Crafting Excellence: Impact of Quality Management System ISO9001:2015 on Subject Supervisors' Organisational Skills in the Ministry of Education in Oman

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Abstract

This study aims to investigate the crafting of excellence through implementing and impacting the ISO 9001:2015 quality management system (QMS) within the Ministry of Education in Oman in the General Directorate of Educational Supervision, focusing on several key objectives. It seeks to explore the awareness of subject supervisors' regarding the benefits of ISO 9001:2015, investigate their perceptions of the QMS training programmes concerning their roles, and examine the impact of ISO 9001:2015 on subject supervisors' organisational skills. Additionally, it aims to identify and provide suggestions, if necessary, to modify current policies and procedures to enhance the QMS in the Ministry of Education in Oman.

Using a mixed-methods approach, the study combines quantitative data from questionnaires distributed to 363 participants with qualitative insights from semi-structured interviews with 11 subject supervisors. It uses SPSS to analyse the quantitative data, and NVivo 12 Pro to code and analyse qualitative data. The findings reveal significant awareness among supervisors about the benefits of ISO 9001:2015, positive evaluations of the training programmes, and a notable impact on their organisational skills, also, significant differences between the levels of demographic variables with the research pillars. Moreover, the study highlights a positive correlation between supervisors' awareness and their organisational skills, identifies challenges in the feedback mechanisms, and offers actionable recommendations for improving feedback processes and fostering a culture of continuous improvement.

The study concludes by emphasising the importance of tailored training programmes, enhanced communication, and strong leadership support. It proposes an EDU-DMAIC framework to refine QMSs in the education fields, aiming to elevate overall educational quality. This synthesis presents key findings, implications, and a roadmap for future research and practical framework implementation.

Acknowledgements

I am profoundly grateful to Almighty Allah for blessing me with the strength, ability, and patience throughout my PhD journey.

"*All praises and thanks be to Allah, who has guided us to this, and never could we have found guidance, were it not that Allah had guided us*" (The Qur'an, 2024,7, 43)

Embarking on the journey of a PhD is much like setting sail across an uncharted ocean. Along the way, there are moments of calm, periods of stormy weather, and the occasional sighting of land that brings hope and renewal. As I reach the end of this incredible journey, I am reminded of a quote by Nelson Mandela: *"It always seems impossible until it's done."*

Completing this thesis has been a testament to the truth of those words. As I reach the shores of completion, I am filled with gratitude for the many individuals who have helped me navigate these waters. And it would not have been possible without the support and encouragement of many wonderful people.

First and foremost, I thank my family, from the youngest to the oldest. Without you and your unwavering support, I would not be where I am today.

Special thanks to my father - may Allah have mercy on him - who once asked me, as we walked together on the campus of a UK University while waiting for my sister to finish her exam, about my desire to pursue a doctorate. His response was motivating and profound: "The learning cycle is beautiful and its value increases when it is combined with the needs of work." His words ignited a spark within me, encouraging me to think with passion, reason, and awareness. This wisdom had a lasting impact on my personal growth and work, guiding me throughout my academic journey. On this journey, my mother was my spiritual guide, with her kindness, prayers, and encouragement lighting the way. Whenever I faced a challenge, she used her wisdom to help me see how each obstacle was simple. Her words still echo in my mind and heart: "*Your faith will carry you beyond the trials, enriching your journey with the flavour of each experience, which is the true essence of success.*"

To my siblings, your unwavering support has been my anchor since I came to study in the United Kingdom and has extended to my daily life and academic trials. That support has

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Abbreviations

No.	Abbreviation	Abbreviation written in full
1	MOE	Ministry Of Education
2	MOHE	Ministry Of Higher Education
3	OAAA	Oman Authority for Academic Accreditation and Quality Assurance of Education
4	QAA	Quality Assurance Agency (United Kingdom)
5	OAAAQA	Oman Authority for Academic Accreditation and Quality Assurance
6	OQF	Oman Qualifications Framework
7	GES	General Education System
8	QMS	Quality Management System
9	ISO	International Organisation for Standardisation
10	PDCA	Plan-Do-Check-Act
11	TQM	Total Quality Management
12	6 σ	Six Sigma
13	SPC	Statistical Process Control
14	DoE	Design of Experiments
15	SOP	Standard operating procedure.
16	VOC	Voice of the Customer
17	SIPOC	Suppliers, Inputs, Processes, Outputs, and Customers.
18	MSA	Measurement System Analysis
19	PCA	Process Capability Analysis
20	FMEA	Failure Mode and Effects Analysis
21	TIMSS	Trends in the International Mathematics and Science Study
22	DPMO	Defects Per Million Opportunities
23	HEPS	Higher Education Providers
24	HEIs	Higher education institutions
25	SIPTT	Specialised Institute for Professional Training of Teachers
26	ASQ	American Society for Quality
27	TOSD	Technical Office for Studies and Educational Development
28	DMAIC	Define, Measure, Analyse, Improve, Control
29	ADRI	Approach, Deployment, Results, Improvement

1 Chapter One: Introduction

The pursuit of excellence serves as a beacon directing educational institutions toward their objectives in the ever-evolving educational landscape of today. This introduction chapter outlines the research journey and aims to comprehend and improve educational excellence by examining the Ministry of Education in Oman's adoption of the ISO 9001:2015 Quality Management System (QMS). It establishes the framework for a thorough examination of this vital subject by providing a brief overview of the research rationale, objectives, questions, methodology, and thesis structure.

1.1 Charting the Course for Educational Excellence

Establishing a QMS in education is essential to ensure that quality education is provided, and that continuous improvement occurs both at the level of the teaching and learning process and at the level of administration (Matorera, 2018). According to Raissi (2019) and Kumar, Singhal and Kansal (2022) QMSs help educational organisations achieve their goals and ensure that their services meet the expectations of students, employees, parents, and other stakeholders. In addition, it promotes the continuous assessment of educational programmes, identifying areas for improvement, and fostering collaboration among stakeholders to ensure mutual benefits for all involved parties (Cruz, Gálvez and Santaolalla, 2016). Moreover, Phillips (2015) and Aniskina and Terekhova (2019) demonstrate that a well-established QMS streamlines administrative processes, empowers employees, and improves organisational performance across various dimensions. Girmanová et al. (2022) emphasise the importance of a QMS at the administrative level in educational organisations. By instituting robust QMSs suited to their specific national or regional circumstances, nations globally can guarantee and elevate the standard of education provided, simultaneously encouraging innovation, cooperation, and trust among all involved parties. Priestley et al. (2012) mentioned the UK's endeavours to align its quality system with internationally agreed practice aim to uphold international trust and foster partnerships. Significant efforts have been undertaken in Oman to enhance the quality of education across various sectors, including both schools and higher education. Specifically, Al-Harthi et al. (2022) indicate that these initiatives encompass comprehensive reforms in curriculum development, teacher training programmes, and the implementation of rigorous accreditation standards in both

sectors. Consequently, these reforms aim to ensure that educational institutions in Oman align with international standards, thereby improving overall educational outcomes. Moreover, is the drive to equip students with the necessary skills and knowledge to thrive in a globalised world (Al'Abri, Ambusaidi and Alhadi, 2022).

In 2012, a report by Oman's Ministry of Education and the World Bank underscored the necessity of establishing a national qualifications framework in Oman. Consequently, to support the development of the Oman Qualifications Framework (OQF), the Ministry of Education engaged the Scottish Qualifications Authority as an external partner in 2014. Thus, as Royal Decree 54/2010 stipulated, the Oman Authority for Academic Accreditation and Quality Assurance of Education (OAAA) was tasked with developing and maintaining the OQF (Oman Legal Citation Standard, 2022 and Al-Saadi, 2023). Moreover, in March 2014, the education council mandated that the OAAA create the OQF, encompassing the academic, vocational, professional, and school education sectors (Oman Authority for Academic Accreditation and Quality Assurance of Education, 2024). Furthermore, the significance of a national qualifications framework for Oman was emphasised in the planning stages of the Education Strategy 2040. Alhabsi and Alfawair (2023) elucidate that these strategies included providing appropriate employee training, updating digital and non-digital resources, and enhancing technology infrastructure, among other initiatives.

This 2040 strategy includes crafting policies and developing standards and procedures for quality assurance (section 2.2.2). It also entails establishing a national qualifications framework, an institutional classification framework, and a glossary of terms to standardise language (section 2.2.2). Furthermore, there is a focus on conducting international benchmarking to inform the development of effective national quality frameworks and processes. Moreover, there is a growing emphasis on improving quality through activities such as training and networking, alongside traditional quality assurance measures.

1.2   Research Rationale:

During my career at the Ministry of Education (MOE), in Oman, firstly as a biology teacher, then as a biology senior teacher, and eventually becoming a biology subject supervisor, I encountered a myriad of experiences in the educational field. These experiences were gained through personal contact with the teachers, school managers, subject supervisors', students, and parents. I have also participated in numerous training

programmes organised by the MOE in various fields, about updates in curricula, evaluation systems, teaching strategies, technological advancements, and enhanced programmes implemented by the MOE, related to international recognitions, such as the Trends in International Mathematics and Science Study (TIMSS) or QMS. My experience in my professional role, combined with the training I have undertaken, has raised several questions over time; for instance, are the most appropriate QMS being applied in the various educational fields (i.e. role and responsibilities of subject supervisors')? Indeed, according to subject supervisors, how effective is the implementation of any QMS system within and across the educational governorates?

These questions became particularly pertinent as I was transitioning from the supervisory department to the quality management department. In preparation for this, I participated in training programmes focused on TQM to enhance my knowledge and increase my qualifications. The completion of the "Training Diploma in Total Quality Management, Appendix (A)" provided me with a comprehensive understanding of quality management terminology and tools. This programme also introduced the concept of Six Sigma, igniting my interest in implementing its Define, Measure, Analyse, Improve, Control (DMAIC) tool within an educational environment. During this timeframe, rather than moving to the quality management department, I was allowed to pursue further studies abroad related to QMS, arriving in the UK in the autumn of 2019 to study for a PhD.

As an educational system in the Sultanate, the implementation of professional concepts aligned with the quality of work has been an essential correlation since 1970, with the rise of the Renaissance in the Sultanate and the directive leadership of the late leader, His Majesty Sultan Qaboos bin Said, may God rest his soul in peace. His vision interacts with all service sectors within Oman, one being the vision of the Ministry of Education in the Sultanate of Oman i.e.,

> *"Equip human resources with the values, knowledge and skills to enable them to be productive in the world of the knowledge economy, keep pace with the continual changes in the world, maintain their national identity and intrinsic values, and contribute to the advancement of human civilisation."* (The Educational Council, 2018, p.19)

This was emphasised by Vision 2040 (Oman Vision 2040 Implementation Follow-up Unit, 2023), which significantly stimulated the development of work because of its public interest in serving the nation in general, especially in education and its quality (sections

2.2 and 2.3). The strategy assured the necessity of improving the quality management framework of the whole education system to a guaranteed level of execution that meets international criteria (The Educational Council, 2018)

My job responsibilities include considering strategies to support this vision's implementation (section 2.2). From this emerged my interest in QMSs, and my research objectives and questions, as detailed below.

1.3   Research objectives:

There are four objectives in the current study:

1. Understand subject supervisors' awareness of the benefits of implementing ISO 9001:2015.
2. Determine subject supervisors' perceptions regarding the quality of the training programme on the QMS regarding their roles and responsibilities.
3. Evaluate the impact of implementing ISO 9001:2015 quality management processes on the organisational skills of subject supervisors.
4. Identify and propose modifications or improvements to the existing policies and procedures for implementing the QMS in the Ministry of Education.

1.4   Research questions:

The study is directed by four main questions, which are:

1. How aware are subject supervisors of the benefits of implementing the ISO 9001:2015 QMS?
2. What are subject supervisors' perceptions about the QMS training programme, in relation to their roles and responsibilities?
3. Does the implementation of ISO 9001:2015 QMS impact the organisational skills of subject supervisors?
4. In what ways can the existing policies and procedures for implementing the QMS in the Ministry of Education be modified/improved?

1.5   Research methods:

The current study employs a mixed-method approach and an explanatory sequential design, with the applied questionnaire gathering quantitative data, which are analysed first, followed by semi-structured interviews, as a qualitative data collection, for which the data is also analysed. The primary purpose of this design is that the qualitative data will explain and contextualise the quantitative findings.

1.6   Structure/ outline of the thesis:

This study comprises eight chapters, as illustrated in Figure 1 below.

Outline of the thesis

- Chapter one: interoducation
- Chapter Two: The Sultanate of Oman Context
- Chapter Three: Litreture review
- Chapter Four: Methodology
- Chapter Five: Quantitative Findings
- Chapter Six: Qualitative Findings
- Chapter Seven: Analysis and Discussion
- Chapter Eight: Conclusion
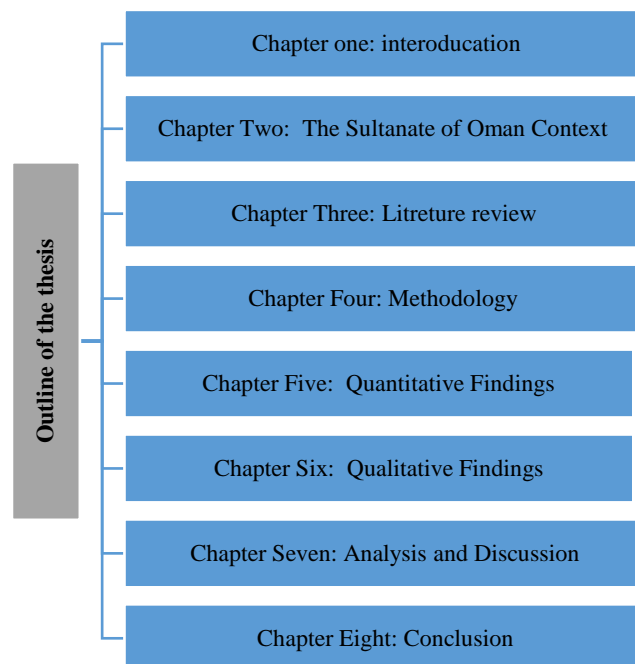
Figure 1 Outline of the thesis

Following this current chapter, **Chapter Two** provides an overview of the Sultanate of Oman's context. It is divided into three sections: Education in Oman, quality of education and its implementation in the Ministry of Education, and previous Omani studies on quality management.

Chapter Three delves first into the evolving background of Quality Management Systems (QMS). Subsequently, the conceptual framework is outlined. Next, the discussion focuses on the pioneers of QMS and their development. Following this, the concepts of Six Sigma and ISO 9001:2015 are explained. Lastly, the research pillars are

clarified, emphasising the impact of QMS on employee awareness, the effectiveness of QMS training, and the development of organisational skills.

Chapter Four outlines the methodology and the approach employed to address the research questions. Various research designs and epistemological stances are discussed and evaluated, offering comprehensive information on the study design adopted, including philosophical position, sampling methods, and data collection and analysis procedures.

Chapter Five presents the quantitative findings, displaying the results of the quantitative analysis conducted using SPSS software. Significant discoveries pertinent to the research questions are highlighted and summarised.

Chapter Six details the qualitative findings of the study, utilising thematic analysis and NVivo 12 Pro software, revealing four distinct themes from the coding. These themes encapsulate the core areas of focus identified through the analysis, helping to fulfil the study's objectives comprehensively.

Chapter Seven provides the analysis and discussion, thoroughly explaining the current study. The results are examined about the specific research questions and pertinent literature, providing a comprehensive interpretation of the findings.

Chapter Eight, the concluding chapter, then includes strategies for enhancing QMS effectiveness, training and development programmes for organisational skills, and policy implications. It contains a summary of the findings, contributions to the field of knowledge, and limitations of the study, as well as suggestions for future research.

1.7   Summary

This chapter introduces the study. It highlights the rationale for the research and delves into the topic to be explored. The study focuses explicitly on subject supervisors as the sample group, providing a detailed examination of their roles and experiences. It also outlines the research objectives and questions, establishing a clear framework for the investigation. Additionally, the research method and the structure of the thesis are discussed comprehensively in this chapter, setting the stage for the subsequent analysis.

The next chapter provides the contextual background to the study, offering a detailed description of the educational system in Oman. This includes an exploration of its historical development, current practices, and challenges. By situating the study within

this context, the chapter aims to provide a deeper understanding of the environment in which the research is conducted.

2 Chapter Two: Background of the study

This chapter offers a comprehensive examination of the educational landscape in Oman, tracing its historical development and highlighting key initiatives aimed at enhancing educational quality (Figure 2). It is structured into three main parts. Part One discusses the evolution of education in Oman, covering the periods before and after 1970 within the MOE. Therefore, the decision to organise the discussion around the periods before and after 1970 underscores the significant educational reforms introduced by the Omani government following Sultan Qaboos' rise to power in that year (Riphenburg, 1998). Notably, 1970 marks a pivotal moment in Oman's educational history, as it signifies the beginning of formalised education under the MOE (Nasser, 2019). Consequently, by structuring the analysis chronologically, the discussion can more effectively highlight the contrast between the traditional, limited educational systems before 1970 and the rapid developments and modernisation efforts that ensued (Peterson, 2004; Issan and Gomaa, 2010).

It also focuses on the role of the Ministry of Higher Education (MOHE), examining strategic enhancements in the quality of Oman's educational landscape. Part Two investigates these enhancements by exploring the role and functions of the Oman Academic Accreditation Authority (OAAA) and the transformative influence of Oman Vision 2040 on educational quality. It also explores Oman's National Strategy for Education 2040.
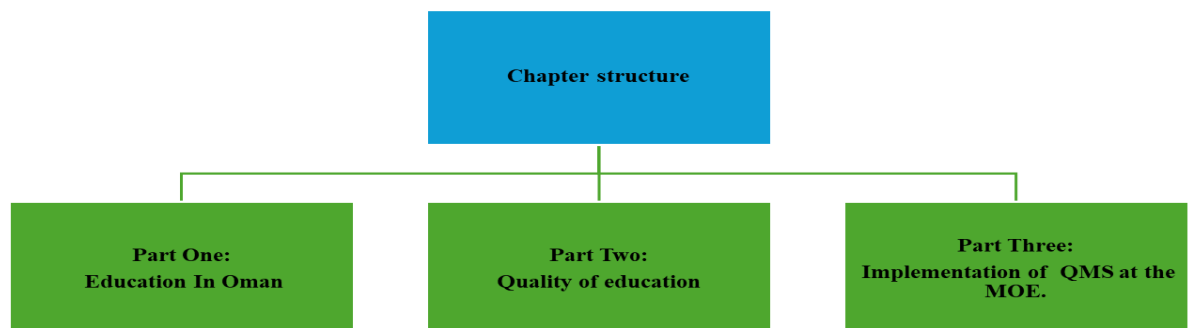
Figure 2 Chapter Two structure

Part Three then delves into how quality is implemented in the MOE. It outlines the MOE's structural hierarchy, the application of quality management, the role of subject supervisors' in ensuring educational quality and consistency, and the training programmes in place. Additionally, it examines the implementation of the quality management policy within the framework of Oman Vision 2040. This chapter sets the stage for understanding the reforms and quality management initiatives crucial for achieving educational excellence in Oman.

2.1   Part One: Education in Oman:

2.1.1   Pre-1970:

Figure 3 the evolution of Education in Oman Pre-1970, depicts the evolution of this period, centring on traditional educational methods, restricted curriculum, transition to organised education, challenges and limitations, and foundation for future reforms, all of which are subsequently discussed.
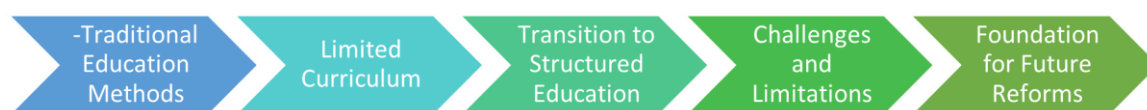
Figure 3 the evolution of Education in Oman Pre-1970

Before 1970, the quality of education in Oman was primarily influenced by traditional and community-driven practices, reflecting a period before significant educational reforms and modernisation. This era was characterised by the informal and decentralised nature of learning, with education predominantly conducted within mosque circles and scholars' homes for both genders. Education during this time focused on reading, reciting, and memorising the Quran, learning Islamic teachings, the Arabic language, and basic arithmetic, as noted by Al Nabhani (2007) and Al Ghanboosi (2017). In the early 20th century, education in Oman was marked by its traditional methods. The establishment of the AbuDhaynah School in 1914 exemplified this blend of traditional Qur'anic education practices, with nascent attempts at modernisation. Classrooms, at this time, resembled traditional Qur'anic schools, where all pupils were taught together regardless of their learning levels (Alhinai, 2003). This teaching method ensured that education was accessible to all, though it did not cater to the varying academic needs of different

students. The mid-20th century saw the beginnings of more structured educational efforts. A significant milestone was the opening of the Alsaidiyh School in Muscat in 1940. This school transitioned towards a more formal public education system with improved curriculum standards, better-trained teachers, and enhanced educational facilities. However, the reach of such educational advancements was limited. Educational opportunities were still scarce by this time, with only three schools, including the Alsaidiyh School, catering exclusively to 909 male students (Al Ghanboosi, 2017; Al Nabhani, 2007). This limited availability of education highlighted the widespread gaps in knowledge and skills across the population.

Despite these early efforts at modernisation, the quality of education remained largely defined by traditional methods. Educational institutions like Al Raheel schools in Suhar, Qasry Village School in Buhla, and Al Qalaah School in Nizwa focused on a curriculum centred around Islamic studies, Arabic, and arithmetic. The emphasis was on memorisation and recitation of the Quran, reinforcing religious and cultural values (Al Ghanboosi, 2017 and Al Nabhani, 2007). Although there were steps towards including broader academic subjects such as Mathematics, these efforts were limited in scope and did not provide a comprehensive education, as understood in modern terms (Alhinai, 2003). This reliance on mosque circles and Qur'anic schools for education underscored the communal and religious nature of learning in Oman before the introduction of more formal educational structures. The educational approach of the time demonstrated a strong commitment to cultural and spiritual education, focusing on the Quran and the Arabic language. This method fostered a solid foundation in religious and linguistic knowledge among students, ensuring they were well-versed in their cultural and religious heritage (Al hashimi, 2022). However, the educational landscape was characterised by a lack of resources, formal teacher training, and structured curricula. These limitations significantly affected the overall quality of education. The pre-1970 period in Omani education history underscores the community-driven nature of learning, highlighting how people relied on themselves to be educated. This self-reliance, although admirable, also pointed to the inherent limitations of the system. Individuals learned to read and handle basic mathematics according to their needs, but there was a significant gap in the broader academic subjects that are part of modern educational systems (Al Ghanboosi, 2017 and Al Nabhani, 2007).

A significant step towards systematic education was the opening of Alsaidiyh School in Muscat, marking the beginning of a new era in education. This transition signified the end of traditional mosque-based educational activities and the commencement of a more structured approach. The new system was characterised by improved curriculum standards, better-trained teachers, and enhanced educational facilities. However, despite these advancements, educational opportunities remained limited, and the quality of education varied significantly across different regions and communities (Al Ghanboosi, 2017).

The quality of education in Oman before 1970 was deeply rooted in traditional and religious practices, with a strong emphasis on memorisation and recitation of the Quran. Educational efforts were community-driven and heavily reliant on mosque-based learning. Thus, while there were early attempts at modernisation, such as the establishment of the AbuDhaynah and Alsaidiyh Schools, the overall educational landscape remained informal and lacked comprehensive structure. Indeed, this period highlighted the community's reliance on itself for education, fostering basic literacy and numeracy skills according to the needs of the time, before the significant educational reforms and modernisation efforts that began in the 1970s (Alhinai, 2003; Al Nabhani, 2007; Al Ghanboosi, 2017; Alhashemi, 2022).

The next section discusses how Omani education broadened educational horizons by developing two Ministries, the Ministry of Education (grades 1-12) and the Ministry of Higher Education (MOHE).

2.1.2 Post-1970 "Emanation of Ministry of Education"

Figure 4 Education in Oman Post-1970, outlines Oman's educational journey through five key stages: Pre-1970 Educational Landscape, Post-1970 Educational Reforms, Evolution of Oman's Education System, Basic Education Reform, and Quality of Education and Future Outlook.

Figure 4 Education in Oman Post-1970

In 1970, the educational infrastructure in Oman was extremely limited, consisting of only three schools (as mentioned in 2.2.1) and a teaching staff of 30 individuals. These schools collectively served a student body of 900, all of whom were boys. This stark gender disparity in education was reflected in the literacy rates of the time. Merely 56.1% of the male population were literate, while the literacy rate among women was even lower, at just 11.7%. These statistics serve to highlight the considerable educational challenges and gender inequalities that existed in Oman during this period (Shabibi and Silvennoinen, 2018).

