’s good.	
1	Ok, let’s look at the next part, the delivery of vocational education.	3	Yes this is important because out there they are not delivering enough of the training in the workplace and the students are not able to perform the skill when they go to work and the employer complain that they have to train them again. This is a big problem	
		4	The new NQA requirements have changed everything.	
		3	Yes, but they haven’t adapted or changed their approach. They are still delivering like they are academic establishments and they are not. They are vocational education establishments.	
		4	Even their staff are academic.	
		3	Yes, when they saw our risk matrix they said ‘We have been recruiting the wrong people’.	
		4	Yes PhD’s for vocational education?	
		3	Well, that is not what you would find with international benchmarking, that’s for sure.	
1	So what we are looking at is the delivery mechanism for the programmes.	2	Yes, the outcome of the programmes or the qualifications undertaken.	
		4	What about the curriculum, should we mention it?	
		3	I think it will come out naturally when we see the skills required to meet the Visions, so	

			maybe no need in this question?	
1	Can we clarify further what we mean?	3	Yes, we need an approach to the delivery of the vocational education.	
		2	Yes, we need to have an approach that can deliver vocational education effectively.	
1	Ok so we need an approach for vocational education in the UAE. Is that good enough?	2	Maybe we need more like 'Is there an approach that can effectively deliver technical and vocational education and training?'	
1	Can we refine it further?	2	Ok how about 'Is there an approach in the UAE context that can effectively deliver technical and vocational education and training?'	Second research question established
		4	Yes that's good. Should it be a strategy or an approach?	
		2	Why don't we call it an approach for now?	
1	Ok are we in agreement with the question, that is, 'Is there an approach in the UAE that can effectively deliver technical and vocational education and training?'	4 & 6	I think it's good.	Second research question agreed
		3	I think it captures what is intended for the delivery part	
		2	Yes I think I am happy with that.	
1	Ok let's move on to the part about employment or unemployment.	3	What we are thinking about is a system to help the unemployed Emiratis to find a job. Although HRA has this role, it needs support. Also we have the students graduating and we know what they are graduating in. We can help them to get interviews with employers?	
		4 & 6	Yes, I agree the present system has Emiratis looking for work but no real formal system. They do go through NAPO at the school leaving stage but after that its direct applications for a job or an institute.	

		2	I think we also have to look at what they are studying to see if it's relevant.	
		3	Yes I would agree and this relates back to the first question about what skills are needed to be delivered.	
1	Ok so we are looking at a system for employment? Is that right	2, 3, and 4	Yes that's right.	
		3	I also think we need to at the occupational that the students have coming out of institutes. There seems to be too many with Business Administration and a lot of female engineering graduates are looking for work, so I am told.	
		2	Yes this is true. I think we need to look at the present system and see if there is a better way of matching Emiratis and jobs.	
		3	Yes, I agree	
1	Ok so now we are looking at a system, occupational uptake and employment. Is that right?	2, 3 and 4	Yes, that's right.	
1	Ok can we refine the question a bit more?	4	Well we could ask, Is there a system to find employment for Emiratis.	
		3	Yes but don't we need to know if their skills are relevant?	
		2	Yes this needs to link back to the skills required for the Visions and apply it to the recruitment in institutes so that when they graduate they are employable.	
		3	Yes, we need to think about the investment and return of investment on these graduates.	
1	Well can we ask "is there a system that engages Emiratis with the correct occupational skills in the workplace"?	4	I think it's close but not accurate enough.	
		3	What about 'Is there a system for employing Emiratis for the occupations they have been trained for?	

		4	But it's the unemployed we want to engage.	
		3	Ok, what about 'Is there a system for engaging unemployed in occupations.	
		2	What about 'Is there a system in the UAE that effectively engages the unemployed in Successful occupational outcomes?'	
1	Ok, how do we feel about that question, that is, 'Is there a system in the UAE that effectively engages the unemployed in successful occupational outcomes?'	3 and 4	I think that sounds good. It certainly captures what we want to know about.	
		4	It will challenge the present system and maybe there will be a new system comes out of the recommendations for this research and the government might apply it.	
		3	It would improve the system here if there was a system for getting Emiratis through a system into employment as per their occupation. This will help Emiratization.	Third research question established
1	Ok are we in agreement with the third question, again that is, 'Is there a system in the UAE that effectively engages the unemployed in successful occupational outcomes?'	3	I am ok with that	
		4 & 5	Me too.	
		2	Yes, I think that's close enough for now.	Third research question agreed