After the accession of Sultan Qaboos bin Said in 1970, education became a top priority, and the government started investing heavily in the education system. The government established various schools, vocational training centres, and colleges. The infrastructure for the education system was built, and teachers from around the world were recruited to Oman. The curriculum included Islamic studies, Arabic language, mathematics, science, social studies, and English. Over the last few decades, the education system in Oman has seen significant improvements, with increases in literacy rates, school enrolments, and the number of graduates (Al Nabhani, 2007). Emphasis on the quality in the organisational structure occurred, with Al-Alwai (2015) asserting that the educational landscape in Oman had undergone considerable expansion, evolving from a modest beginning of three schools and 900 students in the early 1970s. Currently, according to the National Centre for Statistics and Information (2023), by the end of the 2022/2023 academic year, the Sultanate of Oman had 2,284 schools. These institutions served 961,774 students across 38,213 classrooms, with 75,479 teachers (National Centre for Statistics and Information, 2023).

 Over the forty-five-year history of education in Oman, there were three principal stages of transformation concerning policy and practice. The initial stage, from 1970 to 1980, prioritised the quantitative expansion of education, striving to extend access despite resource constraints (Al-Haadi, Al-Kiyumi and Al-Abri, 2023). Subsequently, the 1980s marked the onset of a phase characterised by introducing curriculum enhancements and teaching methodologies. The third stage commenced in 1995, propelled by the government's endorsement of a forward-looking vision, encapsulated in Oman's 2040 vision, aimed at revitalising the nation's economy (Bhandari and Mohite, 2024).

Responsibility for the development of education in Oman lies primarily with the central Ministry of Education, which formulates policies in alignment with governmental directives and plans (Al-Haadi, Al-Kiyumi and Al-Abri, 2023). Moreover, local authorities in the eleven governorates constitute the second tier of educational management, while schools, as the third level, serve as the implementers of policies and directives, as dictated by the Ministry through the local education authorities.

According to Al Weshahi (2023) and Lamki and Hashemi (2024), the educational system in Oman is structured into three tiers: the first cycle of basic education (grades 1 to 4), the second cycle of basic education (grades 5 to 10), and secondary education (grades 11 and 12). For male and female students, the initial four-year cycle of basic education occurs in designated school buildings, which serve as co-educational institutions, providing foundational education for all students (Al-Sinani and Benn, 2023). Notably, despite the co-educational setting, the staff, including all principals, is exclusively female (Lamki and Hashemi, 2024).

The second cycle of basic education spans six years (grades 5 to 10) and is segregated by gender. Male and female students attend separate facilities, with distinct staff and principals for each group (Al Weshahi, 2023). Finally, secondary education, comprising grades eleven and twelve, also adheres to gender segregation, in line with national cultural norms and practices (Al-Sinani and Benn, 2023).

This delineation of Oman's educational framework and its organisational structure sets the stage for a deeper exploration of educational reform initiatives and their implications for preparing and advancing school leadership (Al Weshahi, 2023). Jawarneh (2013) explained that implementing the basic Education Reform in 1998 represents a significant milestone in the country's efforts to enhance the quality of education. This reform initiative likely addressed some aspects by modernising the curriculum, improving teaching standards, promoting equity and inclusion, and fostering a culture of continuous improvement (Al Weshahi, 2023). Indeed, by focusing on these key areas, Oman could work towards providing quality education that prepares students for success in the 21st century (Jawarne, 2013).

The quality of education in the context presented is multi-faceted and indicative of Oman's commitment to enhancing its educational system. Al-Mahrooqi and Denman (2020) emphasise the government's dedication to equitable access to education, which is

underscored by its provision of publicly funded schooling for all citizens. Alhabsi and Alfawair (2023) highlight that commitment is evident in the substantial expansion of educational infrastructure, marked by a remarkable increase in public and private schools to accommodate a growing student population. Furthermore, gender equality in education is prioritised, with efforts made to ensure that both male and female students have access to schooling, as highlighted by the significant representation of female students, comprising 46% of the total student population (Al-Mahrooqi and Denman, 2020). Moreover, aligning educational goals with Oman's long-term economic vision, as outlined in section 2.2, underscores the strategic importance of education in national development and global competitiveness. Through these concerted efforts, Oman aims to bolster the quality of its education system, ensuring that it adequately prepares its citizens for the challenges of the 21st century (Al-Mahrooqi and Denman, 2020). Wyatt and Atkins (2009) mentioned educational advancements in Oman have been swift, marked by substantial enhancements in curriculum, teacher training, and educational infrastructure

In 1995, the MOE initiated an ambitious plan to introduce Basic Education across the Sultanate of Oman, aiming to elevate the quality of education accessible to all school-aged children. Al-Haadi, Al-Kiyumi and Al-Abri (2023) describe this initiative, which prioritised the cultivation of essential life skills, including effective communication, self-directed learning, critical thinking, problem-solving abilities, and the fostering of positive values. Also, the implementation of basic education schools under this initiative involved the incorporation of modern amenities such as computer laboratories and learning resource centres (Arop, 2023). These facilities were integrated to enrich the learning environment and equip students with the necessary tools to excel in a rapidly evolving world. The concerted efforts underscore a steadfast commitment to enhancing the quality of education in Oman, ensuring that students receive a comprehensive education that prepares them effectively for future challenges (Wyatt and Atkins, 2009).

2.1.3   *Ministry of Higher Education (MOHE):*

The evolution of higher education in Oman has unfolded through distinct phases, each contributing to the evolution of the country's educational landscape (Baporikar and Shah, 2012). Before 1970, Oman lacked formal structures for higher education, reflecting a time when educational opportunities beyond the basic levels were limited. This period marked a foundational era, during which the groundwork for future advancements in higher

education was yet to be laid. However, with the advent of the 1970s and 1980s, Oman witnessed a significant transformation in its educational sector. This period saw the establishment of public colleges, representing a crucial milestone in the nation's educational journey (Baporikar and Shah, 2012). These colleges, with a strong emphasis on vocational training, particularly in fields such as teaching and health, played a pivotal role in expanding access to higher education and nurturing skilled professionals in key sectors of the economy.

Concurrently, the founding of Sultan Qaboos University during this era further bolstered Oman's higher education landscape (Baporikar and Shah, 2012). As the country's premier institution of higher learning, Sultan Qaboos University became a beacon of academic excellence and innovation, setting new standards for education and research in Oman. Its establishment marked a turning point in Oman's educational narrative, symbolising a commitment to fostering intellectual growth and knowledge creation within the country. Moving into the 1990s, and beyond, Oman experienced another significant shift in its higher education paradigm. With increasing globalisation and the growing demand for skilled professionals, a notable trend emerged towards importing foreign programmes (Alshoaibi, 2015). Facilitated by private Higher Education Providers (HEPs), such initiatives aimed to meet the evolving needs of Oman's workforce and accelerate the pace of educational development in the country. However, amidst the rapid expansion of educational offerings, quality assurance and standardisation challenges began to emerge. During this critical juncture, the need for a comprehensive higher education system became apparent. Recognising the importance of quality assurance and enhancement mechanisms, the Ministry of Education spearheaded efforts to consolidate the gains made in Oman's higher education sector (Alshoaibi, 2015). Through a gradual and deliberate approach, emphasis was placed on implementing robust quality assurance processes to uphold academic standards and ensure the credibility of Oman's higher education institutions.

The gradual evolution of Oman's higher education landscape has been underpinned by a concerted effort to align educational initiatives with the nation's economic transformation objectives (Baporikar and Shah, 2012). From 1970 to 2014, Oman's higher education system was closely intertwined with the nation's economic diversification efforts, driven by revenues from the oil industry. Recognising the pivotal role of higher education in supporting economic growth, the government prioritised initiatives to enhance education

quality and develop a skilled workforce capable of driving innovation and competitiveness in key sectors (Alshoaibi, 2015). The Ministry of Higher Education has played a central role in orchestrating the establishment and expansion of universities, colleges, and higher education institutions across Oman (Baporikar and Shah, 2012). By increasing access to higher education and aligning academic programmes with the evolving needs of the economy, the Ministry has sought to address the growing demand for skilled human capital. Efforts have been made to diversify educational offerings and promote interdisciplinary studies to cater to the needs of Oman's rapidly evolving job market.

One of the key strategies employed by the Ministry to enhance the quality of higher education in Oman has been the promotion of research and development activities within universities (Alshoaibi, 2015). Collaborations with foreign universities and academic institutions have also been pursued to facilitate knowledge transfer and exchange of best practices, enriching the educational experience for students and faculty alike. Moreover, the Ministry has implemented comprehensive quality assurance systems and accreditation processes to ensure that higher education institutions maintain high academic standards aligned with national and international benchmarks (Baporikar and Shah, 2012). Sultan Qaboos University, along with other leading institutions, has established dedicated measures designed to uphold high academic standards and ensure that educational offerings meet both national and international benchmarks. Internal quality assurance mechanisms are implemented at the college and departmental levels, supported by units such as the Quality Assurance and Academic Accreditation Unit (QAAU) (Alshoaibi, 2015).

To sum up, the Ministry of Higher Education in Oman has significantly enhanced and maintained the quality of education through several strategic initiatives (Table 1). This includes the establishment and expansion of institutions, such as public colleges and Sultan Qaboos University 1986, with a focus on vocational training and academic excellence.

Strategic Initiative	Description
Establishment and Expansion of Institutions	Founding public colleges and Sultan Qaboos University, with a focus on vocational training and academic excellence.
Adapting to Global Trends	Importing foreign programmes through private Higher Education Providers to meet the evolving workforce demands.
Quality Assurance and Standardisation	Implementing robust quality assurance processes and accreditation systems to uphold academic standards.
Promotion of Research and Development	Fostering a culture of innovation within universities and encouraging research activities.
International Collaborations	Partnering with foreign universities to facilitate knowledge transfer and exchange best practices.
Alignment with Economic Needs	Tailoring academic programmes to support economic diversification and meet job market demands.
Internal Quality Mechanisms	Establishing dedicated quality assurance units within institutions to maintain high academic standards.

Table 1 Strategic Initiatives in MOEH

Moreover, Alshanfari (2016) explained that the Ministry of Higher Education has adapted to global trends by importing foreign programmes through private HEPs to meet the evolving workforce demands. Robust QMSs and accreditation systems have been implemented to uphold academic standards (Alshanfari, 2016; Al Abry, 2018). Additionally, the Ministry of Higher Education, as Al Abry (2018) mentioned, promotes research and development within universities, fostering a culture of innovation. International collaborations with foreign universities facilitate knowledge transfer and the exchange of best practices. Collectively, Brandenburg (2013), Alshanfari (2016) and Al Abry (2018) emphasise that the academic programmes are tailored to support economic diversification and meet job market demands, with dedicated quality assurance units within institutions maintaining high academic standards. These efforts collectively ensure that Oman's higher education system remains competitive and capable of producing skilled graduates ready to meet global economic challenges, as well as to keep following the national and international quality of education standards.

The impact of globalisation on education systems has resulted in the widespread implementation of market-driven reforms, frequently advocated under the premises of

efficiency, accountability, and quality enhancement. Scholars such as Ball (2012) and Ozga (2000) have critically analysed how neoliberal ideologies have reconfigured educational governance, with policy increasingly reflecting commercial logics rather than pedagogical principles. Incorporating TQM, QMS, and ISO standards within the educational sector exemplifies this transformation, wherein institutions are compelled to operate according to competitive metrics and international benchmarks.

Although Oman's educational reforms have incorporated certain neoliberal practices, they remain deeply rooted in Islamic principles and national cultural priorities. They aim to balance economic modernisation with the preservation of social, moral, and religious values (Oman Vision 2040 Implementation Follow-up Unit, 2023)

2.2 Part Two: Quality of Education, "Strategic Enhancements in the Quality of Oman's Educational Landscape "

In the Sultanate of Oman, a transformative journey towards educational excellence is underway, led by key entities committed to enhancing the quality of education. At the forefront of this endeavour stands the Oman Authority for Academic Accreditation and Quality Assurance of Education (OAAAQA), the Oman Vision 2040, and the National Strategy for Education 2040 (Figure 5).
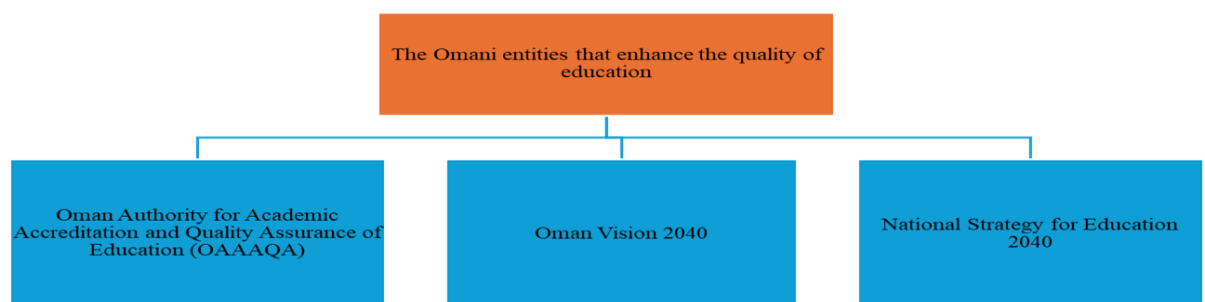
Figure 5 The Omani entities and strategies to enhance the quality of education

Each entity plays a pivotal role in shaping the educational landscape, offering unique contributions that propel Oman towards a future of academic excellence. The OAAAQA

serves as the vanguard of quality assurance, ensuring that educational institutions meet rigorous standards of excellence through accreditation processes and programme assessments. The Oman Vision 2040 charts a visionary path towards sustainable development, with education emerging as a cornerstone for economic diversification and societal progress. By aligning educational programmes with economic imperatives and fostering innovation, Oman Vision 2040 catalyses the transformation of the education sector. Complementing these efforts, the National Strategy for Education provides a comprehensive framework for reform, focusing on equitable access, 21st-century skills development, and continuous improvement in educational institutions. Collectively, these entities unite in a shared mission to enhance the quality standard of education in Oman, laying the groundwork for a future where all individuals have the chance to flourish and make significant contributions to society, as will be further detailed in section 2.2.1 (Role and Functions of Oman Academic Accreditation Authority, 2.2.1), (Striving for Excellence: The Transformative Influence of Oman Vision 2040 on Educational Quality, section 2.2.2) and (Shaping the Future: Oman's National Strategy for Education 2040, section 2.3.3).

2.2.1 *Role and Functions of Oman Academic Accreditation Authority:*

The Oman Academic Accreditation Authority (OAAA) was established in 2010 (Abdel-Gadir, 2020). Additionally, it is an autonomous entity overseeing quality assurance and accreditation within higher education institutions (HEIs) in Oman Al-Amri et al., 2021; Al-Saadi, 2023). Its principal responsibilities encompass several key areas: the development and implementations Liou (2016) highlighted, these leadership tasks act as bridges connecting management, curriculum, and teaching, facilitating a cohesive and effective educational environment that supports adherence to quality standards; accrediting higher education institutions and their programmes based on stringent quality criteria; promoting a culture of quality and continuous improvement within HEIs by encouraging best practices and ongoing enhancements; and providing essential training and capacity building in the field of quality assurance to equip educational professionals with the necessary skills and knowledge (Badrawi and Rashwan, 2024).
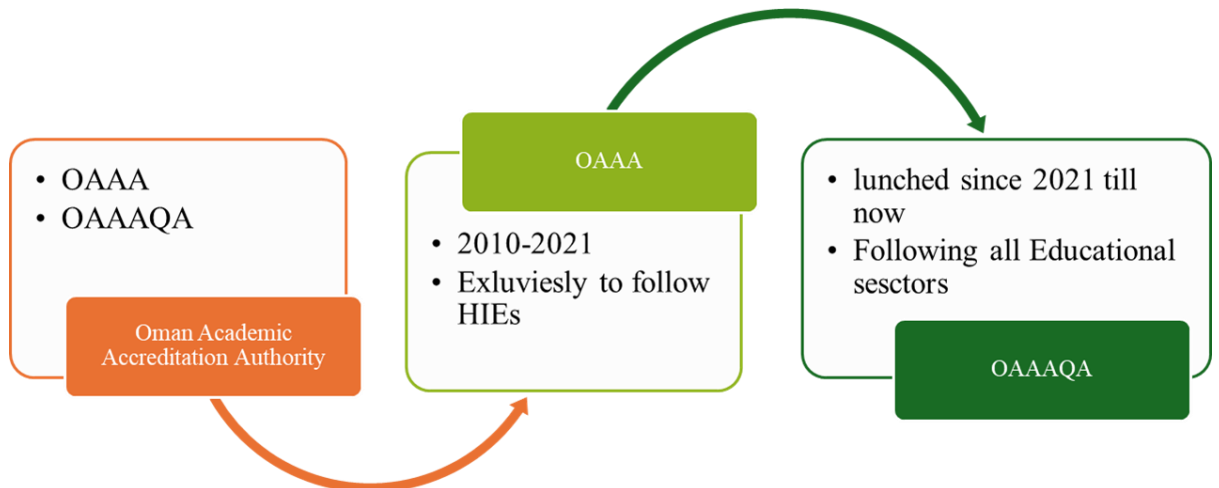
Figure 6 From OAAA to OAAAQA

The OAAAQA came into existence in 2021 through Royal Decree 09/2021, supplanting its predecessor, the OAAA (Figure 6(Oman Legal Citation Standard, 2022). This new entity was established with an expanded mandate to enhance its oversight capabilities across the entire educational spectrum in Oman, encompassing both school and higher education. One of the primary responsibilities of the OAAAQA is the development and implementation of the Oman National Qualifications Framework (ONQF), covering all levels of education from basic schooling to higher education, providing a unified standard for qualifications across the nation (Hussainy, Rasheed and Al-Haziazi, 2024c). The OAAAQA plays a pivotal role in establishing a cohesive system for quality assurance and accreditation across all educational institutions in Oman (Jaboob, Hadabi and Ani, 2023). With its expanded remit, the OAAAQA now oversees quality assurance practices in both school and higher education, allowing for a more integrated approach to quality assurance and ensuring that educational standards are upheld from the earliest stages of education to higher learning.

2.2.2 Striving for Excellence: The Transformative Influence of Oman Vision 2040 on Educational Quality

Oman Vision 2040 places considerable emphasis on education as a pivotal element for sustainable development, underscoring its paramount importance in enhancing the quality of education across the nation (Oman Vision 2040 Implementation Follow-up Unit, 2023). As illustrated in Figure 7, the key components of Oman Vision 2040 for achieving educational quality excellence are listed.

Figure 7 The key components of Oman Vision 2040

By aligning educational programmes with the evolving requirements of the job market and economic strategies, educational institutions can tailor their curricula to ensure graduates possess the skills and knowledge demanded by employers (Shami and Kippels, 2022). This alignment not only enhances graduates' employability, but also contributes to reducing skills mismatches and unemployment rates (Mishrif, 2024, pp. 3-10). Furthermore, the focus on developing human resources with the necessary skills and competencies for a diversified economy entails investments in teacher training, curriculum development, and educational infrastructure (Shami and Kippels, 2022; Mishrif, 2024, pp. 3-10). These investments, as Redman (2020b) explained, lead to the adoption of innovative teaching methods, the integration of emerging technologies in classrooms, and the provision of hands-on learning experiences, all of which contribute to a more engaging and effective learning environment. Moreover, promoting research and innovation within higher education institutions encourages collaboration between academia, industry, and government, fostering a culture of creativity and problem-solving (Goli and Oqbah, 2023). This collaboration leads to the development of cutting-edge technologies, the commercialisation of research findings, and the creation of new industries, ultimately driving economic growth and competitiveness (Oman Vision 2040 Implementation Follow-up Unit, 2023).

In conclusion, Oman Vision 2040 represents a visionary roadmap for advancing educational quality in Oman. By aligning educational programmes with economic imperatives and promoting research and innovation, Oman aspires to cultivate a dynamic learning ecosystem conducive to academic excellence and sustainable development. The following section delves into integrating Oman's vision within the education sector, facilitated by the national strategic framework. This strategic framework aims to deeply

embed the vision within the educational system, encompassing both the Ministry of Education and the Ministry of Higher Education. Each ministry adopts this framework as a comprehensive guideline, aligning it with their respective objectives.

2.2.3 Shaping the Future: Oman's National Strategy for Education 2040:

The National Strategy for Education 2040 represents a comprehensive framework designed to address the multifaceted challenges and opportunities in Oman's educational landscape (The Educational Council, 2018). The following elaborates on the key components of Oman's National Strategy for Education 2040 (Figure 8).
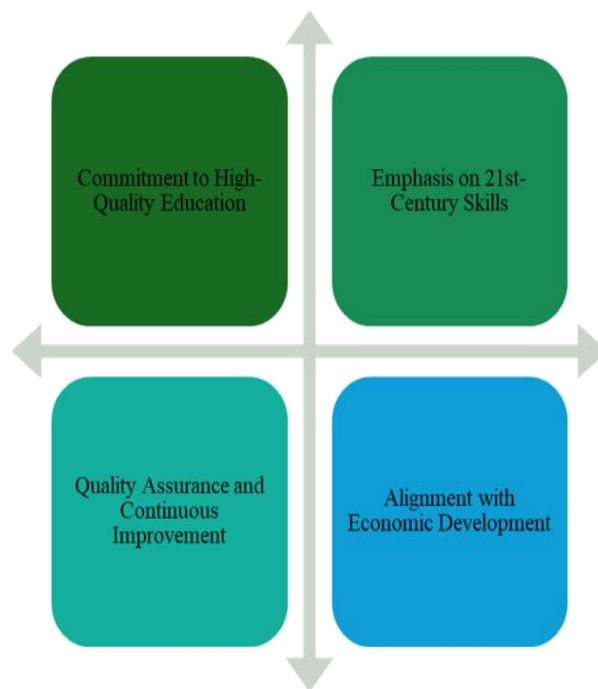
Figure 8 the key components of Oman's National Strategy for Education 2040

The policy ensures that every student, regardless of background, gender, or location, has access to high-quality education (Al Ghanboosi, 2017). Moreover, Al-Busaidi and Tuzlukova (2021) emphasised that this commitment extends from childhood education to tertiary education, reflecting a deep-seated conviction in education's ability to bring about meaningful change to unlock individual potential and drive national development. In recognising the rapidly evolving demands of the twenty-first century, Maata et al. (2018) observed that the strategy prioritised the development of students' skills and competencies

essential for thriving in the rapidly evolving landscape of the modern world. This entails cultivating students' analytical reasoning, the ability to address complex challenges, innovative thinking, and proficiency in digital literacy (The Educational Council, 2018, p. 15). In pursuit of this objective, Weshahi (2022) asserted that the strategy supports modernising curricula, pedagogical approaches, and assessment methods, ensuring their alignment with current educational standards and established best practices. By fostering a culture of innovation and adaptability, educational institutions are better positioned to equip learners with the skills to navigate the complexities of the contemporary labour market and make meaningful contributions to society (Al Ghanboosi, 2017; Weshahi, 2022). A cornerstone of the National Strategy for Education 2040 is its commitment to quality assurance and continuous improvement within educational institutions (The Educational Council, 2018, p. 31). Recognising that excellence in education requires a systematic approach to monitoring and evaluation, the strategy calls for the establishment of robust quality assurance mechanisms (Maata et al., 2018). This includes the implementation of internal quality assurance systems within institutions, as well as external evaluations and accreditation processes to uphold rigorous standards of educational excellence (Alhabsi and Alfawair, 2023). By fostering a culture of quality and accountability, the strategy seeks to instil confidence in the educational system and inspire continuous innovation and improvement. Furthermore, the strategy recognises the interdependence between education and economic development, aligning closely with the goals of Oman Vision 2040 (Alhabsi and Alfawair, 2023; Weshahi, 2022). By integrating educational programmes with the Sultanate's economic diversification objectives, the strategy aims to cultivate a skilled workforce capable of driving innovation and sustaining economic growth (The Educational Council, 2018, p.13). This involves forging partnerships with industry stakeholders, promoting entrepreneurship and innovation within educational institutions, and equipping students with the practical skills and knowledge needed to succeed in a rapidly changing economy (Maata et al., 2018).

To sum up, the establishment of the OAAAQA in 2021 signals Oman's commitment to ensuring educational quality. With an expanded mandate covering both school and higher education, the OAAAQA oversees the development and implementation of the Oman National Qualifications Framework (ONQF), ensuring unified standards. Concurrently, Oman Vision 2040 and the National Strategy for Education 2040 prioritise access to quality education, fostering 21st-century skills, and aligning with economic

diversification goals. Through these initiatives, Oman aims to cultivate a dynamic learning ecosystem conducive to academic excellence and sustainable development, firmly embedding its vision within the educational system. The Ministry of Education aligns its efforts with these strategic frameworks to ensure the quality of education. By incorporating the standards set forth by the OAAAQA and the educational objectives outlined in Oman Vision 2040 and the National Strategy for Education 2040, the Ministry of Education implements policies and practices aimed at enhancing educational quality across all levels. These initiatives include curriculum development, teacher training programmes, and the establishment of quality assurance mechanisms within educational institutions.

2.3 Part Three: How Quality Implemented in the Ministry of Education

This section delves into quality management within the MOE in Oman. It begins with an overview of the structural hierarchy of the MOE, elucidating the organisational framework that supports educational initiatives. The discussion then shifts to the history of implementation of quality management within the MOE, highlighting a critical focus placed on the role of subject supervisors', emphasising their contributions to ensuring educational quality and consistency. The section delves into their responsibilities and role in maintaining high educational standards, concluding with a focus on MOE's training initiatives, all collectively highlighting the confirmed quality of education within the organisation (MOE).

2.3.1 The Structural Hierarchy of the Ministry of Education:

The Ministry ensures the quality of education is upheld within each directorate, based on their respective specialisations. The figure below depicts the structure of the Ministry of Education in Oman, as outlined in the royal decree Royal Decree No. 79/2020 (MOE, 2020) and Oman Legal Citation Standard (2022).

At the apex of this hierarchy is the Minister (Figure 9**Error! Reference source not found.**), who supervises several key offices and departments. Directly under the Minister's purview are the Minister's Office, the Permanent Delegation to UNESCO, the Omani National Commission for Education, Culture, and Science (General Directorate), the Specialised Institute for Professional Training of Teachers (General Directorate), the

General Directorate for Strategic Planning and Development, and the General Directorate for School Evaluation, Undersecretary for Administrative and Financial Affairs (the General Directorate), the Undersecretary for Education manages (the General Directorate), and general directorates of education in the eleven educational governorates.
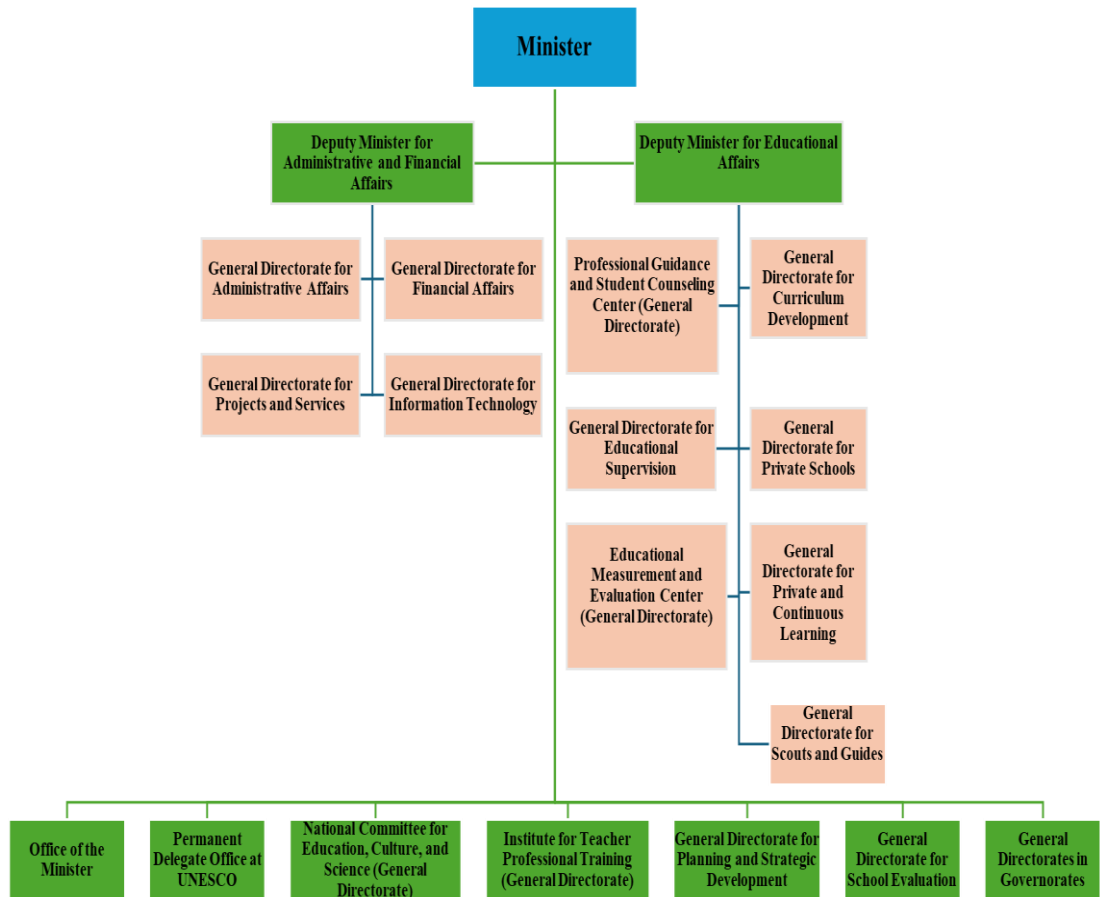
Figure 9 The Structural Hierarchy of the MOE

The organisational structure of the Ministry of Education is derived, as previously indicated, from Royal Decree No. 79/2020. As illustrated in Figure 9, this structure is designed to address various aspects per their specific functions within the Ministry. For instance, the directorate of educational supervision is responsible for educational supervisors', focusing on enhancing their skills to align with the Ministry's objectives (Ministry of Education in Oman, 2020, pp.140-141). Meanwhile, the Directorate General of Planning and Strategic Development comprises three departments, including the Quality Department, which is divided into three sections: the Quality Systems Section, the Quality Systems Audit and Review Section, and the Continuous Improvement Section. Their main roles and responsibilities are to monitor the implementation of the

QMS within the Ministry and stay updated on its advancements, ensuring alignment with the Ministry's goals. (Ministry of Education in Oman, 2020, pp. 137-141). This organisational structure provides a comprehensive overview of the Ministry of Education's structure, illustrating a clear hierarchy and the functional division of responsibilities across different departments and educational governorates. The implementation of the QMS by the directorate general of planning and strategic development, particularly the quality department, across various directorates within the MOE, focusing specifically on the general directorate of educational supervision, is detailed in sections 2.3.2 and 2.3.3.

2.3.2   *Quality Management in the Ministry of Education in Oman (MOE):*

The MOE in Oman initiated the Quality Management (Q.M.) programme ISO 9001:2008 project through an international tender awarded to the principal management consulting firm (Alseiabi, 2015; Ministry of Education in Oman, 2019). The execution of this project spanned 18 months, from May 2012 to November 2013. During this timeframe, the directorate of planning, quality management, and the administrative affairs qualified for external auditing within the educational governorates, to achieve international ISO 9001:2008 accreditation (Ministry of Education in Oman, 2012).

According to Alseiabi (2015), the project's primary focus was to ensure that the services provided by the departments of planning, quality management, and administrative affairs adhered to the standards required, thereby satisfying the needs of beneficiaries, which include government schools and special needs education institutions (Ministry of Education in Oman, 2012). Alhosni (2016) notes that the project's second phase was launched in 2016, concentrating on qualifying all structural divisions of the Ministry of Education to implement a QMS by the latest ISO 9001:2015 standards. This phase comprises three stages: preparation, evaluation and diagnosis, and documentation. Each stage has specific goals and outputs that can be assessed through relevant indicators (Ministry of Education in Oman, 2012).

2.3.3   *Subject Supervisors': Ensuring Educational Quality and Consistency*

Subject supervisors are pivotal figures within the educational framework, whose roles have evolved significantly from traditional administrative functions to encompass a

broader range of responsibilities. According to Usman, Mudhofir, and Gusmian (2023), subject supervisors in education are professionals dedicated to enhancing the quality of education. Their contemporary roles are characterised by multifaceted duties, including overseeing curriculum implementation, managing teaching practices, and ensuring the maintenance of educational standards (Istiani and Islamy, 2020). These leadership responsibilities encompass several key areas, such as subject supervisors' handling daily operations and resource allocation, and ensuring efficient management (Usman, Mudhofir, and Gusmian, 2023). They align educational content with standards and student needs, playing a crucial role in curriculum development (Mandefro, 2022). Al-Tai and Al-Issa (2023) mentioned that subject supervisors' support and enhance instructional quality, overseeing teaching practices. As Liou (2016) highlighted, these leadership tasks act as bridges connecting management, curriculum, and teaching, facilitating a cohesive and effective educational environment that supports teachers and students. In addition to their administrative and leadership roles, subject supervisors are essential in guiding and influencing teachers to perform optimally. Mandefro (2022) notes that supervisors' set targets and provide the necessary instructions and guidelines to achieve these targets in each subject. They are also responsible for advancing the educational process by improving teacher performance and introducing effective teaching methods (Istiani and Islamy, 2020; Al-Tai and Al-Issa, 2023). Moreover, subject supervisors maintain teaching and learning standards, offer pedagogical support, and conduct school visits (Mandefro, 2022). Supervisors' also serve as coordinators, orchestrating teaching and learning programmes while managing staff duties to ensure smooth operations and alignment with educational goals (Istiani and Islamy, 2020). They act as consultants, offering critical assistance and support to teachers to help them improve instructional methods and address classroom challenges (Al-Tai and Al-Issa, 2023). Furthermore, supervisors' take on the role of group leaders, fostering collaboration among teachers and aiding in their professional development (Istiani and Islamy, 2020). Importantly, they also function as evaluators, assisting teachers in assessing learning outcomes and educational processes, thus providing feedback and strategies for improvement. Besides, the primary function of supervision is to aid schools in achieving their teaching goals, particularly the individual development of students. Additionally, supervisors facilitate effective communication between schools, teachers, and the community, helping them adapt to societal demands and pioneer progress (Usman, Mudhofir and Gusmian, 2023). From the above, the functions of supervision can be

grouped into five distinct areas: leadership, providing direction and guidance; supervision, overseeing the implementation of educational programmes; execution, ensuring the enforcement of policies and procedures; service, offering support services; and development, promoting continuous professional growth and improvement within the educational system (Mandefro, 2022; Al-Tai and Al-Issa, 2023).

In Oman, the MOE mandates that individuals aspiring to supervisory positions must have at least three years of teaching experience (Ministry of Education, 2024, p. 48). This requirement highlights the importance of experience in enhancing the effectiveness and benefits of supervisory roles. Furthermore, Alshehhi and Mohd (2022) express that within the Ministry of Education in Oman, the subject supervisors' play a pivotal role in managing the execution and quality of educational programmes and curricula in Omani schools. Their duties are comprehensive and multifaceted, encompassing several key areas of educational oversight. Firstly, subject supervisors are responsible for monitoring educational progress, ensuring that teachers and students meet the established educational standards (Hosni et al., 2013). Also, Al-Ajmi (2020) mentioned that subject supervisors' conduct thorough assessments to gauge the effectiveness of teaching methods and the level of student comprehension. This involves verifying student work to ensure it meets the required criteria and that learning outcomes are consistently achieved (Al-Kiyumi and Hammad, 2020). In their capacity as subject matter experts, these supervisors provide invaluable guidance to teachers (Hosni et al., 2013). They share their extensive knowledge and expertise, helping educators effectively understand and deliver the curriculum (Al-Ajmi, 2020; Hosni et al., 2013). This guidance includes modelling best practices in teaching and demonstrating how to integrate subject-specific knowledge into classroom instruction. Subject supervisors are also heavily involved in the planning and development of the curriculum (Alshehhi and Mohd, 2022). They contribute to the creation and selection of educational resources, ensuring that materials are relevant, up-to-date, and supportive of the curriculum goals. Additionally, they observe classroom teaching to ensure that the curriculum is being implemented correctly and to identify areas where teachers may need further support or professional development (Al-Kiyumi and Hammad, 2020; Al-Ajmi, 2020; Alshehhi and Mohd, 2022).

The subject supervisors' role is crucial in ensuring the quality and consistency of education. They act as both mentors and quality controllers within the system. Their management of the learning environment is key to maintaining high educational standards

and supporting teachers in delivering the curriculum effectively. However, the perception and implementation of policies can significantly influence their impact, a topic explored in the next section.

2.3.4 Training:

Al-Shukri (2014) explains that the MOE aimed to implement a national project to develop the professional development sector namely (The Specialised Centre for Professional Training of Teachers), thus enhancing the efficiency of administrative, teaching, and supervisory bodies through in-service training, in line with internationally recognised performance standards. Alomairi, Al-Nabhani and Al-Blushi (2022) highlight that the goal was to establish a specialised professional training framework intended to advance professional development within the educational sector, based on performance indicators and research studies in this field. Additionally, Al-Shukri (2014) describes that the project sought to address the actual needs identified in the educational field (i.e. supervisory directorate, schools), achieve quality standards in the development programmes offered, and create an attractive environment for training teachers and staff at various levels, comparable to the best educational systems worldwide. The approval by the Council of Ministers to establish the Specialised Centre for Professional Training for Teachers aligns with the ministry's strategic objectives. Subsequently, ministerial decision No. 2019/273 re-designated it as the Specialised Institute for Professional Training of Teachers (SIPTTOMAN, 2019) and (Oman Legal Citation Standard, 2022). Since its inception in 2019, the Specialised Institute for Professional Training of Teachers (SIPTT) has been instrumental in executing several strategic training initiatives for individuals in teaching and supervisory roles. These initiatives have been crafted to align with the Ministry's educational policies (section 2.2.3) and global advancements in the field. The SIPTT has implemented several strategic training initiatives aimed at individuals in teaching and supervisory roles (Ministry of Education in Oman, 2023, p. 2). These initiatives have been crafted to align with the educational policies (2.2.3). Furthermore, Alomairi, Al-Nabhani and Al-Blushi (2022) elucidate that the Institute administers specialised training schemes as part of its professional development agenda (Figure 10).
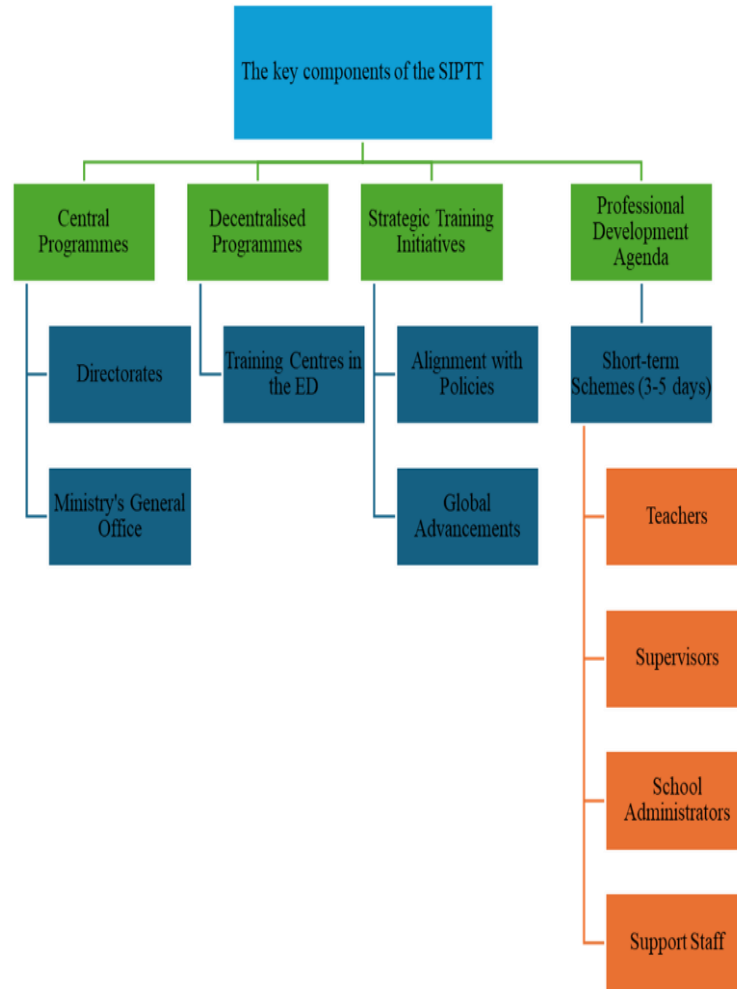
Figure 10 The key components of the SIPTT

2.4   Summary

This chapter offers a comprehensive examination of the educational landscape in Oman, tracing its historical development and highlighting key initiatives aimed at enhancing educational quality. The next chapter will cover the background and evolution of the QMS, the conceptual framework, contributions of QMS pioneers, principles of Six Sigma and ISO 9001:2015, and the research pillars supporting the current study's objectives.

3 Chapter Three: Literature Review

3.1 Chapter structure

This chapter is organised into five sections (Figure 11). section one examines the evolving background of the MOE, with Section two outlining the conceptual framework. Then, section three discusses the pioneers of QMSs and their philosophy in QMS development. Following this, section four explains the concepts of Six Sigma and ISO 9001:2015. Lastly, section five clarifies the research pillars that focus on this study's objectives.
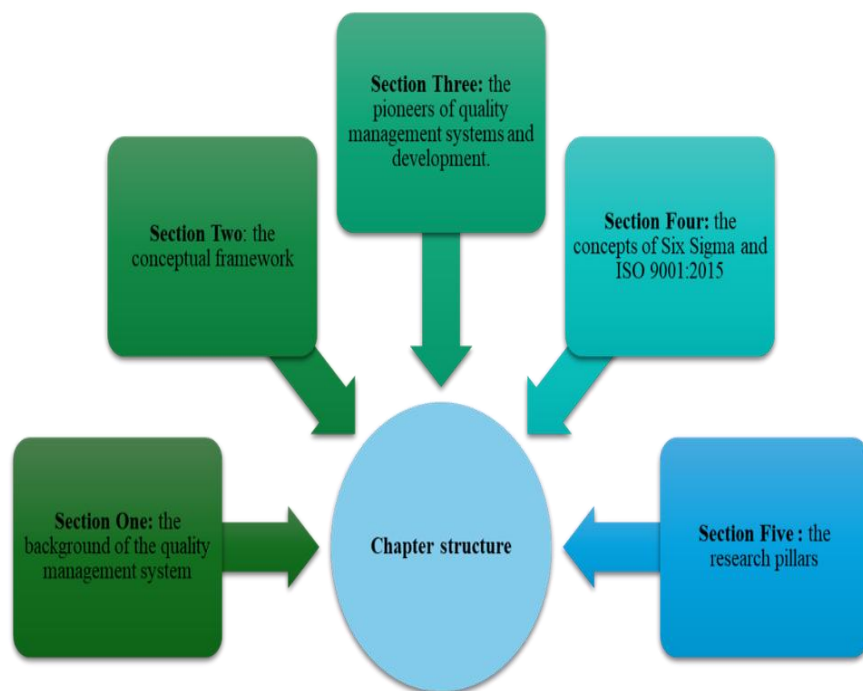
Figure 11 Chapter Three Structure

3.2 Approach taken to review literature:

The literature review covers studies from the early 1980s onward, a period notable for seminal works on QMSs. Key contributors include Walter A. Shewhart (1891-1967), Deming (1900-1993), Juran (1904-2008), and Crosby (1926-2001). Although key terms such as organisational skills frequently appeared in the literature, their association with the impact of QMSs was not always explicitly defined. Instead, these skills were often identified with other factors affecting the implementation of the ISO 9001:2015. Indeed, as Hussein et al. (2017) elucidate, effective time management is a crucial factor in successfully implementing the ISO 9001 QMS in educational institutions. Furthermore,

soft and hard skills concepts emerged as significant focal points in the literature to elucidate organisational skills (Aniskina and Terekhova, 2019). Articles were evaluated for relevance, with some excluded promptly and others marked for further examination. Those deemed most pertinent to the study underwent thorough scrutiny.

The approach taken in this chapter is twofold (Figure 12). Initially, a comprehensive review of relevant literature related to the research aim and subsequent research questions was conducted. This review includes Section One: Historical Background, Section Two: Conceptual Framework / Quality Definitions, and Section Three: Six Sigma and ISO 9001:2015. This review aims to provide the research with a solid theoretical foundation concerning the subject area, facilitating potential adjustments to the main research questions before data collection. This involved exploring the historical background of QMSs and gaining theoretical insights into Six Sigma and ISO 9001:2015, particularly its clauses.

Figure 12 Literature review approach

Secondly, after data had been gathered and analysed, a search for literature concerning significant themes identified in the findings was conducted. This is detailed in Section Four: The Research Pillars, which include QMS, Employee Awareness, Effective Training, and Organisational Skills. Any gaps in the literature have been acknowledged and are outlined after this chapter, with relevant discussions incorporated into the Analysis and Discussion chapter later.

3.2.1   The Evolution of Quality Management:

This section traces QMS's historical progression from the medieval period through the transformative industrial revolution, highlighting shifts from reactive to proactive approaches. It offers a snapshot of contemporary developments in QMS, reflecting ongoing advancements and applications in modern organisational contexts.

3.2.1.1   Medieval period:

The idea of meeting the needs of potential customers to improve economic prosperity has a long history, dating back to the beginning of human trade (Weckenmann, Akkasoglu and Werner, 2015). Indeed, the pursuit of consistent and reliable products can be traced over the centuries. Ogilvie (2020) elucidates that by the latter part of the 13th century, craftsmen in the medieval period began to establish organisations that introduced and strictly enforced standardised procedures to maintain the quality of goods and services. Regular inspections were carried out, with distinctive symbols used to indicate high-quality products (Fisher and Nair, 2009)

As proposed by Weckenmann, Akkasoglu and Werner (2015) and Ogilvie (2020), product quality evaluation has traditionally relied on thorough inspections. This process involved the precise examination, evaluation, and assessment of goods, processes, and services against various criteria to determine compliance with established standards and guidelines.

3.2.1.2   The Industrial Revolution:

Until the beginning of the 19th century, industrial manufacturing in developed nations largely adhered to the craftsmanship paradigm (Hazarika, Dixit and Davim, 2019). The factory system, which prioritised product inspection, originated in Great Britain around the mid-1750s and expanded significantly during the onset of the Industrial Revolution in the early 1800s (Evans, 2017, pp. 15-28). Concurrently, American quality practices underwent evolution throughout the 1800s, influenced by shifts in prevailing production methodologies (Awodiji and Katjiteo, 2023).

Modrák and Semančo (2014) mentioned that the factory system transitioned craftsmen into factory workers who delineated their responsibilities into specialised tasks. As previously mentioned, (section 3.2.1.1), inspection, predominantly conducted at the end

of the production line, was implemented to guarantee the satisfactory quality of goods delivered to customers (Fisher and Nair, 2009). Fisher and Nair (2009) traced the history of quality management and found that it emerged in the mass production period when manufacturers became factory workers. Modrák and Semančo (2014) mentioned that the manufacturers' work was divided into specialised duties, with each worker responsible for a specific aspect of production. This division of labour created issues in achieving consistent product quality, as the workers were not responsible for the whole product but only a part of it. Hence, there arose a requirement for a novel system of production and quality management. So, the first model of quality management to be recognised was developed by Walter A. Shewhart (the mid-1920s), and quality control practices concentrated primarily on producing manufactured goods without documented failures (Popescu, Mandru and Gogoncea, 2017), which focuses on specification-production-inspection, and transformation (Augustyn, Seakhoa-King and Mason, 2022b). This process facilitates improvements through continuous quality advancement, as highlighted by Popescu, Mandru and Gogoncea (2017) and Khasanov (2024), by supporting error detection and correction, incorporating the entire production chain with multiple entities, and enabling the application of statistical methods to practical challenges, ultimately leading to the development and widespread adoption of Statistical Process Control (SPC) to address temporal changes and minimise waste generation (Khasanov, 2024). Integrally, the statistical Design of Experiments (DoE) was developed to promote the efficient identification and adjustment of significant input variables to obtain optimum product quality performance results (Popescu, Mandru and Gogoncea, 2017).

The above procedures focus heavily on using statistical techniques in quality management. Deming (1950s) introduced a Plan, Do, Study, Act (PDSA) cyclical system that focuses on checking at each process step, not just inspecting the product or service only after completion. It is a methodical approach employed across diverse industries, including construction, to drive continuous enhancement. Adler (2015) and Augustyn, Seakhoa-King and Mason (2022) elucidated that Deming enhanced Shewhart's (1939) earlier Plan, Do, Check, Act cycle of specification-production-inspection, transforming it into a cycle of learning and improvement applicable to anyone seeking enhancement of quality. Consequently, Augustyn, Seakhoa-King and Mason (2022) asserted that Deming devised a novel theory of management, referred to as the theory of future management or management of the 21st century (Adler, 2015). Through adherence to the PDCA quality

management stages within the cycle, organisations can consistently refine their processes and products (Tang, Ahmed, and Aoieong, 2005).