Group construction	1 = Moderator – Lindsey McPherson, European Expat 2 = Researcher – Mubarak Al Shamsi, Emirati 3 = Focus group participant with in strategy and policy in education doctorate – Eva Beens, European Expat 4 = Focus group participant with experience in vocational education – Ziad Abu Sal, Arabic Expat 5 = Focus group participant with experience in vocational education – Ali Al Marzouqi, Emirati 6 = Focus group participant with experience in vocational education – Naeema Al Menhali, Emirati		Date of Focus Group: 2016	
	Focus group start time: 10:00 am		Focus group end time: 12:30 pm	
Group Member Number	Moderator questions	Group Member Number	Response	Action - Outcome
		2	Thank you for coming to discuss part two of the research, that is, to set the questions for each of the three main Research questions. Just to recap they are as follows: Research question 1: 'Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership's Visions?' Research question 2: 'Is there an approach in the UAE context that can effectively deliver technical and vocational education and training?' Research question 3: 'Is there a system in the UAE that effectively engages the unemployed in successful occupational outcomes?'	
1	So let's start with Research question number 1: 'Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership's Visions?' Let's start by talking around the subject, what is it that we know about the strategy for technical and vocational education in the UAE?			
		3	Well we know that there isn't a strategy for technical vocational education and we need one.	

			Some of the issues come from not having a strategy and not being able to pass down messages through the various systems to the vocational education providers. Therefore, we have a gap in communication.	
		4	Yes but the country communicates using tweets, this is how the information is passed down.	
		6	Agreed, but is that effective? If we don't know if it's effective maybe you should look into it further? We could fashion a question around how the country communicates with citizens.	
		2	Okay I agree with that, how do we word the question?	
		6	Maybe we could ask about the country tweets and whether they think it's effective? Also whether they are informative?	
		5	It would be better to just ask if they are informative because is very difficult to measure effective.	
		2	Okay let's look at communication using tweets. Can we word it as: "To what extent are the tweets informative?"	
		4	But would we not have to mention that it's the country's leadership tweets, not vocational education tweets.	
		2	Yes I agree with that.	
		3	What about wording it as follows: "To what extent are the tweets by the country leadership informative?"	
		6	Yes, I think that sounds pretty good.	
		3, 5	Yes, I agree with that.	
1	Okay. Can we formalise that question, do we all agree with the following: "To what extent at the tweets by the country leadership informative?"			Agreed question
1	Okay if we are all happy with that let's go onto the next question. You mentioned that there is no strategy. If there is no strategy how can the meet the visions of the country?	2	This is a good question. Strategy can only be effective if it matches the country's visions and missions.	

		6	I agree with you. Maybe you want to ask if the visions of the country are working.	
		5	Do you mean - do they give direction?	
		6	Yes, do they direct development for example?	
		2	This is a good suggestion. Maybe you want to word it to something like: "To what extent are the UAE visions for the country's direction informative?"	
		4	I suggest that we look at development of the country as well.	
1	Okay good, we're getting close on this one. Can we reword to include development? What if we reword it as follows: "To what extent are the UAE visions for the country's direction and development informative?"			
		3, 4, 5, 6	Yes, I agree with that.	
1	Okay, I think we can agree on the question which reads as follows; "To what extent are the UAE visions for the country's direction and development informative?" Do you agree?	2	Yes, I am happy with that.	Agreed question
1	Okay that's good, let's go onto the next question. The next question is to look at if we have the resources to achieve that? In that case we would need to have the digital requirements to meet the vision? Would that not be the case?			
		3	Yeah I agree with that, we need to look at the computing skills and the digital resources? Does anyone agree?	
		4	Okay, what about having two questions then? What about a question about computing skills and a question about resources?	
		5, 6	Yes I agree, let's consider two different questions.	
1	Okay can we look first at computing skills? What is that what actually trying to ask here? It's about achieving the visions?	2	Yes, if the vision is to be technically competent to fly to Mars, then we are going to need computing skills to be able to programme computers and artificial intelligence to be able to do that. So why don't we ask a	

			question about is the computing skills sufficient for the country?	
		5, 6	Yes I agree.	
		2	Why do we ask about the extent of computing skills especially for a knowledge economy?	
		5	Yes what about asking something like: "Are the computing skills sufficient for a knowledge economy?"	
		6	Can we develop that further, can we ask something like: "To what extent is the level of computing sufficient for a knowledge economy?"	
		3	We need to define whether this is country level or to fit specific skills.	
1	Yes I agree with that. Can we develop the question further then? What about; "To what extent are the general levels of computing skills in the country sufficient for a knowledge economy?"			
1	Okay can we confirm that that's the question?	4, 5, 6	Yes we agree with that.	
		2	Yes let's confirm the question as: "To what extent are the general levels of computing skills in the country sufficient for a knowledge economy?"	Agreed question
1	Next, let's look at the digital resources. I think we need to find out if the digital resources are sufficient in schools.	2	Yes can we consider if the schools are institutes even have sufficient digital resources? Again were addressing this for a knowledge economy.	
1	So the question would be something like: "To what extent are the digital resources available in schools or institutes sufficient for a knowledge economy?"	3	That's quite close but can we reword it as: "To what extent are the digital resources available in the UAE schools/institutes sufficient for a knowledge economy?"	
1	Are we all in agreement with that? "To what extent are the digital resources available in the UAE schools/institutes sufficient for a knowledge economy?"	2, 3, 4, 5, 6	Yes	Agreed question
1	Good let's move on to the next question. If they're going to be doing programming don't they need to know mathematics for algorithms? Yes I think we need to know about the			