3.2.1.3 From Reactive to Proactive Approaches

From approximately the 1960s onwards, Weckenmann, Akkasoglu, and Werner (2015) observed that the concept of proactive quality management was implemented, not only to oversee the quality of products and processes and react subsequently, but also to ensure quality beforehand by identifying and mitigating potential risks and issues before they arise. Initially, the focus of these preventative measures was as follows: a one-oriented push strategy from the company to the consumer—starting from managerial directives about the potential product, aiming to convert it as efficiently as possible into tangible products and then market them to consumers (Tang, Ahmed, and Aoieong, 2005). It was not until around 1980 that the notion of prioritising customer emphasis in development, rather than the previous business-oriented perspective, began to gain traction (Payne, Frow and Eggert, 2017). In 1988, Juran's approach to quality management revolved around defining quality using measurable criteria that align with organisational objectives, establishing attainable quality targets, and employing a structured approach to achieve these objectives (Kiran, 2017). Referred to as the "Juran Trilogy," Juran's quality management framework comprises Quality Planning, Quality Control, and Quality Improvement (Tang, Ahmed, and Aoieong, 2005; Weckenmann, Akkasoglu and Werner, 2015; Kiran, 2017). The Quality Planning phase focuses on understanding customer requirements and creating products and procedures to meet them (Weckenmann, Akkasoglu and Werner, 2015). Quality Control involves assessing actual quality performance and taking corrective measures as needed. The Quality Improvement stage aims to establish a framework for making yearly quality enhancements, identifying areas for improvement, and executing improvement initiatives (Tang, Ahmed, and Aoieong, 2005). Juran's philosophy perceives quality as an ongoing process deeply embedded within an organisation's culture, operations, and systems (Kiran, 2017).

3.2.1.4 From linear methodologies to perspectives focused on systems.

Borrás and Laatsit (2019) assert that the need for awareness expanded due to heightened consumer involvement and the inclination towards more advanced preparatory methods. Before this, Pfeifer, Reissiger and Canales (2004) suggested that the concept of

predominantly linear approaches as the cornerstone for quality had evolved into a broader perspective, one focused on systems. This shift extended beyond merely the linear aspects of value creation to encompass the connection and interdependencies with all organisational processes and practices, introducing perspectives focused on systems and their operations. The quality process shifted to operations by the 1990s, as Popescu Mandru and Gogoncea (2017) express that the international standards for quality systems, which were established (the ISO 9000 series), supported the implementation of scientific quality management approaches in all areas of operation. Here, Celik and Hakan Ölcer (2018) highlight the focus on quality management through organisational behaviour, improved transparency, and the participation of workers to ensure consistency as being perhaps the most critical elements of "quality management"—an advanced attitude to service aligned with the 1990s needs in service sectors, especially in education.

Therefore, the development of the definition of quality has been geared towards shifting attention from technological features to economic, environmental, and social dimensions, implying not only the consumers but also other involved parties (stakeholders). The focus has been broadened from the manufacturing processes to the increasingly relevant service processes (Smith, Maull, and Ng, 2014).

3.2.1.5   A Snapshot of Contemporary Developments of QMS:

Proskurnina and Bilousko (2023) note that advancements in quality management in recent years include the introduction of a business results criterion in 1995 as part of the Malcolm Baldrige National Quality Award. Building on this, the 2000 update of the ISO 9000 series focused on customer satisfaction, followed by the 2015 revision of the ISO 9001 standard, which emphasised risk management (Yang, 2023). Additionally, methodologies like Six Sigma (section 3.2.4.1) have evolved into comprehensive organisational approaches. In contrast, tools like Quality Function Deployment, sector-specific ISO 9000 standards (particularly 9001:2015 as in section 3.2.4), and the expansion of quality principles into sectors beyond manufacturing, showcase the movement's broadening scope. Moreover, the inclusion of education and healthcare categories in the Malcolm Baldrige National Quality Award underscores the growing relevance of quality management across various industries and sectors (Proskurnina and Bilousko, 2023). For this study, the subsequent sections will primarily examine Six Sigma

and ISO 9001:2015, particularly in their application within education (section 3.2.4.5 and section 3.2.4.7).

Early approaches to the implementation of QMSs, such as product inspection, laid the groundwork for subsequent quality management methodologies, including the Plan-Do-Check-Act cycle introduced by Shewhart in 1939 (Taylor et al., 2013b). Walter A. Shewhart introduced the concept of a cycle for learning and improvement in his 1939 book (Bayart, 2005). This cycle, known as the Shewhart Cycle, involved three steps: specification, production, and inspection. Shewhart's cycle was foundational in establishing a systematic approach to quality improvement and was later refined by his collaborator, W. Edwards Deming (Malindzakova, Čulková and Trpčevská, 2023)

Sutanto et al. (2023) mentioned that, in 1950, Deming expanded on Shewhart's cycle by adding a fourth step: design the product, make it, test it in production, sell it, and redesign the product based on feedback. This modified cycle became known as the Deming Wheel or Deming Cycle (Taylor et al., 2013). Deming, however, critiqued the term "check," arguing that it implied a passive approach. In 1986, he reintroduced the Shewhart Cycle under the Plan-Do-Study-Act (PDSA) Cycle. Here, Deming emphasised that the PDSA cycle aligned more closely with the scientific method and was designed for effective learning and improvement (Moan, 2009; Sutanto et al., 2023). The key difference in the PDSA cycle is the "Study" phase, which replaces "Check" to encourage a more thorough analysis of data (Moan, 2009).

Moan (2009) elucidates that in modern quality management and continuous improvement practices, both PDCA and PDSA are utilised, with PDSA often preferred due to its emphasis on learning and adaptation. Deming advocated for PDSA, stating that the term "check" in PDCA could be misleading, suggesting a static rather than a dynamic approach (Beaird, Geist and Lewis, 2018). He argued that PDSA better supports scientific learning and improvement by reflecting an iterative process of making informed adjustments based on studied results (Moan, 2009; Beaird, Geist and Lewis, 2018).

While PDCA remains in use, particularly for standardisation and compliance, PDSA is increasingly favoured for its robust approach to continuous improvement through iterative learning and adaptation. This makes PDSA a more versatile and effective tool in the contemporary landscape of quality management and process improvement (Joel and Jolayemi, 2022; Lloyd et al., 2023).

3.2.2 Conceptual Framework / Quality Definitions:

This section focuses on the conceptual framework used for the current research study. It defines key terms essential for the study, such as quality, quality system, QMS, Total Quality Management (TQM), and International Organisation for Standardisation (ISO). It explores their significance within the context of quality management. Additionally, the section examines prominent methodologies, as quality improvement programmes, such as the Total Quality System, Kaizen, Six Sigma, and ISO 9001:2015. It elucidates their importance and relevance to this study, emphasising their roles in enhancing organisational performance and ensuring consistency in quality management practices.

3.2.2.1 Definition of quality:

Quality has been defined in various ways, depending on the context and the perspective from which it is viewed. Deming's view of quality, as presented by Koiesar (1994), is more holistic, encompassing standardisation, consistency, productivity, and cost. He stressed the importance of defining and understanding quality throughout production, from suppliers to customers. This inclusive approach ensures that every aspect of the process contributes to the overall quality of the final product. Thus, Chandrupatla (2009) defined quality as the degree to which a product or service meets or exceeds customer expectations. This definition underscores the importance of consistency in conformance and performance while always keeping the customer's needs and expectations in mind. The term "quality" is inherently subjective, with various interpretations depending on individuals and sectors. In technical contexts, it typically refers to the attributes of a product or service that crucially impact its ability to meet both stated and implied needs, besides the degree to which it is free from defects (American Society for Quality, 2024). This suggests that quality is determined by how well products and services conform to established standards and their effectiveness in meeting or surpassing customer expectations. It encompasses the strict adherence to specific criteria and the successful attainment of customer satisfaction (Chandrupatla, 2009). Additionally, quality is recognised as a subjective concept that varies across products, services, and stakeholders. Atkinson et al. (2010) emphasise that quality is not a one-size-fits-all attribute; instead, it depends on perceived value and utility from the viewpoint of different stakeholders. For instance, one customer may consider high quality, while another may view it subpar based on their unique needs and expectations. Furthermore, from a historical perspective,

Helmold (2023) emphasises that quality was closely associated with craftsmanship and aesthetic values. Artisans and craftsmen focused on creating products that were functional, visually appealing, and durable. Monuments and artworks from ancient times reflect this intrinsic value placed on artistry and skill. Conversely, in modern times, the definition of quality has shifted towards operational efficiency. Moreover, Bamford, Forrester, and Reid (2023) define quality as fulfilling customer specifications while maintaining cost efficiency. This approach highlights the importance of meeting specific requirements and ensuring economic viability, which is crucial for sustaining business operations in a competitive market.

Table 2 summarises the various standpoints on defining quality, highlighting their unique focuses and how they contribute to a broader understanding of the concept.

Source	Year	Perspective	Definition	Key Focus
Koiesar (interpreting Deming)	1994	Holistic	Quality encompasses standardisation, consistency, productivity, and cost.	Comprehensive approach including all stages of production.
Chandrupatla	2009	Customer-Centric	Quality is the degree to which a product or service meets or exceeds customer expectations.	Customer satisfaction, consistency in conformance and performance.
Atkinson et al.	2010	Subjective	Quality varies across products, services, and stakeholders depending on perceived value and utility.	Subjective perception, variability in expectations.
Helmold	2023	Historical	Quality is associated with craftsmanship and aesthetic values.	Intrinsic value, artistry, and skill in product creation.
Bamford, Forrester, and Reid	2023	Contemporary Operational	Quality is the precise fulfilment of customer specifications while maintaining cost-efficiency.	Precision, operational efficiency, and cost-effectiveness.
American Society for Quality (ASQ)	2024	Standard Definition	Quality pertains to how well a product or service meets needs and is free from defects.	Meeting needs and freedom from defects

Table 2 Standpoints on Quality Definitions

The table underscores the significance of comprehending and defining quality in diverse contexts, showcasing various perspectives such as those of the customer and producer. This allows for examining its functionality and how it is integrated within different perspectives and systems.

3.2.2.2 Definition of Quality System:

The quality system, as defined by Kolesar (1994), encompasses a set of principles and techniques applied throughout the entire production process to ensure integrated and continuous quality control from suppliers to customers. This approach emphasises

maintaining quality standards at every stage of the supply chain. Chandrupatla (2009) elaborates that a quality system involves a comprehensive array of strategies, protocols, and methodologies adopted by a company to achieve its quality objectives. It establishes a structured approach for overseeing and enhancing quality across all aspects of the organisation, including product design, manufacturing, and customer service. These two definitions highlight the systematic integration of quality principles across the entire organisational process, ensuring consistency and efficiency in meeting quality goals (Kolesar, 1994; Chandrupatla, 2009).

3.2.2.3 QMS Definition:

According to the American Society for Quality (ASQ), a QMS represents a formalised framework that systematically outlines an organisation's structure, operational processes, roles, responsibilities, and procedures essential for managing quality effectively (ASQ, 2024). It provides a coherent system through which methods, protocols, and accountabilities are defined to support the attainment of quality-related policies and goals. Notably, a QMS enables the alignment and governance of organisational activities to ensure conformity with customer requirements and monitoring standards, while promoting ongoing enhancements in operational efficiency and overall performance.

Bamford, Forrester, and Reid (2023) define a QMS as a structured framework comprising three levels of measurement and control: inspection, control, and quality audit and management. This system ensures compliance through stringent inspection protocols, testing procedures, and ongoing quality control practices (Helmold, 2023). Moreover, QMSs are fundamental for aligning operations with established quality standards and fulfilling customer expectations. This incorporates the implementation of systematic audits to verify conformity with quality guidelines and to support continuous improvement initiatives (Sharma and Luthra, 2023). The definition highlights the critical role of structured monitoring and control mechanisms in sustaining and enhancing product quality across production and service delivery stages (Bamford, Forrester, and Reid, 2023). In addition, Alaghbari, Al-Dubai and Arishi (2022), along with Janjić, Todorović and Domanović (2018), explain that a QMS comprises an integrated set of policies, procedures, and processes adopted by organisations to ensure the consistent provision of high-quality products or services, thereby fostering increased customer satisfaction. The primary objective of a QMS, as concurred by Alaghbari, Al-Dubai and

Arishi (2022) and Janjić, Todorović, and Domanović (2018), is to ensure that a company's products or services consistently meet customer requirements and enhance customer satisfaction. Moreover, Alaghbari, Al-Dubai and Arishi (2022) and Janjić, Todorović, and Domanović (2018b) underscore that QMS aims to improve the efficiency, effectiveness, and overall performance of organisational processes. Specifically, Alaghbari, Al-Dubai and Arishi (2022) emphasise that QMS focuses on quality control, quality assurance, and quality improvement, while Janjić, Todorović, and Domanović (2018) highlight the QMS's focus on improving processes within an organisation to achieve better efficiency and effectiveness. While Bamford, Forrester, and Reid (2023) provide a detailed framework focusing on inspection, control, and audit, Alaghbari, Al-Dubai and Arishi (2022) and Janjić, Todorović, and Domanović (2018) expand on this by discussing the broader implementation and impact of QMS on organisational processes and customer satisfaction. This comprehensive view highlights the multifaceted nature of QMS, emphasising both detailed control mechanisms and broader organisational benefits.

The QMS encompasses a variety of tools and methodologies designed to enhance and develop any organisational system. For instance, ISO 9001:2015, as discussed by Ronalter, Bernardo, and Romaní (2022), provides a structured framework for quality assurance. Additionally, TQM, elaborated upon by Stannojevska et al. (2016), Alaghbari, Al-Dubai and Arishi (2022), and Gremyr et al. (2021), serves as another critical approach within QMS, as clarified below.

TQM emerged in the 1950s, influenced by practices observed in Japanese organisations (Deshmukh, Dighe, and Shelke, 2023; Helmold, 2023). Bamford, Forrester, and Reid (2023) describe TQM as a comprehensive philosophy and applied process, involving the establishment of a formal structure of management education and activities to address quality issues. Nwokeocha (2024) explains that proponents of TQM suggest that most quality concerns can be effectively addressed through specific management actions, which in turn improve work quality and promote overall organisational excellence.

As defined by the ASQ (2024), TQM is a comprehensive management approach aimed at quality improvement. Talha (2004) underscores that TQM is an internal QMS requiring all organisational members' active participation and involvement. Unlike a mere quality control system or a programme implemented by a few individuals, TQM is a holistic management strategy that integrates all facets of an organisation to achieve customer

satisfaction and continuous improvement. Therefore, Talha (2004) elucidates that TQM encompasses all organisational functions and processes to continually enhance efficiency, flexibility, and competitiveness, thereby improving the quality of goods and services and ultimately leading to customer satisfaction. Stannojevska et al. (2016) highlight TQM as a multifaceted approach widely recognised across various industries, aimed at enhancing organisational sustainability through efficiency, flexibility, and competitiveness improvements. The primary objective of TQM is to meet client requirements, thereby enabling organisations to adapt swiftly to environmental changes and enhance their global market competitiveness. The emphasis on continuous improvement, customer satisfaction, and the involvement of all employees within the organisation is further elucidated by Alaghbari, Al-Dubai and Arishi (2022) and Janjić, Todorović, and Domanović (2018b). They assert that TQM aims to cultivate a pervasive culture of quality throughout the organisation, wherein each employee is responsible for delivering quality and contributing to overall organisational success. These authors underscore essential elements of TQM such as customer focus, process improvement, employee empowerment, and the utilisation of data and statistical tools for decision-making. They also emphasise the critical role of human resources in nurturing a quality culture and producing high-quality products. According to Talha (2004), TQM is primarily concerned with customer satisfaction and continuous improvement. The overarching goal of TQM is to enhance the quality of products and services offered by an organisation, thereby increasing customer satisfaction. This is achieved through the active involvement of all organisation members in planning and implementing continuous improvement processes.

QMS can greatly enhance educational institutions by promoting continuous improvement and efficient resource management. As an example, language education benefits from quality management by incorporating structured assessments and reflective practices, which ensure accountability while also fostering creativity (Heyworth, 2013). The application of QMS models promotes a culture of team learning and systems thinking, both of which are essential for embedding quality practices in daily operations (Matorera, 2018). Developing reliable measurement instruments for quality management practices also enables schools to identify their strengths and areas needing improvement (Soria-García and Martínez-Lorente, 2012). Ultimately, implementing QMS within education supports a systematic approach to improving the quality and effectiveness of educational outcomes. In contrast, TQM underscores a holistic approach that involves all educational

stakeholders, ensuring quality is maintained at every level. TQM promotes continuous development via the Plan-Do-Check-Act (PDCA) cycle, facilitating ongoing enhancements in educational processes (Gunawan et al., 2024). Schools that have implemented TQM have consistently reported improvements in educational services through systematic planning and evaluation (Khasanah, Riyanto and Setyowati, 2023). Additionally, active participation from students, parents, and staff is vital for achieving educational goals (Ikhsan, Salim and Tasya, 2023). Leadership commitment likewise performs a crucial role in mobilising resources and empowering teams to adhere to TQM principles (Kurniawan, Maulidin and Rohman, 2024). Importantly, TQM prioritises customer satisfaction, with success measured through continuous feedback from students and parents (Ikhsan, Salim and Tasya, 2023).

In conclusion, TQM represents a robust and dynamic approach that integrates various management elements to enhance quality and competitiveness. By leveraging continuous improvement, employee involvement, and a steadfast customer focus, TQM establishes an adaptable and resilient organisational framework. This holistic methodology addresses current quality challenges and equips organisations to meet future demands, thus ensuring sustained success and enduring relevance in the marketplace.

3.2.2.4   International Organisation for Standardisation (ISO):

Alaghbari, Al-Dubai and Arishi (2022) recognise the ISO as a globally acknowledged body responsible for developing and publishing standards. Similarly, Janjić, Todorović and Domanović (2018) describe ISO as an international authority establishing guidelines applicable across various industries and sectors. The objective of ISO standards, as agreed by these authors, is to provide a common framework and guidelines for organisations to ensure consistency, reliability, and quality in their products, services, and processes. Additionally, ISO standards aid organisations in meeting customer requirements, complying with regulations, improving efficiency, and enhancing customer satisfaction. Alaghbari, Al-Dubai and Arishi (2022) observe that ISO standards cover an extensive array of domains, such as quality management, environmental sustainability, information security, and occupational health and safety. In contrast, Janjić, Todorović, and Domanović (2018) add that ISO promotes the development of standardisation and related activities to facilitate international trade and cooperation.

A comprehensive understanding of the definitions, objectives, and fundamental components of QMS, TQM, and ISO is essential for appreciating their interconnected roles in organisational quality assurance (Figure 13).

QMS, TQM, and ISO

QMS
Ensures consistent quality delivery and customer satisfaction.

TQM
Fosters continuous improvement and employee involvement.

ISO
Establishes international standards for consistency and compliance.
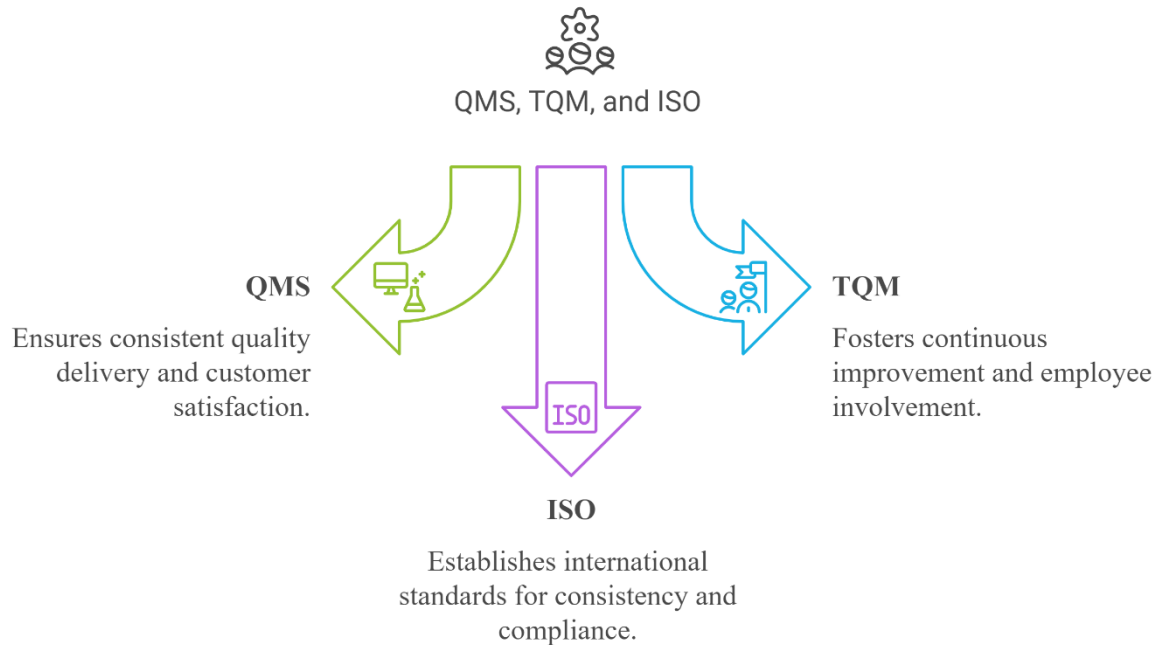
Figure 13 The fundamental components of QMS, TQM, and ISO

Table 3 summarises the main points regarding the relationship between QMS, TQM, and ISO 9001:2015, highlighting their interconnected and complementary nature in achieving organisational quality objectives and continuous improvement. This has been noted by Deshmukh, Dighe, and Shelke (2023), Helmold (2023), Bamford, Forrester, and Reid (2023), Talha (2004), Stannojevska et al. (2016), Alaghbari, Al-Dubai and Arishi (2022), and Janjić, Todorović, and Domanović (2018b).

Aspect	Summary
Foundational Approach	QMS is the foundational framework providing structured documentation of processes, procedures, and responsibilities for achieving quality objectives.
Shared Principles	TQM and ISO 9001:2015 share principles like customer focus, process approach, continuous improvement, and leadership commitment.
Scope and Implementation	QMS offers structure, TQM is a broader management philosophy focusing on long-term success through customer satisfaction, while ISO 9001:2015 provides specific certification requirements.
Continuous Improvement	Emphasised by all three approaches, TQM mandates continuous improvement, and ISO 9001:2015 requires evidence-based decision-making, supported by a well-implemented QMS.
Customer Focus	Central to all: TQM defines quality from the customer perspective, and QMS and ISO 9001:2015 provide tools to meet customer requirements.
Process Approach	Understanding the links between process inputs and quality outcomes is fundamental to QMS, TQM, and ISO 9001:2015.
Employee Engagement	TQM and ISO 9001:2015 require Organisation-wide participation to improve processes, products, services, and culture.
Strategic Alignment	Quality management must align with organisational strategy and have leadership support, as per TQM and ISO 9001:2015.
Data-Driven Decision Making	Emphasised by QMS, TQM, and ISO 9001:2015 to drive decisions and improvements using performance metrics and data.
Certification	ISO 9001:2015 provides a certifiable standard for QMS, facilitating quality management programmes beyond TQM's philosophy.

Table 3 relationship between QMSs, TQM, and ISO 9001:2015

3.2.3   *Quality pioneers and their philosophy in quality improvement:*

In the realm of quality management, three prominent figures, Deming (1900–1993), Juran (1904–2008), and Crosby (1926–2001), have provided foundational definitions and frameworks that have significantly shaped modern practices. Despite their distinct approaches, these definitions collectively emphasise meeting customer needs, striving for process perfection, and adapting to changing expectations to ensure sustained quality excellence in products and services.

As elucidated by Umble (2000), Deming is acknowledged as one of the foremost authorities in quality management, viewing quality as a comprehensive concept encompassing customer satisfaction, ongoing improvement, and organisational culture (Singh, 2023). Deming suggests that the customer determines quality, which is a relative term that evolves with customer needs, thus highlighting the dynamic nature of quality perception (Sánchez, 2020). Additionally, Deming's notion of quality is characterised as a management system focused on people, aiming to enhance customer satisfaction while realistically reducing costs (Sánchez, 2020). His philosophy of quality and the essentials for quality improvement are encapsulated in his 'system of profound knowledge' (Best and Neuhauser, 2005). This philosophy serves as a strategic framework encompassing all organisational functions and departments, engaging employees at every level alongside suppliers and other stakeholders (Sánchez, 2020). Deming (2000) articulated quality through his 14 points, which advocate for continuously improving product and process quality and eliminating slogans, workforce targets, and numerical quotas. He viewed quality as a comprehensive approach to business and management, focusing on meeting customer needs (Umble, 2000). Deming's approach to quality underscores the importance of unifying various concepts and parameters of quality, highlighting its crucial role in contemporary business practices.

Deming's philosophy, as elucidated by Vlad-Andrei et al. (2022), can be effectively applied to the education sector as a service industry through transforming management practices, fostering cooperative education, and creating a more responsive educational environment. Deming asserted that most organisational issues, including those in the service industry, are rooted in poor management practices. Additionally, Jamalludin (2022) noted that to transform an educational institution, Deming advocated for a shift in management style towards cooperative learning and continuous improvement via the

Deming Cycle (Plan, Do, Check, Act) (section 3.2.1.5). Moreover, as detailed by Vlad-Andrei et al. (2022) and Jamalludin (2022), this transformation requires a change in leadership style and a concerted focus on developing an educational system that is responsive to the needs of students, parents, and the community. Deming's principles can be applied to the education sector by emphasising quality management and customer satisfaction, creating a more responsive and efficient educational system (Best and Neuhauser, 2005).