	maths, because maths is required not only for a knowledge economy but also for artificial intelligence solutions. Is that not correct?			
		2	Yes I agree with this. Let's develop this question further.	
		3	Why don't we just ask the same sort of question as before and ask: 'To what extent is the general level of mathematics in the country sufficient to develop artificial intelligence solutions?'	
		5	That sounds okay to me.	
		4	I think that question is sufficient	
1	Okay if we all agree let's finalise that question to read. "To what extent is the general level of mathematics in the country sufficient to develop artificial intelligence solutions?"			
1	Are we all in agreement with this? "To what extent is the general level of mathematics in the country sufficient to develop artificial intelligence solutions?"	3, 4, 5, 6	Yes we agree with that.	
		2	Okay let's go with that question:	Agreed question
1	Okay we're doing well. Can we go onto the next question? If we're talking about artificial intelligence then they need to be able to programme computers. So maybe we should be looking at the extent of computer programming skills?	3	Why don't we look at the coding skills courses coding skills and be required for artificial intelligence?	
		3	Yes I agree with that. Can we consider the question to what extent is the - and we will use the word again general - level of computing programming and coding skills sufficient for a knowledge economy?	
		2	Should it not be for artificial intelligence?	
1	Yes, we could ask the following: "To what extent is the general level of computer programming and coding skills in the country sufficient to develop artificial intelligence			

	solution?" Does everyone agree with that question? Do you think it's sufficient to find out about coding skills?			
		5,3	Yes I think that this would be sufficient.	
		6	I think it'll get the information that we want to know about.	
1	Okay then we have an agreed question as follows: "To what extent is the general level of computer programming and coding skills sufficient to develop artificial intelligence solution?"	2	Yes I'm happy with that.	Agreed question
1	Okay then why don't we look at robots? Don't we need to find out if the students can programme or build robots?	3	Yes, this would be an important skill to achieve artificial intelligence. We need them to be able to build and programme robots.	
		4	Okay we asked about programming already why don't we just ask about building robots?	
		3	Yes I agree, just ask about building robots.	
		6	Okay can we ask the question to what extent can students build robots?	
1	Can we refine that further?			
		3	I think we can ask the question: 'To what extent are UAE students able to build robots?' That's quite a simple question and it's quite direct.	
1	Okay so is everyone happy with that question? It reads as follows: 'To what extent are UAE students able to build robots?'	2	Yes I'm happy with that.	Agreed question
1	Okay well done. Let's go onto the next question. Don't we need to ask questions about the teacher's ability? Because if the teacher doesn't have the ability how can the students learn?	5	Yes, I agree with that. Why don't we ask about the teacher's ability to teach for a knowledge economy, that was the first question we looked at, knowledge economy?	
		6	Yes why don't we ask about if the teachers are able to teach for a knowledge economy?	
		5	Do you think that teachers would know what a knowledge economy is?	
		3	Yes, I would imagine that the teachers do know what it means.	

		6	Okay then what about: "To what extent are teachers able to teach for a knowledge economy?"	
		4	Yes but it is information that's being passed on.	
1	Okay then what about: "To what extent are teachers able to teach the information needed for a knowledge economy?"			
		3	Yes I think that's a better question.	
		5	I think it's clear enough.	
		2	Yes I'm happy with that question, what was it again?	
1	The question would then read as follows: "To what extent are teachers able to teach the information needed for a knowledge economy?"	3, 4, 5	Yes I think we are happy with that question.	Agreed question
		2	Yes I agree let's finalise that as a question.	
1	Okay can we have a look at the questions around teacher's competence?	3	Most teachers are supplementing their knowledge by using Google and YouTube, or even better TeacherTube.	
		5	This is common practice now.	
		3	What about if we ask if the teachers use Google to supplement the knowledge?	
		5	Maybe we should not restricted to Google, why not just research engines?	
		4	Okay let's develop that further. Can we look at: "To what extent is teacher's knowledge supplemented by using computer search engines?"	
1	I think that this is quite a good question. Do we need to expand on that more is it fine?			
		2	Maybe we should come up with the question as follows; "Teachers knowledge supplemented by using computer search engines?"	
1	I think that's quite a good question. Do we agree that it's worded okay?	5	Yes I'd be quite happy with this.	
		6	Yes I think it asks what we need to know.	
		2	Yes I'm happy with that, can you read the question again please?	
1	The question reads: "Teachers knowledge is	2	Yes I think this is fine.	Agreed question