Conversely, Juran defined quality as "fitness for use," focusing on designing products and services to meet customer needs (Stephens, 2004). Moreover, Juran offers a more precise definition of quality as "fitness for use," emphasising the product's ability to meet customer requirements (Fretes, 2023b; Bisgaard, 2007). Thus, by focusing on features and deficiencies, this broader definition places the customer at the forefront (Bisgaard, 2007). Juran's viewpoint, articulated in 1990, extends beyond mere product characteristics to encompass comprehensive planning, control, and improvement processes (Sánchez, 2020). This definition underscores the strategic aspect of quality management, stressing that quality should be integrated into products and consistently monitored and enhanced. Juran's quality trilogy, which comprises planning, control, and improvement, bridges the quality function with management and addresses quality improvement. He drew a parallel between financial management and quality management, highlighting the necessity for quality professionals to be proficient in both areas (Stephens, 2004). Juran's quality improvement philosophy concentrates on eliminating chronic problems and wastes to achieve significant returns on investment. By prioritising the customer in the definition of quality and stressing the importance of quality improvement, Juran's philosophy aids organisations in attaining higher levels of customer satisfaction and in becoming more efficient, effective, and competitive (Bisgaard, 2007). Juran's philosophy can be effectively applied to the education sector as a service by focusing on understanding customer needs and designing courses accordingly (Azhar, 2023). Implementing Juran's Quality Trilogy—comprising Quality Planning, Quality Control, and Quality Improvement—involves comprehending the needs of students and parents (Faruq, Rozi and Sunoko, 2024). Additionally, control ensures that courses meet these requirements, and monitoring outcomes evaluates their effectiveness. Improvement, meanwhile, concentrates on continuously enhancing courses and the student learning experience (Junita et al., 2024). Furthermore, Juran's concept of

internal and external conformance can be employed in education to cultivate a learning environment that aligns with student expectations. This approach also necessitates the development of leadership and a quality culture that prioritises continuous improvement in the teaching and learning process (Stephens, 2004).

Taking a different perspective, Crosby (1980) articulates that quality is about conformance, not elegance. He emphasises that quality entails strictly following the requirements or formally modifying them to align with customer needs (McConnell, 2002). Crosby defines quality as conformance to specifications or requirements, asserting that quality is achieved when a product or service adheres to the specified targets and tolerances set by the product designers (Haider, Al-Kilidar and Leveaux, 2018). Further, Gremyr et al. (2021) elaborate on this definition, underscoring the critical importance of meeting predetermined standards and requirements to ensure quality. Consequently, Crosby's methodology centres on achieving "Zero Defects" through performing tasks correctly from the outset and maintaining this consistency, thereby aiming for defect-free products and services (Jain et al., 2023). This perspective underscores the necessity of rigorous adherence to specifications to uphold high-quality standards. Additionally, he posits that there is no such thing as a quality problem, asserting that executing tasks correctly the first time is always more economical. He also mentions that the sole performance standard is zero defects; the only performance measurement is the COQ (Crosby, 1980). Also, Suarez (1992) explains that Crosby's philosophy is predicated on prevention rather than the inspection and correction of errors. His approach involves proactive thinking, planning, and analysing processes to anticipate potential errors and take pre-emptive actions to prevent them. This methodology, as further elucidated by Maier and Shibles (2010), encompasses:

1. Establishing product or service requirements.
2. Developing the product or service.
3. Gathering data.
4. Comparing the data to the requirements.
5. Taking corrective action based on the results.

In addition, Crosby devised the "Six C's" approach to education and training, which includes: Comprehension, Commitment, Competence, Communication, Correction, and

Continuance. Collectively, these elements aim to instil a quality-centric mindset within an organisation.

As articulated by Purwaningsih (2022), Crosby's philosophy has been effectively applied in education by implementing quality improvement measures such as management commitment, quality measurement, and error elimination. By emphasising quality without incurring additional costs and striving for zero defects, Crosby's approach seeks to elevate educational standards. As detailed by Kirillov, Fadeeva, and Fadeev (2016), this philosophy can significantly enhance student outcomes by ensuring higher education quality and reducing errors in the learning process. Implementing Crosby's 14 steps can improve educational experiences, potentially resulting in superior academic performance and student success. Therefore, integrating Crosby's principles into educational practices may substantially contribute to enhancing student outcomes and the overall effectiveness of educational institutions.

Quality Pioneers	Key Contributions to Quality Improvement	Application in the Education Sector
Deming	Emphasised customer-driven quality; advocated continuous improvement and employee involvement through his 'system of profound knowledge.'	Applied in educational transformation through cooperative learning and management reform, aligning education with customer (student) needs.
Juran	Defined quality as 'fitness for use'; introduced Quality Trilogy (Planning, Control, Improvement) to integrate quality into product design and management practices.	Implemented in education by focusing on understanding and meeting student needs through comprehensive planning, control, and continuous improvement of courses.
Crosby	Defined quality as conformance to requirements; promoted 'Zero Defects' through prevention rather than correction of errors.	Utilised in education to ensure adherence to quality standards and reduce errors in the teaching and learning process, enhancing overall educational effectiveness.

Table 4 Contributions of Deming, Juran, and Crosby in improving quality management

Table 4 summarises how Deming, Juran, and Crosby contributed to improving quality management and their application in enhancing educational practices, emphasising different aspects of quality and management philosophy.

Deming, Juran, and Crosby made significant contributions to the advancement of quality through their emphasis on TQM principles. Deming (2000) advocated 1950 for continuous improvement and stressed the importance of involving employees in enhancing quality. Juran in 1964 underscored the necessity of commitment from senior management and the significance of planning for quality enhancement (Juran and Godfrey, 1999). Crosby in 1979 prioritised preventing defects through proactive measures rather than relying solely on inspection, promoting the concept of getting it right the first time to elevate quality standards (Crosby, 1980). These quality pioneers believed that by implementing TQM practices such as customer-centricity, process refinement, and empowering employees, organisations could attain greater customer satisfaction, reduced costs, and heightened competitiveness. Their philosophies aimed to instil a culture of quality excellence across all organisational levels, fostering sustained success and enhanced business performance.

Despite the variances in their definitions, Deming, Juran, and Crosby share a common goal: to enhance customer satisfaction through high-quality products and services. Deming's emphasis on the dynamic and relative nature of quality, Juran's focus on fitness for use, and Crosby's advocacy for zero defects each contribute uniquely to the broader understanding of quality management; all of which can be applied within services such as the education sector (section 8.3.3).

3.2.3.1   Elevating Excellence: Quality Improvement Programmes

Implementing the quality improvement programmes outlined can significantly enhance the quality of services, notably, for this study, educational services.   Other methodologies, such as Six Sigma, Lean Manufacturing, ISO 9001:2015, TQM and Kaizen, initially considered within the broad lens of business can, as discussed in the next sections, also be applied within educational settings.

3.2.3.1.1   Six Sigma and Lean Manufacturing:

Six Sigma and Lean Manufacturing have extensively embraced methodologies for enhancing organisational efficiency, minimising waste, and boosting overall performance

across various industries and services (Zhang, Xu and Zhao, 2010). Consequently, Kumar et al., (2006) elucidate these approaches have become essential tools for businesses seeking to improve their processes and achieve sustainable growth. The six sigma, a statistical methodology introduced by Motorola in the 1980s, has emerged as a widely adopted quality management approach across various sectors (Linares, Da Silva Christo and Costa, 2019). This approach is designed to systematically reduce process variability and eliminate defects, aiming to attain a performance level of fewer than 3.4 Defects Per Million Opportunities (DPMO) (Venkatesh and Sumangala, 2018). By minimising variation and eradicating defects, Six Sigma ensures consistently high-quality service delivery, enhancing customer satisfaction (Zhang Yuan, Xu Yan et al., 2010; Kumar et al., 2006). The central tenet of Six Sigma is symbolised by the Greek letter (σ), representing standard deviation and high-quality processes, products, and services (Venkatesh and Sumangala, 2018). Furthermore, a Define, Measure, Analyse, Improve, Control (DMAIC) framework is integral to the Six Sigma quality improvement strategy, guiding organisations in identifying and resolving quality issues, resulting in significant improvements in customer satisfaction (Zhang Yuan, Xu Yan et al., 2010; Kumar et al., 2006; Zaman, Pattanayak, and Paul, 2014).

Conversely, Lean Manufacturing, originally developed for the manufacturing sector, is a systematic approach to minimising waste within a production system without compromising productivity (Sabah, Al-Kindi, and Al-Baldawi, 2023). Lean is founded on five fundamental principles: identifying value, mapping the value stream, establishing continuous workflows, implementing a pull-based system, and striving for perfection through ongoing improvement (Kaneku-Orbegozo et al., 2019). Collectively, these principles aim to optimise efficiency, minimise costs, and enhance the quality of products.

Although initially intended for manufacturing, Lean principles can also be effectively applied to service industries, helping to eliminate waste, streamline processes, and enhance customer value (Sharma, 2014; Sabah, Al-Kindi, and Al-Baldawi, 2023). Techniques such as value stream mapping are useful for identifying inefficiencies and improving service delivery (Kaneku-Orbegozo et al., 2019; Zakaria et al., 2016). By incorporating Lean methodologies, organisations can achieve significant improvements in operational efficiency and service quality, promoting an environment of ongoing development, improvement and customer focus. This approach proves to be as beneficial in the educational sector as it is in business and manufacturing (Zakaria et al., 2016).

Despite their distinct origins and methodologies, the integration of Six Sigma and Lean, known as Lean Six Sigma, has gained prominence. This hybrid approach combines Six Sigma's data-driven problem-solving with Lean's focus on waste reduction, providing a comprehensive strategy for process improvement (Linares, Da Silva Christo and Costa, 2019; Alnadi and McLaughlin, 2020). Both methodologies pursue similar objectives, including the enhancement of quality, the minimisation of inefficiencies, and the improvement of client satisfaction (Alnadi and McLaughlin, 2020). However, their primary differences lie in their emphases and tools. Six Sigma emphasises statistical analysis and reducing process variation, while Lean prioritises waste elimination and optimising process flow (Alnadi and McLaughlin, 2020).

In essence, Six Sigma and Lean, while distinct in their approaches, serve as complementary methodologies widely adopted for enhancing operational efficiency and achieving sustained improvements across industries. In the table 5, Six Sigma and Lean are compared to show how complementary methodologies can be and how they are widely used in the industry.

Aspect	Six Sigma	Lean
Purpose	Enhance organisational efficiency by reducing variability and eliminating defects.	Improve overall performance by eliminating waste and streamlining processes.
Approach	Data-driven, improving quality and achieving consistent, predictable outcomes (Catherwood, P., 2002).	Philosophical, focusing on waste elimination, process streamlining, and improving flow (Silva et al., 2018).
Framework (Tools & Techniques)	DMAIC (Define, Measure, Analyse, Improve, Control) for structured problem-solving (Silva et al., 2018).	Techniques like value stream mapping and SIPOC (Suppliers, Inputs, Processes, Outputs, Customers) (Silva et al., 2018).
Focus	Reducing process variability and eliminating defects.	Eliminating non-value-added activities and optimising process flow.
Customer Satisfaction	Enhances by guaranteeing consistently high-quality service delivery (Zhang Yuan, Xu Yan et al. 2010; Kumar et al., 2006).	Enhances by streamlining processes and reducing waste (Sharma, 2014).
Primary Differences	Emphasises statistical analysis and reduction of process variation (Silva et al., 2018).	Focuses on the elimination of waste and optimisation of process flow (Alnadi and McLaughlin, 2020).
Common Objectives	Improving quality, reducing waste, and enhancing customer satisfaction (Alnadi and McLaughlin, 2020).	
Integration	Lean Six Sigma	

Table 5 Comparison between Six Sigma and lean

3.2.3.1.2 ISO 9001:2015:

ISO 9001:2015 is a specific requirement within the ISO family (Chowdhary and Kumar, 2023). It belongs to the ISO 9000 series, which focuses specifically on QMS (Fonseca and Domingues, 2018). Moreover, ISO 9001:2015 establishes the standards required for implementing a QMS and is used to enable organisations to show that they can reliably deliver products and services under both client expectations and regulatory standards (Rogala and Wawak, 2021). The standard highlights several core principles, including a strong customer orientation, effective leadership, active employee engagement, a structured and process-oriented approach, continual enhancement, decisions grounded in empirical evidence, and the strategic management of organisational partnerships (Iskarim, 2018).

ISO 9001:2015 is an internationally recognised standard for QMS that delineates the requirements organisations must fulfil to ensure consistent quality (Helmold, 2023). These standard underscores the importance of risk-based thinking, a process-oriented approach, and continuous improvement. The initial aim of ISO 9001:2015 is to enhance client satisfaction and operational efficiency (Balahadia, Dalugdog and Cabiente, 2022). Moreover, Aldowaisan and Youssef (2006) assert that ISO 9001:2015 provides a comprehensive framework for QMSs, ensuring that services consistently meet customer and regulatory requirements. Furthermore, Magd and Arabia (2010) elucidate that the standard fosters an environment committed to ongoing development and prioritisation of stakeholder needs, which are crucial for maintaining high-quality service delivery.

By integrating these principles, organisations can achieve a robust QMS that, not only meets but exceeds industry standards. Consequently, adherence to ISO 9001:2015 is instrumental in driving organisational excellence and sustaining long-term customer satisfaction (see section 3.3.4.7).

3.2.3.1.3 Total Quality Management (TQM):

Emerging in the mid-20th century, TQM integrates principles from quality control, organisational behaviour, and strategic management (Hoang, Igel and Laosirihongthong, 2010). Influenced by thought pioneers like Deming, Juran, and Crosby (section 3.2.3), TQM emphasises the critical role of quality in achieving long-term business success. Helmold (2023) and Ivanova (2019) described TQM as a comprehensive managerial approach that is dedicated to achieving sustained success through customer satisfaction (section3.2.3.1.3). This methodology actively engages all members of an organisation in

continuous improvement efforts across processes, products, services, and the broader organisational culture (Helmold, 2023). TQMs participative approach ensures that every employee, from top management to frontline worker, is involved in identifying and addressing inefficiencies. The primary goal of TQM is to perpetually enhance customer satisfaction through systematic, incremental improvements (Ivanova, 2019).

Consequently, TQM ensures the consistent delivery of high-quality services by involving every stakeholder in the pursuit of excellence (Helmold, 2023; Jehangiri, 2017). TQM shows significant improvements in product quality, operational efficiency, and customer satisfaction (Smith, Maull and Ng, 2014). Ivanova (2019) demonstrated that this integrated approach cultivates a pervasive culture of quality consciousness and fosters ongoing improvements. This cultural shift toward quality, not only enhances internal processes and positively influences external perceptions but boosts the organisation's reputation and market position (Ivanova, 2019). Furthermore, Jehangiri (2017) explained that TQM facilitates interdisciplinary collaboration, which stimulates innovation and efficiency across departments. By breaking down silos, TQM promotes a holistic view of organisational processes, encouraging departments to work together toward common goals. This interdisciplinary synergy is crucial for innovation because it combines diverse perspectives and expertise to solve complex problems (Jehangiri, 2017; Helmold, 2023 and Ivanova, 2019).

In conclusion, TQM is a cornerstone of organisational excellence, driving continual progress and enhancing customer experiences. Its principles have evolved to adapt to contemporary business challenges, incorporating technological advancements and shifts in consumer expectations. As a strategic framework, TQM, not only improves internal processes, but also enhances the organisation's agility and responsiveness in a competitive market. As the literature purports (Jehangiri, 2017; Helmold, 2023 and Ivanova, 2019), implementing TQM is essential for organisations aiming for long-term sustainability and success in an increasingly dynamic business environment.

3.2.3.1.4 Kaizen:

Gasper and Mwenda (2023) and Doran (2023) elucidate that Kaizen, a Japanese term signifying "change for the better" or "continuous improvement," emphasises incremental, ongoing modifications involving all members of an organisation. Narusawa and Shook (2009) elucidated this Japanese business philosophy was popularised by Toyota as part of its Toyota Production System, which revolutionised manufacturing processes worldwide.

Also, Syaputra and Aisyah (2022) further expound that the primary objective of Kaizen is to enhance productivity, efficiency, and quality through these modest yet consistent adjustments. This methodology asserts that is not confined to manufacturing; its principles have been successfully implemented across various sectors, including healthcare, software development, and service industries, demonstrating its versatility and efficacy (Githongo and Karugu, 2023) and (Sridhar, Sujatha and Ponniah, 2023) and (Villanueva et al., 2024). Thus, Kaizen's emphasis on continuous, small-scale improvements engages all employees in the process of quality enhancement (Plescaci, 2022), which subsequently leads to cumulative advancements in service quality and operational efficiency (Leseure, 2010). By fostering an inclusive environment where every employee is encouraged to contribute ideas for improvement, Kaizen helps cultivate a proactive organisational culture centred on perpetual improvement (Janjić, Todorović, and Domanović, 2018). Moreover, the collective endeavour promoted by Kaizen drives internal enhancements and enhances the organisation's competitive advantage by ensuring adaptability and resilience in a rapidly changing market landscape (Mui, Muthuveloo and Chan, 2021). This holistic approach to continuous improvement underpins long-term sustainability and success in today's global economy.

In conclusion, these quality improvement programmes help organisations systematically address and improve various service quality dimensions. The intention is that implementing these methodologies leads to higher customer satisfaction, operational efficiency, and competitive advantage; all of which the educational sector seeks to sustain and/or attain.

3.2.4   *Six Sigma and ISO 9001:2015 standard:*

Sections 3.2.3.1.1 and 3.2.3.1.2 introduced the Six Sigma and the ISO 9001:2015. In addition to understanding the fundamental aspects of quality, such as its definition and the role of QMSs, it is essential to explore specific methodologies and standards that improve quality in organisations. Because ISO 9001:2015 as a QMS has already been applied in the MOE in Oman, it is pertinent to discuss its applicability and relevance to the current study. Six Sigma is the process that we want to use, with some modifications to suit the educational field (i.e. schools). The following will elaborate on both methods, with some historical backgrounds, and their implications in the educational field, with some examples.

3.2.4.1   What Is Six Sigma (6σ)?

The term 'Six Sigma' incorporates the Greek symbol (σ), symbolising high-quality processes, products, and services (Kęsek, Bogacz and Migza, 2019). Originating from statistical theory where Sigma represents the standard deviation (Kartika, Bakti and Purwanti, 2018), Six Sigma aims to minimise variation within processes. Its primary objective is to achieve fewer than 3.4 Defects per Million Opportunities (DPMO), thereby eliminating defects and enhancing customer satisfaction. According to Majstorovic and Stefanovic (2007) and Fersini (2019), Six Sigma is a management philosophy and methodology focused on controlling parameters and reducing errors to attain world-class quality standards. This approach ultimately aims for virtually defect-free processes and products. By implementing Six Sigma methodologies such as DMAIC, organisations can systematically enhance process efficiency and product quality (Tijerina et al., 2023). Consequently, this reduction in defects leads to streamlined operations, shorter cycle times, and lower costs, thereby enhancing organisational profitability and competitiveness in the market (Pfeifer, Reissiger and Canales, 2004).

Majstorovic and Stefanovic (2007) and Fersini (2019) further elaborate that Six Sigma's emphasis on minimising errors through parameter control and improvement implementation is rooted in Sigma (σ) as a measure of standard deviation in statistics. Higher Sigma values denote reduced variation and fewer errors. The overarching goal of Six Sigma is to achieve a world standard quality of 6 Sigma or higher, representing processes with zero errors.

3.2.4.2   History of Six Sigma:

Raisinghani et al. (2005) stated that Carl Friedrich Gauss (1777–1855), renowned for formulating the concept of the normal distribution curve, is also recognised for introducing the term Sigma as a statistical notation (Permana, Steven and Purba, 2021). Shewhart, established the three-sigma in 1922 as a measure for output variation, saying that process intervention is required when output deviation exceeds this level. He related the three-sigma concept to a process yield of 99.973 per cent and a defect rate of 2 (Alkubaisi, 2013).

However, the development and use of Six Sigma took hold in the 1980s when Bill Smith, a reliability engineer at Motorola, concluded that inspections and tests did not detect all

defects in the product manufacturing units (Basu and Wright, 2012); customers found defects, and defects caused product failures. Since process failure rates were far higher than product tests suggested, Smith concluded that the best way to address the issue of defects was first to develop the processes of minimising or removing the risk of defects. He set the six-sigma standard—nearly ideal, at 99.9997 per cent—and is recognised as coining the word for the technique (Figure 14) (Permana, Steven and Purba, 2021). Bill Smith's ambition was to find a way to count flaws in its processes (LeMahieu, Nordstrum and Cudney, 2017).
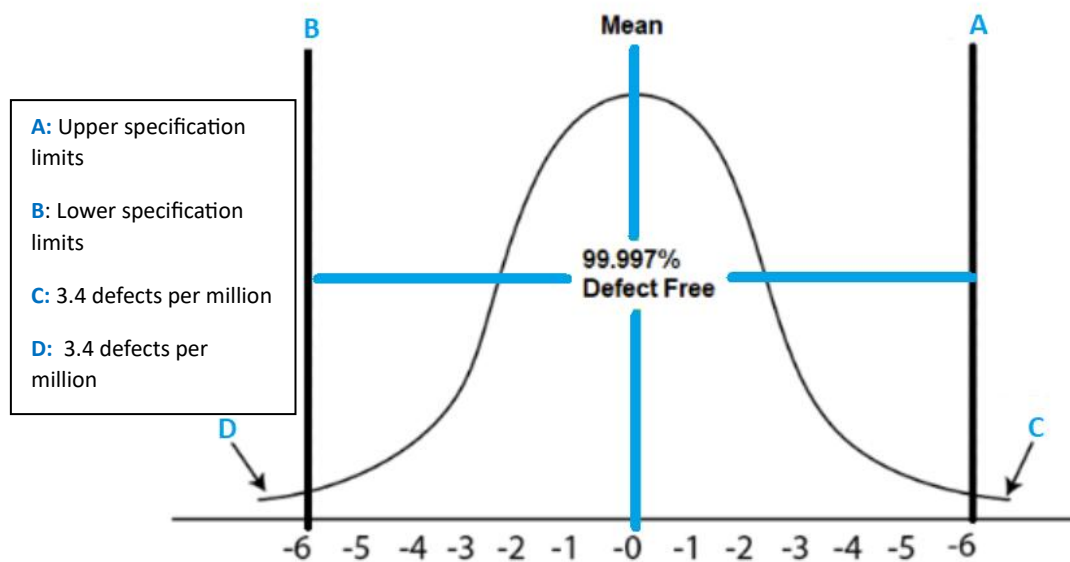
Figure 14 Normal curve distribution and Six Sigma

In other words, Six Sigma can be defined as attention to defects. Kwak and Anbari (2006) mentioned the common view is that flaws are a necessary aspect of the development of the product. Measurement of faults per hundred is an appropriate standard. The general standard view is that errors must be avoided using efficient management mechanisms and measured at one million errors (Zhang *et al.*, 2014; Goetsch, 2020).

3.2.4.3   DMAIC Methodology (Roadmap)

3.2.4.3.1   Definition of DMAIC
Six Sigma implements a scientific methodology or roadmap (Figure 15): DMAIC (Navas *et al.*, 2016).
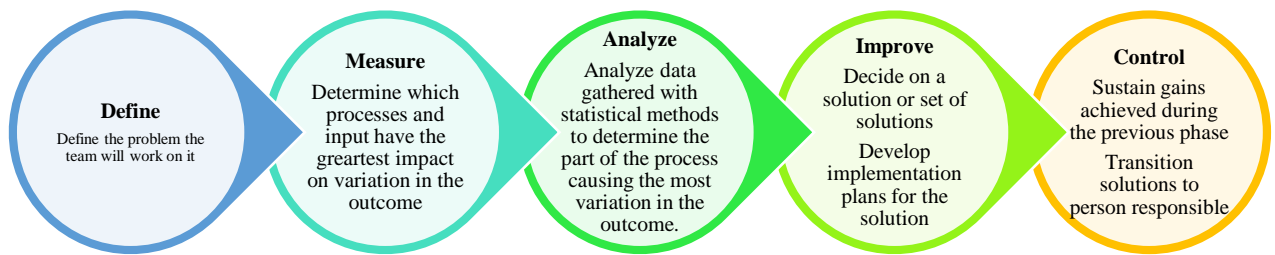
Figure 15 DMAIC Methodology

Specifically, a Six Sigma methodology known as DMAIC follows the phases that are necessary for producing results: defining or identifying tasks, goals, and deliverables for consumers (internal and external); measuring or evaluating the current performance of the process; analysing or examining and determining the root cause(s) of defects; improving the process or optimising the mechanism for removing defects; and controlling or monitoring the performance of the process (Yang and El-Haik, 2003). More about DMAIC is elaborated in section 3.2.4.3.2.