	supplemented by using computer search engines?"			
1	Fine, were doing well.			
1	Do you think these questions will be sufficient to answer the first research question? Research question 1 reads as follows: "Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership's Visions?"			
		4,	I think that's enough because we can't have too many questions in the questionnaire.	
1	Agreed. Lets move on but if necessary we could always come back and add if necessary.			
1	Too many questions makes it difficult to analyse. So let's look at the next research question. Research question 2 asks 'Is there an approach in the UAE context that can effectively deliver technical and vocational education and training?' Now we need to look at questions that surround this issue. Particularly about the delivery of technical and vocational education and training. What about the teachers?			
		2	The input of the teachers is very important.	
		3	Can we be a bit more specific and ask the method got skills to develop artificial intelligence solutions?	
		5	I agree we need to think about something related to teacher's ability to teach for artificial intelligence.	
1	Okay, how would this be worded?	3	What about something along the lines of "To what extent are teachers equipped to teach development of artificial intelligence?"	
		5	Can we refine it a little bit further? Can we add something like teaching the skills for artificial intelligence?	

		3	Or can we have a look at the skills required to develop artificial intelligence?	
1	Yes I think that that's a little bit closer to what we want.	2	Can we then come up with the question as follows: "To what extent are teachers in the UAE equipped to teach skills for development of artificial intelligence?"	
		4	Yes I'm happy with that.	
		5	Yes I would agree with that.	
1	Okay can we finalise the question? Can we agree as follows: "To what extent are teachers in the UAE equipped to teach skills for development of artificial intelligence?"	2	Yes I'm happy with that question.	Agreed question
1	Okay, well done. Can we go onto the next one, I think we need to ask more questions about teachers. For example, do we not want to know about teachings qualifications?	3	Would that be for a specific teaching qualification? This is as question that would be difficult to answer because Arabic teachers traditionally don't have a teaching qualification but they are qualified in the specific area.	
		4	Why don't we just ask if teachers have a specific teaching qualification? In which case we don't mean the subject, we mean a teaching qualification?	
1	Do you think respondents will know what you mean by a specific teaching qualification?	6	I think it's clear what we were looking for.	
		3	I would agree, it's a specific teaching qualification we will want to know about.	
1	Okay, can we then agree on the wording of the following: "Teachers have a specific teaching qualification?"			
		4	Yes that's quite simple I think we can go with that. What do you think?	
		2	Yes I think we can go with that question.	
1	Okay so let's agreeing the question: "Teachers have a specific teaching qualification?"			Agreed question
		2	Yes I'm happy with that	
1	Okay, we're doing well, let's go to the next area. I think we need to ask about English language because we have a lot of issues with	6	Yes this is a very big area that needs to be considered. The cost of post-school English language takes up about 1/3 of the Higher Education budget and this is far too much.	

	the cost of English language. Would you agree?			
		4	Why does the government have to pay so much money for something that other students have managed to achieve?	
		3	Some students learn at different rates. Not all students achieve at the same time.	
1	Okay so we're going to ask about who's going to pay for the English language training?	2	Yes, I think it's important to ask the question who should pay.	
		5	Can we ask if parents should be paying?	
1	I don't see why we shouldn't ask this question?	3	Okay, then should we not ask if parents should pay for post school education? I mean English language education?	
		4	Yes it's a question that's going to raise a few eyebrows.	
		6	Why should we not ask if parents should pay?	
1	Okay, we can ask about who should pay for post school English.	3	Well why don't we ask the question.	
		5	Should parents pay for post school English language?	
		3	We could ask; to what extent should parents be paying for post school English language.	
		2	Okay why don't we ask: "To what extent should post school English language education be paid by parents?"	
1	We can ask that question. Is everyone in agreement with that?			
		5	I would agree with that.	
		3	Yes, I think that's okay.	
1	Okay, then if we worded as follows: "To what extent should Post-school English language education be paid by parents?"	2	I would be happy with that. What does everybody think?	
		6	I agree with that.	
		5	I think that would work.	
1	Okay, then can we agree that question as reading: "To what extent should Post-school English language education be paid by parents?"	2	Yes I'm happy with that question.	Agreed question
1	Okay moving on. I think we need to concentrate now on research question 3. Which we agreed would read as follows: 'Is there a system in	3	Yeah, I think we need to look at industry and whether they have enough involvement in the education system. We do all this education for industry and then	