3.2.4.3.2   DMAIC methodology, phases and tools:
Al Kuwaiti and Subbarayalu (2015) highlight DMAIC as integral to Six Sigma for continuously enhancing quality processes. Similarly, Krishnaveni and Rajendran (2015) expand on DMAIC, delineating its five phases: define, measure, analyse, improve, and control. This structured approach aims to rectify shortcomings in existing processes, aligning them with desired specifications and quality standards. Moreover, the DMAIC methodology encompasses specific phases, each supported by widely used tools, offering practical insights into implementation timelines (Hambleton, 2008).

3.2.4.3.2.1 The Define phase:
The define phase within the DMAIC methodology is defined by Al Kuwaiti and Subbarayalu (2015), and Srinivasan et al. (2016) with a shared emphasis on establishing a robust foundation for project initiation. Collectively, they agree that the primary objective of the Define phase is to identify the problem at hand, delineate project goals and scope, and outline customer requirements. This initial step sets the groundwork for subsequent phases of the DMAIC process.

In the define phase, the focus is on understanding project scope, problem statements, and customer requirements, with activities including drafting project charters and conducting Voice of the Customer (VOC) analyses (Monday, 2022). Pakdil (2020) provides a broader perspective, asserting that the define phase, not only identifies the problem, but also establishes its boundaries and overall scope. They advocate for tools like SIPOC analysis (Suppliers, Inputs, Processes, Outputs, and Customers), project charters, and VOC analysis to comprehensively capture stakeholder requirements and refine project objectives (Johnston and Dougherty, 2012). Al Kuwaiti and Subbarayalu (2015) highlight the critical role of the define phase in educational contexts, underscoring the use of tools such as the SIPOC diagram and project charter to refine project objectives and scope, thereby enhancing educational quality. Similarly, Srinivasan et al. (2016) reaffirm that the define phase is fundamental for precisely defining the problem, project goals, and scope, aligning them with customer expectations. They highlight the SIPOC diagram and project charter as pivotal tools for structuring project parameters and ensuring a focused approach to problem-solving.

3.2.4.3.2.2 *The Measure phase:*

Transitioning to the measure phase, the primary objective of this phase is to quantify the problem and establish a baseline performance, which sets the stage for subsequent analysis and improvement efforts. This phase employs various tools to ensure accurate and comprehensive data collection, facilitating a thorough understanding of the process performance. According to Hambleton (2008) and Sabtu and Matore (2024), the emphasis during the Measure phase shifts to establishing baseline performance and developing robust data collection plans. Tools such as Measurement System Analysis (MSA) and Process Capability Analysis (PCA) are integral to this phase, ensuring that data gathered is reliable and valid. Furthermore, Srinivasan et al. (2016) elaborate that in the Measure phase, process performance is quantitatively defined and described. Using the data collected during the process mapping conducted in the Define phase, this phase involves defining suitable metrics, developing a data collection strategy, and conducting data gathering activities to analyse the metrics. This approach ensures that the problem is defined in quantitative terms, and baseline performance is established. Al Kuwaiti and Subbarayalu (2015) also emphasise that the objective of the Measure phase is to understand the current performance of the process and identify areas with scope for improvement. Tools used in this phase include process mapping, data collection,

statistical process control charts, and measurement system analysis. These tools help in capturing detailed process data and highlighting areas where performance can be enhanced. Similarly, Johnston and Dougherty, (2012) state that the objective of the Measure phase is to measure the current performance level of the process using process data. They identify tools such as data collection plans, Measurement System Analysis (MSA), and process flowcharts as essential for this phase. These tools facilitate a structured approach to gathering and analysing data, ensuring that the measurement process is thorough and accurate.

3.2.4.3.2.3 *The Analyse phase:*

The analyse phase within the DMAIC methodology is crucial for identifying the root causes of problems and understanding the underlying issues that affect process performance. The primary objective of this phase is to thoroughly examine the data collected in previous phases in order to identify patterns, trends, and anomalies that can reveal the sources of variation and inefficiencies (Hambleton, 2008; Krishnaveni and Rajendran, 2015; Srinivasan et al., 2016; Al Kuwaiti and Subbarayalu, 2015). According to Hambleton (2008), data-driven methodologies such as root cause analysis and cause and effect diagrams are employed in the analysis phase to pinpoint the root causes and isolate sources of variation. These methodologies are essential for systematically dissecting the problem and identifying its core components. Lackey (2023) emphasises that the objective of the analyse phase is to identify the root cause of the problem and validate the data using statistical methods. They highlight tools such as Fishbone diagrams, Pareto charts, Hypothesis testing, and Statistical Process Control (SPC) as essential for this phase. These tools facilitate a structured approach to data analysis, ensuring that the root causes are accurately identified and validated. Also, Srinivasan et al. (2016) elaborate further, stating that the analyse phase involves examining the data collected in the previous two stages to detect patterns, trends, and anomalies. The objective is to identify the root cause of the problem by identifying key issues requiring resolution, analysing and verifying potential causes, and assessing possible solutions to address these issues. This comprehensive analysis is critical for understanding the factors driving process performance. Similarly, Al Kuwaiti and Subbarayalu (2015) state that the objective of the purpose of the analysis phase is to uncover the underlying causes of issues and to determine those that are most influential and serve as primary drivers of performance. They advocate for using tools such as Fishbone diagrams, 5 Whys, and

Hypothesis testing to systematically uncover and validate the root causes of performance issues.

3.2.4.3.2.4 The Improve phase:

Advancing to the Improve phase within the DMAIC methodology involves formulating and executing solutions that directly tackle the root causes of the identified issues. The principal aim of this stage is to ensure that the implemented changes lead to demonstrable enhancements in process performance, operational efficiency, or customer satisfaction (Monday, 2022; Al Kuwaiti and Subbarayalu, 2015; Srinivasan et al., 2016; Lackey, 2023). According to Al Kuwaiti and Subbarayalu (2015), the improve phase aims to design and apply solutions that effectively resolve the root causes of problems, while also verifying that these interventions produce the intended enhancements. Commonly utilised tools during this stage include brainstorming, Failure Mode and Effects Analysis (FMEA), and pilot testing of proposed solutions. Srinivasan et al. (2016) explain that the primary goal of this phase is to devise corrective actions that tackle the underlying issues and lead to substantial gains in operational efficiency or customer satisfaction. Potential solutions are developed and tested to determine if they provide the desired improvements. These include alternate processes, equipment, or layout, as well as changes to policies, training, and other human factors. Lackey (2023) likewise, it is stated that the purpose of the Improve phase is to devise and implement a solution aimed at resolving the identified problem. They identify tools such as Design of Experiments (DoE), Failure Mode and Effects Analysis (FMEA), and process simulation as essential for this phase. Therefore, this systematic approach guarantees that solutions are not only put into practice but also assessed for their effectiveness in resolving the identified problems.

3.2.4.3.2.5 The Control phase:

The control stage in the DMAIC methodology is crucial for confirming that the developments accomplished in past stages are sustained over the long term. The principal purpose of this phase is to maintain the process improvements and ensure they become an integral part of the organisational culture and procedures (Lackey, 2023; Al Kuwaiti and Subbarayalu, 2015; Srinivasan et al., 2016). According to Lackey (2023), the objective of the control phase is to ensure that the process remains controlled. Tools used in this phase include control plans, Statistical Process Control (SPC), and process monitoring. These tools help maintain the stability of the improvements and ensure that the process continues to operate at the desired performance level. Furthermore, Al

Kuwaiti and Subbarayalu (2015) add that the objective of the control phase is to ensure that the improvements are sustained over the long term and to identify opportunities for further improvement. They highlight tools such as control charts, SPC, and standard operating procedures (SOPs) as essential for this phase. These tools help in tracking the performance and maintaining the gains achieved during the improvement phase. Also, Srinivasan et al. (2016) elaborate that in the control phase, the solutions implemented in the previous phase are monitored for effectiveness and stability. This includes developing a control plan to ensure project outputs are monitored and meet the project objectives; establishing control measures to manage and control any changes made during the Improvement phase; and ensuring the process becomes a sustained part of organisational culture and procedures. Furthermore, Sabtu and Matore (2024) emphasise the use of tools like control charts and monitoring and response plans to prioritize maintaining improvements. This structured approach ensures that the improvements are, not only maintained but also continuously monitored for any deviations. Additionally, Hambleton (2008) notes that, while specific timelines for the analysis, improve, and control phases are not explicitly provided, the DMAIC cycle typically spans several weeks to months. The DMAIC methodology is iterative, often requiring multiple cycles to achieve the desired improvements (Monday, 2022), with implementation durations varying based on project complexity, resource availability, and organisational commitment (Permana, Steven and Purba, 2021). In summary, the control phase is essential for sustaining the improvements achieved, ensuring they are maintained over time, and integrating them into the organisational culture using various control tools and strategies.

Overall, the utilisation of the DMAIC methodology significantly enhances problem-solving capabilities by systematically identifying the root causes of issues and addressing them directly. By employing a structured, data-driven approach, DMAIC facilitates the development and implementation of sustainable solutions within an appropriate timeframe. This methodology not only resolves existing problems but also establishes a robust framework for continuous improvement, thereby fostering long-term organisational excellence and operational efficiency.

3.2.4.4   Six Sigma in Quality Management:

The Six Sigma approach is employed to enhance both productivity and profitability (Antony et al., 2016). As a quality management strategy, it involves the systematic

application of statistical problem-solving techniques to detect and measure inefficiencies, as well as to outline steps for improvement (Basu and Wright, 2012).

3.2.4.5   Six Sigma in Education:

Davis and Goetsch (2020, pp.19-33) highlight similarities between the business and service sectors. Like industrial and service sectors, educational institutions are often under pressure to raise efficiency, improve quality and quality assurance mechanisms and manage increased and changing demands on funding (Davis and Goetsch,2020). Mehrotra (2012, pp. 11-20) It is acknowledged that, akin to the business sector, educational establishments can undergo substantial improvement through the implementation of the Six Sigma methodology.

Li Zhao (2011) proposed a theoretical model that applied Six Sigma management principles to enhance the quality of higher education in China. In a comparable initiative, Weinstein et al. (2008) outlined a method for embedding Total Quality Management (TQM) and Six Sigma within a Master of Business Administration programme, employing process improvement projects in collaboration with local businesses. As a further illustration, the Milwaukee School in Wisconsin, USA (2017), implemented Six Sigma as part of a community-wide initiative aimed at enriching the educational experiences of children and families. Additionally, Kanigolla et al. (2014) investigated learning outcomes through the use of project-based learning within quality and Six Sigma modules at both undergraduate and postgraduate levels.

In 2015, a self-financing technical institution situated in India's National Capital Region (NCR) was selected as the subject of a case study. Narula and Grover (2015) illustrated the application of Six Sigma principles to enhance institutional output measures by identifying key quality characteristics and proposing a team-based framework for effective project implementation. Similarly, Al Kuwaiti and Subbarayalu (2015) developed a novel six-point quality assessment model, grounded in the Six Sigma Poisson distribution, to evaluate the quality of higher education programmes at the University of Dammam in the Kingdom of Saudi Arabia. This model incorporated a Student Experience Survey (SES) to assess students' perceptions of their academic programmes across six key dimensions: Instruction, assessment and feedback, curriculum design and development, programme management, academic support, and the learning environment. The findings underscored the SES's effectiveness as a tool for evaluating and enhancing

programme quality in higher education. Additionally, Navas et al. (2016) utilised the Six Sigma methodology in a case study to assess academic performance indicators within an engineering institution. By analysing examination results using statistical software such as SPSS, the study sought to identify the factors contributing to reduced academic performance, aiming to improve pass rates and inform future educational progress. Originating in the manufacturing sector, Six Sigma adopts a project-based approach, concentrating improvement efforts on processes characterised by significant levels of undesirable variation and error. As outlined in Section 3.2.4.3, Six Sigma initiatives typically adhere to the structured five-phase framework known as DMAIC (Define, Measure, Analyse, Improve, Control) (LeMahieu, Nordstrum and Cudney, 2017). The forthcoming sections will address ISO 9001:2015, in alignment with the specific requirements of this study.

3.2.4.6   The ISO 9001:2015:

The ISO released the fifth edition of the ISO 9001 standard, known as ISO 9001:2015, in September 2015. This version builds upon the original standard, which was initially published in 1987 (Hoyle, 2017, pp. 89-90). The latest version of the ISO is an essential resource for companies that want to implement and maintain a successful QMS (Militaru, 2016). This globally recognised standard is particularly helpful for small businesses, as it provides a framework for methodological expansion while maintaining product quality (Aldowaisan, 2006). Numerous organisations have reported significant business gains from implementing ISO-based QMS, proving that the time, money, and effort are worth it (Oke and Owaba, 2007).

3.2.4.7   Introduction to ISO 9001:2015 Standards and Education

ISO standards offer widely accepted frameworks for industries to improve processes, products, and services. While commonly applied in manufacturing and service sectors, these standards also contain clauses applicable to diverse fields, including education (Othman, Mokhtar and Asaad, 2017; Parso *et al.,* 2021). As noted by Tricker (2016, p.20), ISO 9001:2015 is renowned for its emphasis on QMSs through a structured approach, organised into ten clauses. The table below outlines each clause and illustrates how it serves as a roadmap for organisations to ensure consistency, efficiency, and continual

improvement. The initial three clauses provide introductory information on quality management, while clauses four to ten address its practical application.

3.2.4.7.1 So what? Why is this important?

Anttila and Jussila (2017) highlighted that understanding and implementing ISO 9001:2015 is essential for organisations seeking to enhance their QMSs. This structured approach promotes consistency and efficiency and fosters continual improvement, which is crucial for maintaining competitiveness in the market (Anttila and Jussila, 2017; Wilson and Campbell, 2016). The standard's clear distinction between introductory information and practical application allows organisations to systematically adopt and integrate these practices into their operations. This integration results in higher customer satisfaction, reduced operational costs, and improved overall performance. Thus, embracing ISO 9001:2015 represents a significant step towards achieving long-term business success and sustainability (Table 6).

Clause Number	Clause Title	Description	Components
1	Scope	Defines the scope of the standard	By identifying inputs, resources, tasks, and outcomes for each operation
2	Plan-Do-Check-Act cycle (Deming cycle)	This cycle suggests that a continuous process of planning, implementation, assessment, and adjustment is essential for a management system to be successful.	The PDCA cycle involves defining objectives, implementing planned arrangements, analysing results to assess performance, and taking actions for continual improvement, constituting an ongoing process driving organisational enhancement.
3	Terms and Definitions	Provides definitions for terms used in the standard	Definitions of key terms
4	Context of the Organisation	Discusses factors influencing the QMS	Internal and external context analysis
5	Leadership	Focuses on leadership's role in the QMS	Leadership commitment, accountability, and roles
6	Planning	Addresses planning for the QMS	Quality objectives, risk assessment, and action plans
7	Support	Discusses resources and support for the QMS	Resource allocation, competence, and infrastructure
8	Operation	Covers the execution of the QMS processes	Process implementation, product/service realisation
9	Performance Evaluation	Deals with monitoring and measuring QMS performance	Monitoring, measurement, analysis, and evaluation
10	Improvement	Focuses on continual improvement of the QMS	Corrective actions, preventive actions, and innovation

Table 6 Clauses of ISO 9001:2015

The ISO 9001:2015 process employs the PDCA (Plan-Do-Check-Act) cycle or Deming cycle to foster ongoing enhancement within QMSs (Figure 16)

- PLAN
  - Clause 4: context of the organisation
  - Clause 5: leadership
  - Clause 6: Planning
  - Cluase 7 Support

- DO:
  - Clause 8: Operation

- ACT
  - Clause 10: Improvement

- CHECK:
  - Clause 9: performance evaluation

PLAN   DO   ACT   CHECK
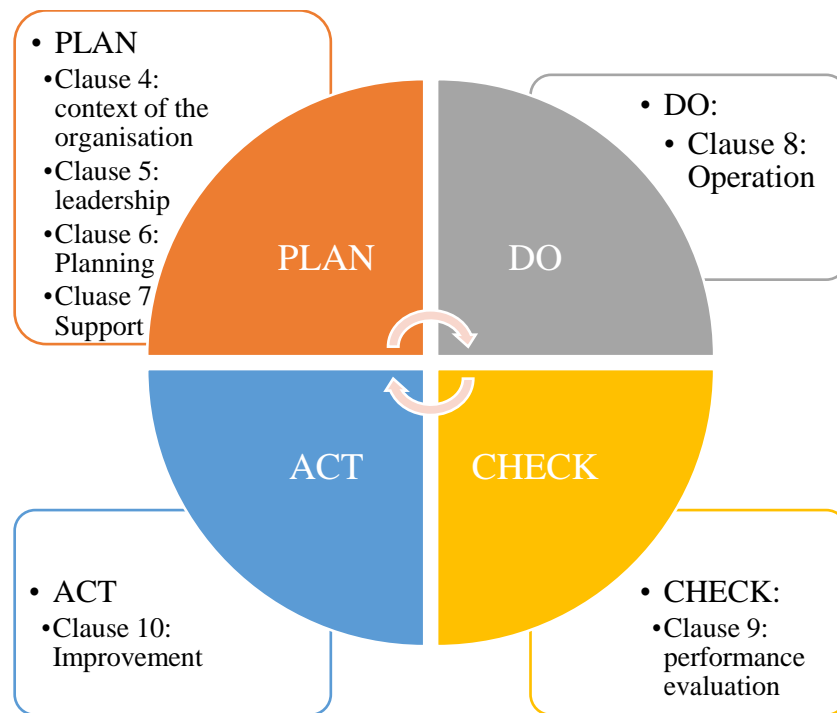
Figure 16 PDCA cycle and the representative clauses of ISO 9001:2015

Kamusoko (2020) noted that using the PDCA cycle with these ISO 9001:2015 clauses, organisations can methodically strategise, execute, oversee, and enhance their QMSs to comply with ISO 9001:2015 standards (Tricker, 2016). Figure 16 illustrates each step of the PDCA process and its corresponding clause in ISO 9001:2015. It can be applied diversely in both sectors (industry or education), as will be elaborated upon in the next section, with a particular emphasis on its application within the educational context to align with the objectives of the study.

3.2.4.8   Applications of Clauses 4-10 in education:

There exist multiple practical implementations of the clauses delineated in ISO 9001:2015 within educational environments. As exemplified by research conducted by González and Huerta-Barrientos (2017), as well as Parso *et al.* (2021), the individual application of clauses 4 to 10 of ISO 9001:2015 can be understood and enacted within an educational context. These studies demonstrate how educational organisations utilise these clauses to satisfy the requirements of clause 4 of ISO 9001:2015, which involves

analysing the organisation's context. Furthermore, the comprehensive implementation of clauses (4-10) within educational environments is illustrated in various studies such as those by Dagdag, Bete and Galiza (2022), Ambarwati, Rusmiati and Aisyah (2023) and Irsyada et al. (2018). The subsequent section will delve into the implementation of clauses pertinent to the research requirements, particularly those associated with the research pillars of awareness, effectiveness of training, and organisational skills.

3.2.4.9   How the ISO 9001:2015 Clauses relate to this study:

The following sections will involve aligning the research objectives by leveraging the research pillars on awareness, practical training, and organisational skills, alongside the corresponding clauses delineated within ISO 9001:2015 (Table 7).

Research Question (RQ)	Research pillars	ISO 9001:2015 Clause
RQ 1	Awareness	Clause 4 (Context of the Organisation)
		Clause 5 (Leadership)
RQ 2	Effective Training	Clause 7 (Resource Management)
		Clause 8 (Operation)
RQ 3 and 4	Organisational Skills and Improvement	Clause 6 (Planning)
		Clause 9 (Performance Evaluation)
		Clause 10 (Improvement)

Table 7 integration research questions with ISO clauses

Table 7 offers an extensive overview detailing how various sides of the QMS are linked to the research pillars (section five), about the impact of QMS on the employee (subject supervisors') awareness, effective training, and organisational skills while aligning with specific clauses specified in the ISO 9001:2015 standard. It underscores the importance of grasping the organisational context, emphasises the role of leadership in fostering awareness, and stresses the necessity of providing effective training to enable personnel to engage with the QMS. Additionally, the table highlights the significance of organisational skills in strategic planning, performance assessment, and fostering a culture of continuous improvement. In summary, its primary aim is to demonstrate the vital role of these components in establishing and maintaining an ISO 9001:2015-compliant QMS through the understanding of its benefits (Othman, Mokhtar and Asaad,

2017; Parso *et al.,* 2021) and impact on the employee, which will be explored in the following section.

While adopting TQM, QMS, and ISO standards within education is often framed to enhance accountability, efficiency, and international competitiveness, critical management studies offer a more problematised view of these developments. Morley (2003) argues that the discourse of quality in higher education is deeply entangled with structures of power, where quality assurance processes often function as mechanisms of control rather than genuine tools for improvement. Rather than fostering academic innovation, the imposition of TQM and QMS may intensify bureaucratic demands, leading to the standardisation of educational practices and a narrowing of academic autonomy (Morley, 2005). Similarly, Anderson (2006) highlights how academics in Australian universities have expressed resistance to quality assurance regimes, viewing them as external impositions that undermine professional judgement and intellectual freedom. These critiques suggest that incorporating corporate quality models into educational contexts is not neutral but politically charged, often generating tensions between managerial imperatives and the core educational mission. In light of these perspectives, it becomes crucial to critically examine the uncritical adoption of TQM, QMS, and ISO frameworks in education, especially in non-Western contexts such as Oman, where educational values may prioritise holistic development and cultural preservation over market-driven notions of quality.

3.2.5   Section Five: The research pillars: QMS and employee Awareness, effective training, and organisational skills:

In the educational context, Fonseca and Domingues (2018) identify numerous advantages stemming from the integration of ISO 9001:2015. They underscore that embedding this QMS within educational institutions yields substantial benefits. Specifically, ISO 9001 aids in elevating the quality of educational services, optimising resource allocation, and enhancing the institution's reputation. Moreover, adherence to ISO 9001 standards enables educational institutions to manage their processes methodically, ensuring consistent service quality. This, in turn, enhances stakeholder satisfaction, including students, staff, and regulatory bodies, thereby strengthening the institution's standing. Furthermore, prioritising a commitment to quality enables educational institutions to

demonstrate their dedication to delivering high-quality educational services, thereby enhancing their competitive edge within the educational sector.

Thus, Mukwakungu and Mbohwa (2018) underscore critical elements essential for the success of quality initiatives, including heightened awareness and comprehension of quality principles. Additionally, Othman (2019) contends that expanding QMSs within education significantly enhances employee satisfaction by fostering awareness and focusing on principles that secure educators' endorsement. This approach also enhances organisational proficiency through enhanced training programmes and a robust emphasis on competence development (Kuncoro, 2013). Sections 3.2.5.1 and 3.2.5.2 and 3.2.5.3 Discuss the impact of the QMS on employees' awareness, the effectiveness of training, and organisational skills.

3.2.5.1   Impact of QMS on Employee Awareness:

Dumond and Johnson (2013), Manders (2015), and Matorera (2018) collectively underscore the significance of fostering employee awareness and involvement in the implementation of ISO 9001:2015 QMS standards within organisational and educational contexts. They emphasise the necessity for employees to understand the benefits and importance of ISO 9001:2015 implementation. Various methods are proposed across the studies to achieve this goal, including training programmes (Dumond and Johnson, 2013), communication channels using technology (Matorera, 2018), as well as active participation of management (Dumond and Johnson, 2013). While Manders (2015) addresses these strategies in a general organisational setting, involving employees from different departments enhances their understanding of how the Organisation's processes integrate. Engaging employees in implementing ISO 9001 fosters ownership and responsibility for the QMS, promoting a culture of continual improvement (Matorera, 2018). Additionally, establishing training programmes to educate employees about ISO 9001 and its requirements can enhance their comprehension and support for the system (Dumond and Johnson, 2013).

Dumond and Johnson (2013) highlight ISO 9001's relevance within educational institutions, stressing that consistent information dissemination, employee training, and communication are essential components. As they address, implementing a QMS can bring multiple advantages to academic institutions. It ensures comprehensive understanding and compliance with QMS across all levels of the organisation (Dumond

and Johnson, 2013). Additionally, it promotes ongoing enhancement and innovation in instructional programmes and processes, thereby improving educational services (Matorera, 2018). Furthermore, ongoing staff training guarantees that employees acquire and maintain the requisite expertise and abilities to perform their roles effectively. (Dumond and Johnson, 2013). Effective communication further fosters transparency and accountability, enhancing decision-making. Moreover, these practices support ISO 9001 certification, thereby boosting competitiveness in the educational sector (Dumond and Johnson, 2013; Manders, 2015).