	the UAE that effectively engages the unemployed in successful occupational outcomes?		they are never happy with the outcome. Maybe we should ask some questions about the extent of the involvement of industry in the UAE education system.	
		5	Yes, I think we should ask about industry but also unemployment as well.	
1	Okay, let's concentrate on industry. Do we want to find out the extent that they are involved in education?			
		3	Yes we need to look at involvement of industry. We could just ask a simple question. Are they involved are not.	
		6	Okay we need to word it a little bit better than that. Can we ask the extent that industry is involved in the education system?	
		4	Yes this seems a little bit better. Can I suggest something like: "To what extent is industry involved in education?"	
		3	Yeah, that's good but we need to be a little bit more specific. Can we mention "To what extent is industry involved in the UAE education system?"	
1	That's a fairly good question. I think it's worded correctly as well. Do we agree with that question?	6	I think the question reads all right.	
		5	I think it serves the purpose.	
		3	I like the question but it's up to you.	
		2	Yes, I think the question is okay. Can you read it back to us?	
1	The question now reads as follows: "To what extent is industry involved in the UAE education system?"	2	Yes, I'm happy with that.	Agreed question
1	I think we need to look at people who are unemployed			
		3	Do not have to specify what we mean by unemployed? Are we talking about people who should be working or people who choose not to work? What do we mean by unemployed?	
		4	We talking about people who want a job, but may be can't find one.	
		6	So are we looking at unemployed who want to work or maybe they need some skills?	

		2	Youth unemployment around the world indicates that skills shortage is a big problem.	
		3	Okay maybe we can ask about the extent that unemployed who are looking for work need to reskill.	
		6	I prefer to call it upskill.	
		5	Okay so to what extent do the UAE unemployed, and we can ask about if they are of working age, need to undergo skills training. Are you sure? Can we use the words "skills up-skilling"?	
		3	Yes, this sounds quite good. What we are looking to ask is: "To what extent do all the UAE unemployed, of working age, who are looking for work, need to undergo upskilling."	
		4	Will people know what upskilling is? Maybe you need to put skills upskilling so that they understand what you're asking for.	
		3	Okay let's have a look at the question again.	
1	It reads: "To what extent do all UAE unemployed, of working age (who are looking for work) need to undergo skill up skilling?" Okay that sounds quite good. Does everyone agree with that question?			
		3	I think it asks what you are looking to ask.	
		6	Yes, I think that's a good question.	
		5	Yes, I think it's quite clear.	
		2	I think the question is what we need to ask.	
1	Okay so the question now reads: "To what extent do all UAE unemployed, of working age (who are looking for work) need to undergo skill upskilling?" Do you agree with that?			Agreed question
		2	Yes, I'm happy with that.	
1	Good, maybe we need to ask about present skills to find out if they actually suit what is required for the economy.			
		3	Yes, we fund a lot of training and we need to be sure that it's going to meet the visions of the	

			country, otherwise the country is not going to raise its GDP.	
		6	I agree with you we need to look at the economy.	
		5	Okay what are we going to be looking at? Are we asking about whether the training meets the needs of the economy?	
		3	Yes but we need to mention that it is vocational education that were talking about.	
		4	Okay so are we talking about the present vocational education system?	
1	Yes I would think so.			
		6	What about the extent the vocational education meets the needs of economy?	
		5	I asked that question already.	
1	Okay let's refine it.			
		3	We could ask to what extent does the present UAE vocational education system meets the needs of the economy?	
		2	I agree with question, but I think we need to add the national economy so they know we were talking about.	
1	Okay so we could refine the question to read something like: "To what extent does the present UAE vocational education system meet the needs of the national economy?"			
		6	Yes I think this question does the job.	
		5	I think the question is clear enough. Do you think we are going to get a clear answer from that?	
		2	I think it's clear enough.	
		4	I think it's fine.	
1	Okay, so can we agree the question to read as follows: "To what extent does the present UAE vocational education system meet the needs of the national economy?"			Agreed question
		4	I think that reads all right.	
		6	I'll agree with that.	
1	How about you?	2	I think the question is fine.	
1	Okay now that we agree that can we move onto the next question?			
		3	Can we ask a question about schools offering training but the	