Matorera (2018) offers a broader analysis of QMSs in education, delving into their impact on individual behaviour, knowledge, and skills, and advocating for personal and institutional development opportunities through self-reflection and personal mastery. Despite differences in context and scope, Dumond and Johnson (2013), Manders (2015), and Matorera (2018) collectively emphasise the pivotal role of employee awareness and involvement in maintaining a successful QMS aligned with the ISO 9001:2015 standards of each organisation. Also, the study of Kerdpitak and Boonrattanakittibhumi (2020), which draws on data gathered from 151 Organisations across seven Association of Southeast Asian Nations (ASEAN) countries, indicates that adopting a Human Resource-Linked Quality Assurance (HR-LQA) system positively influences product innovation and operational efficiency. The study underscores that integrating an HR-LQA system can enhance the effectiveness and productivity of a company's operations. Furthermore, it reveals that the assimilation of knowledge entirely mediates the impact of the HR-LQA system on operational efficiency. Essentially, the implementation of an HR-LQA system leads to heightened assimilation of knowledge, consequently resulting in improved operational proficiency. (Kerdpitak and Boonrattanakittibhumi, (2020).

Manders (2011), Matorera (2018), and Dumond and Johnson (2013) advocate for the consistent dissemination of information regarding the QMS. They outline various strategies to enhance employee awareness of ISO 9001:2015 implementation and ensure its effective adoption. According to Matorera's (2018) findings, raising awareness about the QMS facilitates the establishment of effective communication channels and the refinement of employee skills.

In the Omani context, Alnabhani's (2007) study focuses on enhancing the educational framework at the MOE in Oman through the implementation of TQM principles. A key

aspect of Alnabhani's (2007) study is the emphasis on understanding TQM principles among educational employees and leaders. The study highlights the importance of educating stakeholders about TQM to ensure its successful implementation. By identifying challenges such as centralisation and weak teamwork motivation, the study underscores the necessity for raising the understanding of TQM within the MOE to facilitate a more supportive environment for quality management practices. In the same context, AL Basami's (2022) research paper delves into the resistance to change in the MOE implementation of QMS. One of their significant findings is the impact of a lack of awareness about QMS requirements on employees' performance. Besides, AL Basami's (2022) study contributes to the understanding that awareness (or the lack thereof) plays a crucial role in the effectiveness of QMS implementation, as it directly influences employees' ability to adapt and perform under the new system. The study suggests that increasing employee awareness about QMS could mitigate resistance and improve overall performance.

3.2.5.1.1   Dissemination and assimilation of QMS through knowledge and efficient communication:

Similarities of thought between Dumond and Johnson (2013), Wahid (2019) and Balahadia, Dalugdog and Cabiente (2022) lie in the emphasis on effective communication and employee involvement in ISO 9001:2015 implementation. Dumond and Johnson (2013) stress the importance of consistent information dissemination, training, and communication to foster employee ownership of the quality system, a notion supported by Balahadia, Dalugdog and Cabiente (2022), who highlights the critical role of transparent communication and seeking input from employees. Similarly, Wahid (2019) underscores the significance of knowledge transfer through various professional development and training methods, including peer mentoring and structured training sessions, in sustaining QMSs. However, Dumond and Johnson (2013), Wahid (2019) and Balahadia, Dalugdog and Cabiente (2022) also exhibit differences in their focus and findings. While Dumond and Johnson (2013) and Balahadia, Dalugdog and Cabiente (2022) primarily concentrate on communication channels and employee awareness during ISO 9001:2015 implementation, Wahid (2019) delves into knowledge transfer and commercialisation in sustaining QMS in higher education, discussing challenges faced during implementation and providing managerial implications. Additionally, while Balahadia, Dalugdog and Cabiente (2022) specifically address the level of awareness and challenges among teaching and non-teaching personnel in a university, Wahid (2019)

provides insights and lessons learned from a case study conducted at a Malaysian university, offering general guidance for ISO 9001-based QMS implementation across organisations.

3.2.5.1.2   Responsibilities and duties with QMS:

This ensures that employees are aware of their responsibilities and understand how their contributions contribute to the broader quality framework (Celik and Ölcer, 2018; Rohayati and Sari, 2019). According to Zelnik et al. (2012), inadequate awareness of QMS processes often leads to a series of practical barriers, including the misinterpretation of organisational goals, resistance to procedural changes, inconsistent application of QMS procedures, and a lack of motivation among employees to engage in QMS activities. These barriers manifest in various ways: employees may not fully understand their specific roles within the QMS, leading to fragmented and ineffective implementation; resistance to procedural changes can stem from a lack of clarity and understanding, resulting in a workforce that is hesitant or even opposed to adopting new practices; and the perceived complexity of QMS requirements can demotivate employees, who may see these requirements as burdensome rather than beneficial.

Zelnik et al. (2012) provide tangible examples of these challenges, illustrating how insufficient awareness can disrupt the intended benefits of QMS. For instance, employees who do not comprehend their roles within the QMS framework are less likely to contribute effectively to quality initiatives. Similarly, resistance to change is exacerbated when employees are not adequately informed about the reasons behind procedural modifications, leading to a workplace culture that is resistant rather than adaptive. The complexity of QMS requirements, when not properly communicated, can further discourage engagement, as employees may feel overwhelmed and demotivated (Zelnik et al., 2012)

Conversely, Rogala (2016) identifies a slightly different aspect of the issue. While acknowledging that awareness of QMS weaknesses exists among management representatives, Rogala emphasises that the more significant obstacles are insufficient involvement from managers and staff, coupled with limited resources. This suggests that merely increasing awareness of QMS processes is not a panacea for improving quality management outcomes. Instead, Rogala argues that the lack of engagement from key stakeholders and the scarcity of resources are critical factors that must be addressed to

enhance QMS effectiveness. Rogala (2016) implies that management is often aware of the deficiencies within their QMS but may struggle to address these issues due to inadequate participation from management and staff. This lack of involvement can stem from a variety of factors, including competing priorities, insufficient training, and a lack of incentive structures to encourage active engagement. Additionally, limited financial, temporal, or personnel resources exacerbate the challenge of implementing QMS effectively (Rogala, 2016).

In summary, while increasing awareness of QMS is necessary, overcoming the barriers to effective implementation is insufficient. Both Zelnik et al. (2012) and Rogala (2016) highlight the multifaceted nature of these challenges, underscoring the need for a comprehensive approach that raises awareness, fosters engagement, and ensures adequate resources. For QMS to be genuinely effective, Organisations must address these intertwined issues, creating an environment where management and staff are actively involved and sufficiently supported in their quality management efforts.

To circumvent the challenges associated with implementing ISO 9001 standards, it is imperative to cultivate awareness through targeted training (Bernardo et al., 2015) and effective communication (Balahadia, Dalugdog, and Cabiente, 2022) of quality standards and objectives among employees. These measures are essential for successfully adopting ISO 9001 within business and educational settings (Lambert and Ouedraogo, 2008; Manders, 2015). Furthermore, comprehensive training facilitates a profound understanding of the QMS, enabling employees to comprehend their roles and responsibilities clearly. This alignment of employee actions with the organisation's quality objectives (Wahid, 2019) ensures consistent adherence to the QMS, thereby enhancing overall performance and quality outcomes.

Girmanová et al. (2022) underscore the importance of robust QMS in education, advocating for the continual use of quality management models to uphold service standards. Their study delves into the responsibilities and obligations of employees within a university's QMS, highlighting the critical role of human resource management and leadership in achieving strategic goals.

Moreover, Girmanová et al. (2022) emphasise aligning staff development and performance management with organisational objectives. They recommend formulating individualised career development plans and involving employees in the university's

planning and development process. Additionally, they underscore the need for improving communication channels, conducting individual employee interviews, and removing barriers to constructive criticism to enhance internal communication and facilitate staff development and performance management. Furthermore, Girmanová et al. (2022) stress the necessity of an active information policy towards employees, suggesting that management should transform the system to meet individual needs and set incentive, motivational conditions. The study of Girmanová et al. (2022) also identifies key challenges in implementing quality management models in education, such as the need for staff training to ensure effective understanding and implementation of QMS practices. The involvement of multiple stakeholders often results in a time lag in observing results, reducing the impact of training and processes. Also, maintaining stakeholder engagement and commitment is crucial amidst changes and challenges. Effective communication strategies are essential to mitigate these issues and ensure the successful implementation of QMS in educational institutions (Girmanová et al., 2022)

In conclusion, while effective communication is a foundational element in promoting employee awareness of QMS, addressing underlying challenges requires a multifaceted approach.

3.2.5.1.3 Feedback, improvement, and motivation:

Zeng, Tian, and Tam (2007) highlight the significance of gathering employee feedback as a means of pinpointing areas requiring enhancement and improving overall effectiveness. Similarly, Boiral (2011) suggests that when employees feel valued and heard, they are more motivated to participate actively in ISO 9001:2015 implementation. Moreover, Zeng, Tian, and Tam (2007) underscore that feedback mechanisms are pivotal in cultivating a culture of ongoing improvement and innovation. Within higher education, Al-Jaghoub et al. (2019) observed that engaging staff in implementing ISO 9001 contributed to enhanced satisfaction and overall institutional performance. This underscores the significance of employee engagement in the implementation process.

In healthcare settings, feedback mechanisms connecting TQM practices to employee satisfaction have proven beneficial (Alsalamah, 2023). Understanding employee perspectives on QMSs aids decision-making processes, enhancing satisfaction and quality performance. In the context of educational establishments, feedback is instrumental in maintaining the quality of services and fulfilling the expectations of stakeholders (Pradeep and Kalicharan, 2019). Challenges such as financial constraints and resistance

to change must be addressed to leverage feedback effectively for educational improvement (Pradeep and Kalicharan, 2019). Moreover, input derived from QMS reports offers numerous benefits for employee development within organisations, as it identifies training needs, encourages participation, and aligns individual and organisational objectives (Alsalamah, 2023). Girmanová et al. (2022) note its role in cultivating problem-solving skills and enhancing process efficiency, contributing significantly to continuous improvement efforts.

In improvement and innovation, the existing literature presents varied findings regarding the correlation between QMS and innovation performance. Previous studies have primarily suggested a direct link between QMS and innovation (Escrig-Tena *et al.*, 2018). In the context of motivation, a case study in Malaysia focused on the motivation and benefits of ISO 9001:2015 implementation and maintenance in a Malaysian legal firm (Nahzatul Ain and Ab Wahid, 2022). Nahzatul Ain and Ab Wahid (2022) highlight the main benefits of implementing and maintaining ISO 9001:2015 in a legal firm. Notably, work has become more systematic, and record-keeping and work tracing have improved, allowing for detailed analysis. Furthermore, there is better familiarity with the quality policy, procedures, and job scope, which reduces overlapping functions and roles. Additionally, enhanced records and tracking facilitate easier management, including traffic management and control. The improved system also benefits suppliers and subcontractors and aids in monitoring and rewarding staff. Moreover, the firm experiences increased revenue and profit before tax, alongside growth in business volume and scope. Service quality also improves, and operating costs decrease as a result. The research highlighted several relationships that were discovered during the study, as a relationship between motivations and implementation, the firm's decision to implement the ISO 9001:2015 standard was motivated by both internal factors, such as the desire for enhanced workflow and productivity, and external factors, including global recognition and client trust. Moreover, the implementation of ISO 9001:2015 was linked to internal benefits like improved workflow, as well as external advantages such as increased client trust, which may subsequently enhance the firm's market position and competitiveness. Furthermore, the significant reduction in the rejection rate from 80% to 10% following ISO 9001 certification suggests a direct correlation between the firm's certification and an improved perception of service quality by both panels and clients. Nevertheless,

despite governmental incentives, the low uptake of ISO 9001 certification among legal firms indicates that there are additional barriers to adoption, beyond financial costs.

The Malaysian study's limitations include its reliance on a single case study, which may restrict generalisability, and a small sample size, potentially limiting the representation of broader population perspectives. Additionally, being self-funded could constrain the research scope due to budget limitations, while the qualitative approach might introduce interpretive biases to the findings.

3.2.5.1.4 Employee Performance Evaluations

The implementation of ISO 9001:2015 serves as a crucial framework for enhancing organisational performance and individual employee effectiveness. Various studies (for example, Rohayati and Sari, 2019 and Al-Jaghoub et al., 2019) have highlighted the impact and challenges associated with ISO 9001:2015 implementation.

Similarities across studies emphasise the pivotal role of ISO 9001:2015 in shaping employee engagement and performance (Rohayati and Sari, 2019; Al-Jaghoub et al., 2019; Balahadia, Dalugdog and Cabiente, 2022; Irsyada et al., 2018). Firstly, the ISO 9001:2015 implementation serves as a cornerstone for performance evaluations and individual employee goals (Rohayati and Sari, 2019). This integration underscores the significance of ISO standards in delineating performance metrics and fostering a quality culture within Organisations. Similarly, the involvement of employees in providing feedback and suggestions for improvement regarding ISO 9001:2015 implementation is emphasised across studies (Al-Jaghoub et al., 2019). This participatory approach, not only enhances the quality of implementation, but also cultivates a sense of ownership and commitment among employees towards organisational objectives.

Furthermore, the implementation of ISO 9001:2015 is found to bolster employee effectiveness and organisational skills (Balahadia, Dalugdog and Cabiente, 2022). Clear communication of job responsibilities and expectations, coupled with resource allocation for skill development, ensures that employees are equipped to perform their roles efficiently. Moreover, the emphasis on continuous improvement embedded within ISO standards nurtures a culture of innovation and initiative among employees, thereby fostering Organisational growth (Irsyada et al., 2018).

However, as well as these similarities, differences emerge in the challenges associated with ISO 9001:2015 implementation. A case study on the "Achievement of QMS ISO

9001:2015 strategy in Vocational High School" highlights potential inconsistencies in quality control measures and the effectiveness of the system (Irsyada et al., 2018). For example, non-adherence to required lesson plans and procedural errors pose significant hurdles to the seamless functioning of ISO 9001:2015 within educational settings. Such challenges underscore the importance of stringent adherence to ISO standards and continuous monitoring to mitigate potential discrepancies.

In summary, while the implementation of ISO 9001:2015 yields numerous benefits in enhancing organisational performance and employee effectiveness, challenges such as quality control inconsistencies and procedural errors necessitate meticulous attention to detail and adherence to standards to ensure optimal outcomes. Thus, while the integration of ISO 9001:2015 can catalyse organisational excellence, addressing inherent challenges is imperative for realising its full potential.

3.2.5.1.5 Impact of QMS on employee awareness and demographic data:

The studies conducted by Macalos-Galbo (2023) and Fronda (2019) both contribute to the understanding of ISO 9001:2015 QMS implementation within organisational settings, albeit within different contexts. Macalos-Galbo's (2023) research in a university environment investigates the determinants of employee awareness regarding the ISO 9001:2015 QMS. Specifically, the study examines the influence of demographic factors for example gender, educational attainment, position/designation, and attendance of relevant training sessions on employees' level of awareness. The study by Macalos-Galbo (2023) focused on assessing the link between respondents' profiles and their awareness of the ISO 9001:2015 QMS within a university setting (Philippines), as well as the motivation of process owners. Furthermore, the findings indicated that there appeared to be no notable association between respondents' age and years in the profession with their awareness of ISO 9001:2015 QMS, leading to the retention of a null hypothesis. This suggests that age and years of experience do not influence awareness levels of the QMS. However, a significant relationship was found between respondents' gender, academic qualifications, professional role, and the frequency of pertinent training engagements, leading to the rejection of these hypotheses. This implies that gender, educational background, job role, and training participation are influential factors in shaping awareness of ISO 9001:2015 QMS among university workers. Therefore, the study concludes that years of experience do not significantly impact awareness levels of the ISO 9001:2015 QMS within the university context.

In contrast, Fronda's (2019) investigation focused on assessing the scale of application of the QMS in school division Offices (SDOs) within the Central Luzon Region of the Philippines, specifically in the provinces of Bataan and Bulacan. Additionally, it sought to determine whether significant differences in the level of QMS implementation exist based on background variables such as age, gender, academic qualifications, length of service, job status, and admissibility criteria.

Ultimately, the study aimed to develop a proposed model that could be offered to other SDOs to assist them in preparing for ISO certification and implementing QMS in their respective offices. While both studies consider demographic variables, Macalos-Galbo emphasises the impact of educational accomplishment and training attendance on QMS awareness, while Fronda (2019) extends the analysis to factors including age, employment status, and years in service, particularly examining their effects on commitment levels, nevertheless, no significant difference was observed when the respondents were categorised by employment status and eligibility.

Furthermore, Macalos-Galbo's (2023) study suggests that heightened responsiveness of the ISO 9001:2015 QMS could foster increased work motivation among employees, based on the findings, with heightened awareness of the ISO 9001:2015 QMS potentially boosting employee motivation within the university setting. The Quality Assurance Office should enhance this by conducting comprehensive re-orientation sessions for all process owners, focusing particularly on Clause 6 (Planning), Clause 7 (Support), Clause 4 (Context of the Organisation), and Clause 10 (Improvement). His study aims to increase awareness levels and consequently improve motivation among university process owners. while Fronda recommends tailored training programmes to address differences in commitment levels across demographic segments.

Neyestani (2016) conducted a survey-based analysis to examine the demographic profile of respondents from various construction companies in Metro Manila classified as AAA or large-scale. Thirty-seven participants from top, medium, and lower-level management provided information on their gender, age, the duration of their company's QMS implementation, and their level of knowledge regarding QMS implementation. The data were analysed based on the respondents' answers, with results presented in tables categorising respondents by gender and age group, for example. The findings revealed that most managers in construction projects are male, with most respondents aged

between 30 and 39 years. Additionally, most respondents belonged to organisations that had implemented QMS for three years or more and exhibited moderate to high levels of knowledge about QMS implementation. The demographic data offer insights into the characteristics of managers in construction projects in Metro Manila. For instance, there is a significant gender disparity in the industry, with 84% of respondents being male. Furthermore, the prevalence of respondents aged between 30 and 39 years suggests this age group holds a substantial number of decision-making positions. Moreover, the data show that most respondents come from companies with at least three years of QMS experience, indicating the increasing prevalence of QMS in the industry. Also, Murmura and Bravi (2016) discovered that, apart from the youngest group, more than half of the participants knew about ISO 9001 and felt more secure if a company was certified. The age group of 36 to 45 years old showed the highest awareness levels of the standard, and knowledge of it increased with age. Older respondents had more work experience, which probably gave them the chance to learn about certified businesses and international standards. In contrast, younger respondents were less vocal about how they felt about certified internal management systems.

Finally, the moderate to high levels of QMS knowledge among respondents suggest a growing awareness of the importance of QMS. Table 8 compares the studies by Macalos-Galbo (2023), Fronda (2019), and Neyestani (2016) based on their similarities, differences, significance, and other relevant aspects.

Aspect	Macalos-Galbo (2023)	Fronda (2019)	Neyestani (2016)
Context	University environment in the Philippines	Schools Division Offices in Central Luzon, Philippines	Construction companies in Metro Manila, Philippines
Aim	Investigate determinants of employee awareness and motivation regarding QMS	Assess level of QMS implementation and demographic impacts on it	Examine demographic profiles and QMS knowledge levels

Demographic Factors Examined	Sex, educational attainment, position/designation, training attendance	Age, sex, educational attainment, years of experience, employment status, eligibility	Gender, age, QMS implementation duration, QMS knowledge
Statistical Methods	Chi-Square Test	Various statistical methods	Survey-based analysis and tabulation
Significant Findings	- No significant relationship between age/years of experience and QMS awareness - Significant relationship between sex, educational attainment, position, training, and QMS awareness	- No significant impact of employment status and eligibility on QMS implementation - Differences in age, sex, educational attainment, and years of experience affecting QMS commitment levels	- Significant gender disparity (84% male) - Predominance of managers aged 30-39 - Most companies had 3+ years of QMS implementation and moderate to high QMS knowledge
Impact on QMS Awareness	Educational attainment and training significantly enhance QMS awareness	Demographic factors affect QMS commitment levels	Moderate to high QMS knowledge among managers
Impact on Employee Motivation	Increased QMS awareness can boost work motivation	Recommends tailored training to address demographic differences	Highlights the prevalence and growing importance of QMS
Practical Recommendations	Conduct comprehensive re-orientation sessions focusing on key QMS clauses	Develop model for SDOs to prepare for ISO certification, implement QMS	None specifically, but highlights need for addressing gender disparity and age demographics

Unique Contributions	Focus on the academic environment and motivation aspects	Provides a model for ISO certification preparation in SDOs	Highlights demographic characteristics in the construction industry

Table 8 Comparison of Macalos-Galbo (2023), Fronda (2019), and Neyestani (2016) studies

To sum up, the impact of QMS on employee awareness is multifaceted and crucial for the successful implementation and maintenance of ISO 9001:2015 standards within organisations. Manders (2015) emphasises that various methods, including training programmes, communication channels, and awareness campaigns, enhance employee understanding and motivation for ISO 9001:2015 implementation. Similarly, Dumond and Johnson (2013) stress the significance of fostering employee involvement and ownership in the QMS through consistently disseminating information, training, and communication. Moreover, Matorera (2018) underscores the role of QMS in shaping individual behaviour, knowledge, and skills, thereby contributing to personal and institutional development opportunities.

Effective communication, knowledge sharing, and adherence to ISO 9001:2015 standards are essential for increasing employee awareness of QMS (Wei *et al.,* 2022). Wahid's (2019) case study in a Malaysian university highlights the importance of knowledge transfer in sustaining QMS, while addressing challenges such as inadequate communication and lack of training. Additionally, feedback mechanisms are crucial in improving QMS effectiveness and employee satisfaction, as evidenced by studies like Alsalamah (2023) and Pradeep and Kalicharan (2019). Furthermore, QMS awareness influences employee performance evaluations and job roles, as highlighted by Rohayati and Sari (2019) and Irsyada et al. (2018). However, challenges such as inconsistencies and errors may hinder QMS effectiveness, underscoring the need for careful implementation and continuous improvement. Moreover, demographic factors like sex, educational attainment, and training attendance influence employee awareness of QMS (Macalos-Galbo, 2023). Tailored training programmes addressing these differences are essential, as proposed by Fronda (2023) in the context of Department of Education Schools Division Offices in the Central Luzon Region.

To conclude, the literature, as noted above purports that promoting employee awareness of QMS through effective communication, training, and feedback mechanisms is vital for successful ISO 9001:2015 implementation. Tailoring training programmes to demographic factors and addressing challenges through continuous improvement efforts are essential for sustaining QMS effectiveness and enhancing organisational performance.

3.2.5.2 The Effectiveness of the QMS training:

Effective QMS training is crucial for equipping employees with the necessary skills and knowledge to proficiently implement ISO 9001:2015 processes and maintain standards, as evidenced by Priede (2012) and Bernardo et al. (2015), and for enhancing organisational skills (Lambert and Ouédraogo, 2008). Moreover, aligning training programmes with ISO 9001:2015 objectives and incorporating expert-led sessions significantly boosts efficacy (Quazi and Jacobs, 2004; Rohayati and Sari, 2019). Although solutions such as training or hiring specialists could benefit respondents, the additional costs associated with standardised QMSs are a significant drawback (Zimon, 2016). Comprehensive training fosters expertise and facilitates the effective implementation of QMS processes, leading to organisational improvement (Deros et al., 2012). Additionally, a well-designed training programme promotes an understanding of roles within the QMS, thereby enhancing organisational skills for effective coordination and management (Dentch, 2016, pp. 86-91; Psomas, 2013). Furthermore, regular evaluation and adjustment of training programmes based on employee feedback are imperative for continual improvement (Bernardo et al., 2015; Rohayati and Sari, 2019).

3.2.5.2.1 Awareness and training:

Comprehensive training and orientation programmes can be conducted to educate employees about the ISO 9001:2015 quality management processes and their potential benefits to both the Organisation and individual employees (Rusjan and Alič, 2010). To ensure that employees are aware of these benefits, organisations can provide training and seminars on ISO 9001:2015 (Fonseca, 2019). This can help employees understand the importance of the standard and its potential impact on their work.

A case study in a company in Malyasia, titled *Evaluation of Training Effectiveness on Advanced Quality Management Practices,* assessed the efficacy of training initiatives administered by Company X among Malaysian small and medium enterprises (SMEs). It

scrutinises participants' viewpoints regarding various facets of the training programme, encompassing content, delivery techniques, resources, and instructors provided by Company X. The objective was to pinpoint the programme's strengths, which participants concurred included the facilitator's use of real-world illustrations, thorough preparation, mastery of subject matter, lucid presentation style, engagement of participants in discussions and activities, and effective delivery (Deros et al., 2012). The presence of illustrations to present the programme probably helped to understand the queries of the QMS. In their study by Clegg, Rees and Titchen, (2010) the main findings reveal a lack of familiarity and comprehension regarding several quality tools, emphasising the significant role of training in increasing awareness and ensuring their proper utilisation. However, of note is that the study's limited sample size of 79 respondents may constrain the generalisability of its findings to a broader population.