			schools are not needed in the economy. I understand that a lot of engineers are trained but there are no jobs for them.	
		6	I also heard that there were business administration graduates who are not finding jobs.	
		3	Can we ask then if there are skills being taught that are not needed in the economy, because there aren't any jobs for them.	
		6	Is this because Emiratis don't know the jobs that are available	
		5	It could be?	
1	Okay let's concentrate on the skills that are being offered. We want to know if they are redundant. I want to know the programmes that are being offered in institutes are redundant programmes? Is that correct?	3	Yes, I hear that there's a lot of training going on but it is not actually leading to a job.	
		4	Okay, so what is it we are asking? Are we asking about redundant programmes? Are we asking about skills for the economy?	
		2	I think skills for the economy? And I think we are talking about when they graduate after school.	
		3	So can we ask about the skills needed for the economy being provided in institutes? By that I mean post school?	
		5	Yes, we could word something around this?	
		4	Yes, we could come up with the extent that skills are being provided but are not needed?	
		2	Yes, we need to find out the extent that skills are not needed in the economy but are provided in post-school education.	
		4	I think the question is quite close what you think?	
1	Okay think we are close to question here. How about something like: 'To what extent are skills that are not needed in the economy being provided for in post-school education?'			
		5	Yes I think it's close enough.	
		3	I like that question	
		2	I think the question reads okay	
1	Can we agree the question then? I think we have	2	Yes I think the question is fine	Agreed question

	agreed the following: "To what extent are skills that are not needed in the economy been provided for in post-school education?"			
1	Okay which area do we want to go now?			
		3	Can we look career vacancies or career pathways or processes for gaining employment?	
		4	I think there are a lot of questions there.	
1	I think there are about three questions in that area of discussion.			
		2	Let's concentrate first on career pathways. We don't give this school students enough career guidance or information about pathways.	
		3	I agree because we've got far too many people that are unemployed because they studied the wrong programs in the first place.	
		6	This is true, we see far too many students that are unemployed because they chose the wrong subjects in school.	
		5	Some students take subjects because the friends are taking the subject. Then when they graduate they realise it's not what they want to do, or worse, the subjects they studied will not help them with their graduate studies or employment.	
		4	I agree this is a big area of concern.	
1	Can we concentrate on the question, try to come up with the question?	3	Okay, what about the students know about career pathways for employment purposes?	
		6	Okay, what about if they know about career pathways would it help them to choose better their subjects at school?	
		5	It's the knowledge of career pathways that is missing. If the knew the career pathways they would be more likely to take the right educational choices.	
1	Okay can we start to define this question now?			
		3	What about "To what extent can knowledge of career pathways help shape educational choices?"	
		6	Maybe that's a bit too specific.	
		5	What you mean too specific?	

		6	Maybe we talking about their educational pathways, which are their choices.	
		4	But it is these choices that are the problem.	
		6	What do you mean?	
		4	Because they don't get career education they are not choosing the right educational pathways.	
1	Okay, can we fashion a question around this? What about "To what extent does knowledge of career pathways help the learner shape their educational pathway?"			
		3	Okay this question sounds okay, what does everybody think?	
		5	I think it's okay.	
		6	I agree with the question.	
		2	I think the question is clear enough.	
1	Okay, can we agree this question then? "To what extent can knowledge of career pathways help a learner shape their educational pathway?"			
		2	Yes I think this is a good question. Now we need to look at if this job vacancies and do students know where to look for them.	
1	Okay so we agree the question	2, 3, 4, 5, 6	Yes we agree	Agreed question
1	Okay let's move to the next question. You asked about job vacancies? Can we look at a question around that area?	3	What about the extent that job vacancies are available?	
		5	Do you mean available in the workplace, or online?	
		3	I mean for someone who is looking for a job.	
		4	Okay so you're looking at the extent that vacancies are available in the job market?	
		3	Yes, but that's not clear enough. We need to ask about the extent the job vacancies are available for someone looking for work	
		2	But we are specifically referring to an Emirati?	
		3	Yes	
1	Okay, can we move to ask the question about whether job vacancies are available to Emiratis is looking for work?			

		3	Yes I think we should be looking at job vacancies and whether it is available in the market are not.	
		6	Sometimes the students complain that they can't find jobs.	
		5	With so many Emiratis without jobs, its clear there's something missing. Something is wrong with the system.	
		4	Well that's a question, is there a system?	
1	Okay let's concentrate on job vacancies. What about a question that states: "To what extent are job vacancies made aware to Emiratis that are looking for work?"			Agreed question
		2	I would go with that question.	
		3, 6	Yes I would agree with that.	
1	Can we confirm the question then?	2	Yes I think the questions okay	
1	Well done, okay, moving on. You're talking about the process for employment. What exactly do you mean by that?	4	Well it's a system. In foreign countries they have a system for unemployed people getting into employment through things like Job Centres. But we don't have Job Centres here, so what is the process?	
		5	There are various government entities, one of which has this role, but up to now has not been very successful.	
		4	Why not?	
		5	Because they are not getting Emiratis into work, and there are many that are unemployed.	
		6	There are thousands of unemployed, that means the system is not working.	
1	Okay, so are looking at the process for getting unemployed into employment, is that correct?			
		3	Yes we're looking at the process that Emiratis go through to find a job.	
		4	Do they not look at websites?	
		5	That's a bit random. Don't we need something that is more systematic?	
		2	Yes, I agree that we need something that's available to everyone and everyone knows where to go if they are unemployed.	

1	So we're talking about a process, a government process? We are talking about trying to get the unemployed into employment?			
		3	Yes, if you were unemployed where would you go and how would you find the available jobs?	
		4	I think this is close to what we want to say.	
		6	I agree, can we refine the question.	
1	What about something like: Is the process to go from unemployed to employed available? Or is it a system we are considering?			
		2	Can we say: "Is there a seamless government process to get unemployed into employment?"	
		5	But are we talking only about Emiratis?	
		2	Yes, only Emiratis.	
1	Okay so should we be asking: "To what extent is there a seamless government process to get the Emirati unemployed into employment?"			
		2	Yes, I think this is a good question.	
		4	Yes, I agree with that.	
		5	Yes, I think that's okay.	
		2	Yes,, I agree with the wording of the question.	
1	Okay so we agree the question? "To what extent is there a seamless government process to get the Emirati unemployed into employment?"			Agreed question
1	Okay we don't want to be asking too many questions I think 20 questions are probably enough. I think we have about 19 questions.	3	Yes, I would agree that it's important that there is a system, but should we identify which organisations can help with the system?	
1	I think it's important to find out if other government organisations can help to be part of a system to help Emiratis find employment. What do you think?			
		4	I agree because we cannot continue to have this number of people unemployed and not have a system. Also we have	

			organisations that could possibly contribute to the process for employment. We could therefore make better use of their databases.	
		5	Absolutely agree, this is necessary.	
		6	It's definitely overdue.	
1	So what we are saying is that we need to look at other organisations and how that they can take part?			
		3	Yes, what about the pension authority? They have all the details about who is working and who is not working. Would this information help? They could identify the unemployed and get them to a Centre and help them to get employed.	
		5	Yes, that's true they could.	
		6	How would it work because that would be quite complex?	
		3	I think it would be a merging of databases.	
		2	Yes, that would be possible, but not sure of the extent of that.	
1	Okay what about the General Pension Authority? Can we not look at their database? Also what about the Emirates Authority for Identification and Citizenship? I mean Emirates ID.	6	Emirates ID has a huge amount of information about everybody. It would certainly be able to tell you about expatriates working, where the work, the job they do, and other personal details. It could help with succession planning.	
		5	Yes, we could start to look at the expatriates that are here to find out if we can replace them with Emiratis.	
1	I think we are trying to find the process here?			
		4	Yes I think we should look at a process.	
1	Okay so what we are looking at is: "Can the general pension authority and Emirates ID assist in finding employment?"	3	I think you can refine the question further. What about: "To what extent can the General Pension Fund and Emirates Authority for Identification and Citizenship help with employment process?"	
1	Okay let's look further at that. Can someone refine that further?			
		2	What about "To what extent can the General Pension Fund and Emirates Authority for Identification and Citizenship	

			play a part in assisting Emiratis to find employment?"	
		6	I would agree with that.	
		5	I would go with that.	
		3	I think it's a good question and certainly it's going to provoke thought.	
1	Okay can we confirm that question which reads: "To what extent can the General Pension and Social Security Authority play a part in assisting Emiratis to find employment?"			Agreed question
		2	I'm happy with that.	
1	I think we have a 20 questions now. I mean I think the 20 questions cover everything we are looking for to answer the three research questions and the main research question. Are you all happy with that? Do you agree?			
		3, 4, 5, 6	Yes with all happy with that	
		2	Yes I am happy.	
		2	Thank you very much indeed for your efforts. I'm very happy with the questions that we have come up with. I think we are going to get them validated by a different group so that we can ensure we are asking the right questions and asking clearly.	
		3, 4, 5, 6	Yes that would be a good idea	
1	Thank you. I think we have achieved a great deal today but more so, I think the research will be very valuable for the country.			
		2, 3, 4, 5, 6	Absolutely!	

Appendix C: Research questions per sample group

<p>Research question 1: <i>'Is there a strategy for technical and vocational education in the UAE that can effectively meet the advanced technological skills to meet the Leadership's Visions?'</i></p> <p>Research question 2: <i>'Is there an approach in the UAE context that can effectively deliver technical and vocational education and training?'</i></p> <p>Research question 3: <i>'Is there a system in the UAE that effectively engages the unemployed in successful occupational outcomes?'</i></p>						
Likert questions (strength of attitude)	M - Government officials	D - Directors and Heads of VET	T - Teachers	S - Students	P - Parents	I - Industry
To what extent are the tweets by the country leadership informative in relation to TVET?	√					√
To what extent are the UAE Visions for the country's direction and development informative in relation to TVET?	√	√	√	√	√	√
To what extent are the general level of computing skills in the country sufficient for a knowledge economy?		√	√	√	√	√
To what extent are the digital resources available in the UAE schools/institutes sufficient for a knowledge economy?	√	√	√	√	√	√
To what extent is the general level of mathematics in the country sufficient to develop artificial intelligence solutions?		√	√	√	√	√
To what extent is the general level of computing programming and coding skills is sufficient for developing Artificial Intelligence?		√	√	√	√	√
To what extent are UAE students able to build robots?		√	√	√	√	
To what extent are teachers able to teach the information needed for a knowledge economy?		√	√	√	√	
Teacher's knowledge is supplemented by using computer search engines?		√	√	√		

To what extent are teachers in the UAE equipped to teach skills for development of artificial intelligence?		√	√	√	√	
To what extent teachers have a specific teaching qualification?		√	√			
To what extent should Post-school English language education be paid by parents?	√	√			√	√
To what extent is industry involved in the UAE education system?	√	√		√		√
To what extent do all UAE unemployed, of working age (who are looking for work) need to undergo skill upskilling?	√	√		√	√	√
To what extent does the present UAE vocational education system meet the needs of the national economy?	√	√	√	√	√	√
To what extent are skills that are not needed in the economy being provided for in post school education?	√	√	√	√	√	√
To what extent can knowledge of career pathways help a learner shape their educational pathway?		√	√	√	√	√
To what extent are job vacancies made aware to Emiratis looking for work?	√	√		√		√
To what extent is there a seamless government process to get the Emirati unemployed into employment?	√	√		√	√	
To what extent can the General Pension and Federal Authority for Identity and Citizenship (emirates ID) play a part in assisting Emiratis to find employment?	√	√				
TOTAL	11	20	13	16	14	13

Appendix D: Chi-square test

Results of Chi-Square tests

“df”= degrees of freedom (these vary according to the number of groups asked the question)

Question 2: To what extent are the UAE visions for the country's direction and development informative? Chi-Square = 45.21, df = 6, $p < 0.0001$

Question 3: To what extent are the general level of computing skills in the country sufficient for a knowledge economy? Chi-Square = 48.11, df = 6, $p < 0.0001$

Question 4: To what extent are the digital resources available in the UAE schools/institutes sufficient for a knowledge economy? Chi-Square = 58.69, df = 6, $p < 0.0001$

Question 5: To what extent is the general level of mathematics in the country sufficient to develop artificial intelligence solutions? Chi-Square = 161.67, df = 6, $p < 0.0001$

Question 6: To what extent is the general level of computing programming and coding skills is sufficient for developing artificial intelligence? Chi-Square = 125.49, df = 6, $p < 0.0001$

Question 7: To what extent are UAE students able to build robots? Chi-Square = 126.58, df = 6, $p < 0.0001$

Question 8: To what extent are teachers able to teach the information needed for a knowledge economy? Chi-Square = 96.96, df = 4, $p < 0.0001$

Question 9: Teachers' knowledge is supplemented by using computer search engines. Chi-Square = 8.73, df = 2, $p < 0.05$

Question 10: To what extent are teachers in the UAE equipped to teach skills for development of artificial intelligence? Chi-Square = 18.91, df = 4, $p = 0.001$

Question 12: To what extent should post school English language be paid by parents? Chi-Square = 14.40, df = 2, $p = 0.001$

Question 13: To what extent is industry involved in the UAE education system? Chi-Square = 68.45, df = 2, $p < 0.0001$

Question 14: To what extent do all UAE unemployed, of working age (who are looking for work) need to undergo skill upskilling? Chi-Square = 70.11, df = 4, $p < 0.0001$

Question 15: To what extent does the present UAE technical and vocational education system meet the needs of the national economy? Chi-Square = 150.61, df = 6, $p < 0.0001$

Question 16: To what extent are skills that are not needed in the economy being provided for in post school education? Chi-Square = 181.22, df = 6, $p < 0.0001$

Question 17: To what extent can knowledge of career pathways help a learner shape their educational pathway? Chi-Square = 56.83, df = 6, $p < 0.0001$

Question 18: To what extent are job vacancies made aware to Emiratis looking for work? Chi-Square = 30.39, df = 2, $p < 0.0001$

Question 19: To what extent is there a seamless government process to get the Emirati unemployed into employment? Chi-Square = 26.17, df = 2, $p < 0.0001$

"Development and reform of technical and vocational education in the UAE: the role and vision of the UAE leadership".

Volume 2 of 2

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