Boiyon, Manduku and Rotumoi (2020) examined how the training of Quality Assurance Officers (QAOs) in Kenyan public universities correlates with customer satisfaction. Their results showed a significant positive relationship between QAOs' training and heightened customer satisfaction in these institutions. Additionally, it was found that most QAOs held doctorate degrees and had less than 10 years of experience, with all having received training on QMSs, mainly through on-the-job methods. However, statistics on QAO qualifications and tenure were not directly pertinent to the study's primary focus. The research identified gaps in training that impact its quality, particularly noted by QAOs who perceive the training they receive is not standardised to ISO standards, which emphasises a concept that customized training is deemed necessary to ensure institutional adherence to established quality standards.

The study by Kravchenko and Saienko (2020) discusses various aspects of higher education quality, including workforce qualification levels in Ukraine, the significance of QMSs in educational institutions, and the correlation between end-user satisfaction and the maturity of QMS. It reviews the assessment of QMS development in higher education institutions (HEIs) and suggests the use of modern information technologies for more effective quality monitoring, such as collecting feedback from students and analysing data on student performance. Moreover, modern information technologies are indeed related to the use of software for analysing data on student performance. Specifically, they involve using advanced tools and applications to collect, process, and interpret data on various educational metrics. Consequently, this allows institutions to monitor quality

more effectively, make informed decisions, and implement improvements based on real-time feedback and performance analysis. Therefore, software that analyses data on student performance plays a crucial role in the continuous enhancement of educational quality and the effectiveness of QMS in HEIs. Additionally, it emphasises that information technology is not merely a supplementary tool but a necessity for restructuring knowledge and institutional frameworks in higher education, ultimately leading to improved education quality. Moreover, Al hashami's (2022) study explores the application of TQM principles within the context of curriculum development and evaluation at the MOE in Oman, with a particular focus on ISO 9001:2015 practices. The study assesses how these practices influence organisational performance, specifically their impact on employee training. The findings suggest that TQM provides a framework for continuous improvement, which is essential for enhancing the effectiveness of training programmes. By identifying challenges such as lack of communication and inadequate resources, the study highlights the need for targeted training initiatives that align with TQM principles to improve employee skills and overall organisational effectiveness.

To sum up, the effectiveness of comprehensive training programmes on ISO 9001:2015 quality management processes is crucial for organisational success, as highlighted by various studies. These programmes aim to educate employees about the standard's importance and benefits, ensuring that staff are fully aware and understand its implications. Nevertheless, evaluating the effectiveness of training is essential. For instance, the Malaysian SME study emphasised the significance of well-prepared facilitators and engaging delivery methods. Moreover, the training of Quality Assurance Officers in Kenyan universities was found to significantly correlate with increased customer satisfaction, underscoring the importance of tailored training to meet ISO standards. Furthermore, the study on higher education quality in Ukraine emphasised the role of modern information technologies in effective quality monitoring. It highlighted the imperative nature of these technologies for restructuring educational frameworks and improving overall education quality. Consequently, addressing training gaps and leveraging technology are critical steps for enhancing the effectiveness of QMSs in educational institutions. Additionally, the integration of modern information technologies, such as software for data analysis on student performance, facilitates real-time feedback and informed decision-making, thereby contributing to continuous improvement and higher standards of education quality.

3.2.5.3   Organisational skills:

The researcher encountered challenges in locating studies about the QMS, which is closely linked to organisational skills. Consequently, there was a necessity to explore skills separately, such as teamwork, time management, decision-making, and prioritisation, among others, which serve as indicators of organisational skills. Furthermore, difficulties arose in accessing studies addressing the implementation of the quality system within educational contexts and its influence on organisational skills within the educational domain. Therefore, the forthcoming subsection will delve into the exploration of defining exploring the organisational skill types and examining their relevance within the workplace context.

3.2.5.3.1   Defining Skills, Organisational Skills:

Durand (2020) defines organisational skills as a set of abilities, emphasising the multifaceted nature of skills encompassing various competencies. Pereira, Amaral, and Mendes (2023, pp. 29-38) further elaborate that skills are the capacity to perform an activity or job proficiently. Rao (2018) concurs, adding that skills involve the ability to perform well, whether this proficiency arises from innate talent or is cultivated through hard work and practice. Thus, synthesising emphasising these viewpoints, skills can be understood as a set of abilities that enable an individual to perform tasks or jobs effectively, acquired through inherent talent or developed through diligent effort and practice. Additionally, skills are competencies developed through training and experiences (Pereira, Amaral, and Mendes, 2023, pp. 29-38), which enable individuals to perform tasks efficiently (Kastayev and Grinshkun, 2023).

Moreover, organisational skills are conceptual capacities that support goal-directed behaviour in the broader community, according to Durand (2020). In contrast, Kastayev and Grinshkun (2023) elaborate on organisational skills within the framework of prospective teachers, describing them as encompassing diverse actions such as design, technology use, analysis, and evaluation. Furthermore, these skills include research, constructive problem-solving, organisational proficiency, information management, and effective communication, underscoring their multifaceted role within the educational system (Kastayev and Grinshkun, 2023). Furthermore, Bratu and Cioca (2021) defined organisational skills as the capacity to efficiently handle multiple tasks, time, and resources to attain precise objectives. They also suggested that these skills represent a holistic competence fostering a lifestyle and work approach centred on achievement and

success. Reflecting on that, organisational skills are not innate; they are learned over time. They can be developed and improved through practice and experience rather than being solely innate abilities.

Also, Kastayev and Grinshkun (2023) and Rao (2018) elaborate on the critical role of organisational skills in professional contexts. They emphasise that these skills are essential for effective task management, ensuring clear communication, meeting deadlines, and maintaining a focused approach towards achieving goals. These capabilities empower individuals to methodically structure tasks, maintain workspace orderliness, and develop strategies aimed at enhancing productivity and overall performance in diverse fields. Together, they highlight that organisational skills encompass the ability to plan, prioritise, and coordinate tasks efficiently, encompassing components such as work organisation, clear communication, punctuality, goal-driven behaviour, diligence, workspace organisation, strategic planning, and attentiveness. Also, Bratu and Cioca (2021) articulate that organisational skills encompass the ability to strategies, prioritise, manage time and resources efficiently, set objectives, resolve challenges, make decisions, and communicate effectively, alongside other essential competencies.

The preceding discussions have underscored the definitions of skills and organisational skills, the importance of organisational skills, and their diverse manifestations. Next, the literature review in the following section delves into research pillar three concerning organisational skills and their integration with QMSs.

3.2.5.3.2   Impact of QMS on the organisational skills:

Neyestani (2016) investigated the effectiveness of QMS on construction projects and found that implementing of QMS contributes to improving organisational skills. Specifically, the QMS has a significant positive effect on four key organisational skills which are: problem-solving, decision-making, teamwork, and communication. According to the study conducted by Neyestani (2016), the study indicates that multiple variables influence the degree of effectiveness such as business size, employee involvement, top management commitment, knowledge sharing, supplier involvement, process management, internal and external communication, and employee involvement. Neyestani's (2016) study, however, has acknowledged limitations, such as the limited number of participants, the geographic boundaries of the investigation, and the focus only

on the construction industry in one country, which may compromise the generalisability of the findings.

The study of Escrig-Tena *et al.* (2018), conducted in the chemical manufacturing and IT service sectors in Spain, examines the relationship among quality management practices, proactive behaviour, and innovation performance. Results suggest that both soft quality management practices (encompassing aspects such as customer focus, teamwork, leadership, and continuous improvement) and hard quality management practices (comprising elements like statistical process control, quality data analysis, progression development, and defect prevention) positively impact proactive behaviour, subsequently enhancing innovation performance. The study revealed that soft quality management (QM) does not directly influence product or process innovation but has a significant positive correlation with proactive behaviour. Conversely, hard QM positively affects both product and process innovation performance. Thus, there is a distinct difference in how human-centred and systematic QM impact innovation performance: systematic QM directly enhances innovation performance, while innovation QM appears to have an indirect effect by fostering proactive behaviour (Escrig-Tena *et al.*, 2018).

In education, Hussein *et al.* (2017) underscore the significance of time management and teamwork in successfully implementing QMS within university settings. It highlights the common issue of university personnel being overwhelmed with tasks, suggesting that forming a dedicated team could alleviate time management challenges. Additionally, the study emphasises the significance of collaborative efforts among team members, stressing effective communication, problem-solving skills, and alignment with organisational goals. Consequently, it advocates for the positive impact of QMS implementation on enhancing time management efficiency and fostering effective teamwork, ultimately leading to improved organisational outcomes for stakeholders. (Hussein *et al.*, 2017). The primary findings of the investigation indicate that accreditation, top management commitment, and effective time management are pivotal factors for the adoption of ISO 9001:2015 in Lebanese universities. Nevertheless, challenges such as insufficient awareness and resistance to change persist. Additionally, while resource availability was noted as a concern by the higher educational directorate, surveyed universities did not prioritize it as a top concern. A notable limitation of the study is its small sample size (10 out of 45 universities), potentially limiting the generalisability of the findings to other educational institutions (Hussein *et al.*, 2017).

Aniskina and Terekhova (2019), from Russia, highlight the benefits of implementing QMS in educational institutions, including staff involvement, goal alignment, leadership development, and enhanced organisational performance. Effective methods for team consolidation and staff engagement have been identified and utilised. Education outcomes can be greatly enhanced by integrating staff members into the QMS implementation process and developing their abilities. Additionally, achieving QMS in education necessitates both technical and soft skills, such as leadership, communication, teamwork, critical thinking, problem-solving, and creativity, to foster a culture of quality and engage stakeholders in improving educational outcomes (Aniskina and Terekhova, 2019).

Al Mushaifri's (2019) study investigates the quality of leadership practices among educational leaders at the MOE in Oman and their application of TQM principles. The study finds a preference for participative leadership styles among Omani educational leaders, which has a direct impact on organisational skills, particularly in fostering a collaborative work environment. The study reveals a positive, albeit weak, correlation between leadership practices and TQM principles, suggesting that while some alignment exists, there is room for improvement in organisational skills, especially in overcoming cultural and organisational barriers. The study provides recommendations for enhancing leadership practices to better support organisational development within the educational sector.

In addition to its focus on training effectiveness, Al hashami's (2022) study at MOE in Oman also addresses organisational skills by examining the impact of TQM principles on organisational performance. The study identifies key organisational challenges within the Directorate General of Curricula (DGC), such as communication gaps, lack of coordination, and inadequate resources, which are critical to organisational effectiveness. The findings suggest that implementing TQM can enhance organisational skills by promoting better process management, employee involvement, and continuous improvement practices. The study's recommendations for improving these areas further contribute to the development of organisational skills within the MOE.

3.2.5.4   Relationships (awareness, training, and organisational skills):

The research conducted by Batista, Feijo, and Silva (2013) focused on organisations certified under the EN NP ISO 9001 standard for QMSs. These organisations operate across   diverse   sectors   including   manufacturing,   commerce,   services,

telecommunications, security, automotive, cement, civil construction, and public services. Data collected from these certified enterprises aimed to explore how QMS practices influence staff engagement, job contentment, job fulfilment, and organisational loyalty. The study revealed a positive correlation between practices such as responsibility and teamwork and these job-related attitudes. Specifically, these practices fostered organisational skills by enhancing employees' sense of responsibility and promoting effective teamwork (Batista, Feijo, and Silva, 2013). The study by Bagińska and Sawicki (2018) proposes a comprehensive six-step model to cultivate quality awareness among employees within the automotive industry's supplier sector. This model draws inspiration from E. Deming's PDCA cycle, which provides a core foundation for applying QMS. The outlined steps of the model include data acquisition, setting of key objectives, analysis of existing quality awareness levels, planning and development of tailored programmes, implementation of these programmes, and evaluating their effectiveness.

Bagińska and Sawicki (2018) underscore the critical importance of initial diagnosis in structuring effective quality awareness programmes. They emphasise the necessity of targeted training and workshops that address specific deficiencies identified during the diagnostic phase. The study's findings indicate a positive correlation between enhancing quality awareness among automotive industry employees and developing their organisational skills. By implementing this structured model, organisations aim to align their workforce more closely with quality standards and processes, enhancing employees' comprehension of and adherence to quality requirements. Ultimately, this alignment is anticipated to significantly improve overall organisational performance. Central to Bagińska and Sawicki's (2018) approach is a systematic approach that includes thorough data analysis, precise goal setting, meticulous programme planning, rigorous implementation, and comprehensive evaluation. This systematic framework ensures that employees are adequately prepared to effectively contribute towards achieving the organisation's quality objectives.

3.3 Summary:

All the studies reviewed underscore the importance of QMSs in various sectors, including construction, innovation, education, and organisational settings. While the effectiveness of QMS implementation is evident in enhancing organisational skills, proactive behaviour, and innovation performance, challenges such as limited awareness, resistance

to change, and resource constraints persist. Addressing these challenges requires a multifaceted approach, emphasising factors like accreditation, top management commitment, effective time management, and staff involvement. Moreover, achieving QMS success necessitates focusing on technical and soft skills, such as leadership, communication, teamwork, critical thinking, and problem-solving. However, limitations in sample size and geographic scope highlight the need for further research to ensure the generalisability of findings and inform comprehensive strategies for successful QMS implementation across diverse contexts.

The next chapter sets out the methodological procedures considered and applied for the research study.

4 Chapter Four: Methodology

4.1 Chapter Structure:

In this chapter, the research's methodological underpinnings (as shown in Figure 17) are meticulously outlined, providing a comprehensive account of the approach, design, and techniques employed in the study. The structure of this chapter is designed to guide the reader through the rationale and execution of the mixed methods research framework, aligning it with the interpretivist paradigm and addressing ontological, epistemological, and axiological considerations. Subsequently, the chapter details the research methodology, including the mixed-methods design, participant sampling, data collection, and analysis procedures. Additionally, it examines the validity and reliability of the data, alongside the researcher's positionality and reflexivity, ensuring a robust ethical framework.

Figure 17 Methodological underpinnings

4.2 Research Aim, Objectives, and Questions:

This section presents the study's aim, objectives, and research questions to clearly understand the research focus and direction.

4.2.1 *Aim:*

To explore, from the lens of subject supervisors', the implementation of the ISO 9001:2015 QMS in the Ministry of Education in Oman and, as appropriate, make recommendations for improvement.

Objectives:

1. Understand the awareness of subject supervisors about the benefits of implementing ISO 9001:2015.

2. Determine subject supervisors' perceptions regarding the quality of the training programme on the QMS regarding their roles and responsibilities.

3. Evaluate the impact of implementing ISO 9001:2015 quality management processes on the organisational skills of subject supervisors.

4. Identify and propose modifications or improvements to the existing policies and procedures for implementing the QMS in the Ministry of Education.

4.2.2 *Research Questions:*

About the aim and the research objectives the research questions are:

1. How aware are subject supervisors of the benefits of implementing the ISO 9001:2015 QMS?

2. What are subject supervisors' perceptions about the QMS training programme, in relation to their roles and responsibilities?

3. Does the implementation of ISO 9001:2015 QMS impact the organisational skills of subject supervisors?

4. In what ways can the existing policies and procedures for implementing the QMS in the Ministry of Education be modified/improved?

4.3   Methodological Rationale for Mixed Methods Research

Salehi and Golafshani (2010) mentioned that the mixed methods approach makes it possible to address multiple research questions in a single study. Moreover, a mixed methods approach's iterative nature offers the flexibility to modify the study design in response to new information (Creswell and Clark, 2017). Using a mixed methods approach to study the impact of the ISO 9001:2015 QMS on the organisational skills of supervisors in the Ministry of Education in Oman provides a comprehensive, reliable, and nuanced understanding of the phenomenon in many ways. This approach leverages the

strengths of both quantitative and qualitative methods to provide detailed and credible analysis that can inform policy and practice effectively.

Quantitative data provides measurable insights into changes in these skills. In contrast, qualitative data provides a deeper understanding of supervisors' experiences and perceptions of the impact of QMS on their awareness, what they gained from the training on the QMS and the impact on their organisational skills. The ability to view things from two different perspectives is essential to understanding the complex effects of the QMS on the material and immaterial facets of organisational skills. In addition, combining data from qualitative and quantitative sources improves the study's validity and dependability in terms of data triangulation and helps minimise biases. For instance, the questionnaire measures the subject supervisor's perceptions of the effectiveness of training in the QMS, whilst the qualitative interviews add perspective, nuances and confirmation of these results by examining professional views and contextual factors from supervisory work. This approach enhances the overall reliability of the research as this cross-verification assures that the conclusions reached are solid and reliable. The overall efficiency of ISO 9001:2015 in enhancing supervisors' organisational skills can be evaluated quantitatively using decision-making, delegation, and time management improvement measures. Simultaneously, qualitative approaches can investigate the causes and mechanisms of these modifications, pinpointing facets of the QMS that support these advancements and emphasising areas needing improvement. Qualitative methods can look more closely into these anomalies if preliminary quantitative results show unexpected patterns or outliers. This flexibility supports the research to stay accurate and relevant, enabling a dynamic investigation of how supervisors' organisational skills are affected by ISO 9001:2015.

Furthermore, the research findings are more effectively communicated and applied when a balanced perspective is presented using quantitative data and qualitative narratives (Creswell and Clark, 2017). Quantitative data can provide unambiguous data to formulate policies and make administrative decisions (Creswell, 2014), as statistical proof of the advantages of ISO 9001:2015. Concurrently, qualitative insights can offer indicative narratives and useful illustrations that strike a chord with professionals and interested parties, enhancing the relatability and feasibility of the results (Tashakkori and Teddlie, 2010).

4.4   Research Philosophy and Paradigms:

As a philosophy, ontology investigates what exists and explores the nature of reality, serving as a core component of metaphysics. This branch of philosophy delves into fundamental questions about existence and the essence of reality (Ladyman, 2007; Sice, Bentley, and Rauch, 2018). In contrast, Smith (2003) describes ontology as the science of what is, encompassing the types and structures of objects, properties, events, processes, and relationships within all areas of reality. It aims to offer a comprehensive classification of entities, ranging from the microphysical to the cosmological, and to account for all types of relations that connect these entities into larger systems (Smith, 2003). Whereas experimental sciences seek to model reality from a given viewpoint, ontology explores the fundamental nature and arrangement of things, independent of context or existence (Staab, Studer and Sure, 2003).

Epistemology, another branch of philosophy, examines knowledge and belief, their justification, and relation to truth (Sice, Bentley, and Rauch, 2018). Hartel and Hjørland (2003) contend that epistemology investigates the nature of knowledge and the processes through which it is acquired. Mertens (2010) further elaborates that it encompasses the scope of knowledge and the rationale for belief justification. Generally, there are two main research paradigms or worldviews recognised, differentiated, and discussed by many authors, as explained by Salama (2019): i.e., positivist (scientific) and interpretive (anti-positivist), which can clarify the philosophical positions of the research.

4.5   The research paradigm:

4.5.1   The positivist paradigm:

John Locke (1632–1704), a British empiricist, and Henri de Saint-Simon (1760–1825), a French social theorist, are historically credited with laying the groundwork for positivism (Horne, 2023). Locke's emphasis on empirical observation and sensory experience in acquiring knowledge significantly contributed to the development of positivist thinking (Steele, 2002). Similarly, Saint-Simon advocated applying scientific principles to study society, influencing Auguste Comte's positivism (Horne, 2023 and Steele, 2002).

Rehman and Alharthi (2016) noted that the French philosopher Auguste Comte was crucial in advancing positivism during the early nineteenth century. Influenced by Enlightenment ideals and Saint-Simon's work, Comte sought to unify human knowledge

under science. He envisioned social progress through scientific inquiry, shaping fields from sociology to politics, significantly advancing the philosophical branch of positivism. Comte (2015) viewed positivism as the belief that societies operate according to specific scientific principles and laws, akin to those in physics or chemistry. This implies that societal phenomena can be understood and explained through empirical observation and scientific analysis, like how natural phenomena are studied in the physical sciences (Rehman and Alharthi, 2016; Comte, 2015). Alharahsheh and Pius (2020) define the positivist paradigm as characterised by its emphasis on empirical observation and measurement to develop universal laws and findings. According to Junjie and Yingxin (2022), positivism is rooted in empiricist philosophy, which holds that theoretical claims require confirmation through observable evidence. Furthermore, Ryan (2018) explains that positivism aligns with the principles of the natural sciences, proposing that logical associations must be present both within and between phenomena. Research conducted within this paradigm aims to uncover and substantiate these associations through systematic and rational methodologies.

In addition, positivist research commonly employs questionnaires and statistical techniques for data collection and analysis (Crotty, 1998). Furthermore, positivism employs scientific methods such as quantification, measurement, and analysis to develop universal laws and findings (Alharahsheh and Pius, 2020). Quantitative research methods, which generate numerical data for statistical analysis, are central to positivist studies and are crucial for informing service provision and health and social care strategies at various levels (Blackwell, 2018). Moreover, while primarily focused on quantitative measures, positivistic studies can also incorporate qualitative measures. This dual approach enhances the robustness of research findings by combining the strengths of both methodologies within the positivist framework (Blackwell, 2018).

Howell's (2013) assertion highlights the foundational knowledge underpinning the positivist stance of this research. Ryan (2018) notes that quantitative procedures reflect the foundational principles of natural science by examining numerical data to uncover relationships, as detailed in Chapter Five (section 5.6). In positivist research, the concept of pre-existing ideas being subjected to testing is central, as asserted by Cohen, Manion and Morrison (2018). From the gathered information, researchers deduce the strength and confirmability of these ideas. In this study, the questionnaire is the primary instrument for data collection (section 4.13.1). As analysed (Chapter Five), quantitative data is presented

in tables, accompanied by various tests aiming to ascertain the robustness of the data and its revelatory potential. Furthermore, exploring positivism's influence extends beyond philosophical foundations to practical applications in empirical research methodologies. The positivist emphasis on empirical observation and objective reality significantly impacts the design and execution of empirical studies. In this regard, laboratory experiments and field studies, as Kumar (2014) exemplified, are quintessential manifestations of research methodologies consonant with the positivist tradition. These methodologies prioritise controlled settings and systematic data collection procedures to elucidate causal relationships and universal patterns in social phenomena.

The positivist paradigm, emphasising empirical observation and objective reality, significantly impacts the design and execution of empirical studies (Kumar, 2014). In contrast, as noted by Alvesson and Sköldberg (2017), the perspectives and environments of individuals profoundly influence their views. Consequently, researchers frequently need to adopt the perspective of their subjects to understand their experiences. This perspective gives rise to the application of interpretivism, centred around understanding the subjective experiences and contextual influences that shape individuals' perceptions and actions as detailed below.

4.5.2   The interpretivist paradigm

At the forefront of interpretivism's development stand key figures whose contributions have shaped its foundational principles (Gao and Alexander, 2017). Emile Durkheim, renowned for emphasising social facts and collective consciousness, provided insights into the significance of social meanings and symbols (Kuyucuoğlu, 2015). Moreover, Max Weber's investigations into the sociology of religion and bureaucracy offered valuable perspectives on cultural meanings and social action (Smaling, 2019). Additionally, Wilhelm Dilthey's focus on interpreting human experience within its historic and social context provided a foundational basis for the development of interpretive methodologies in sociology and the social sciences. These scholars, among others, have significantly influenced interpretivism's focus on subjective meanings and experiences in understanding social phenomena (Glass and Schönhofen, 2018). The interpretivist paradigm, also known as the constructivist paradigm, is grounded in the notion that truth is not singular but multiple and socially constructed (Creswell, 2014, p.56). This paradigm contrasts sharply with positivist approaches by adopting a relativist

ontology, where a single phenomenon can be understood in various ways, and there is no definitive method to ascertain a singular truth (Cohen, Manion and Morrison, 2018). According to Bryman (2012), interpretivism seeks to uncover different perspectives and examine phenomena from multiple angles, thus providing a comprehensive understanding of social realities. This paradigm emphasises the importance of context and the subjective interpretations of individuals, making it particularly valuable in fields that study complex human behaviours and social interactions.

As expounded by Rehman and Alharthi (2016), the data collection of interpretive research emphasises the necessity of perceiving social phenomena from the participants' perspective instead of that of the researchers. This methodological stance underscores the importance of contextual understanding, where qualitative data collection takes precedence over statistical methods. Such qualitative approaches, ranging from open-ended interviews to document analysis, enable researchers to delve into the nuanced lived experiences of participants. Pham (2018) supplements this discourse by elaborating on interpretivism's diverse methodological toolkit, including ethnography and interactive interviews, which provide unique avenues for accessing authentic insights from insiders. Building upon this, Gichuru (2017) highlights the pivotal role of interviews within interpretive research, noting their capacity to elucidate personal perspectives and experiences. Gichuru (2017) further delineates the versatility of interview formats, from structured to unstructured discussions, as well as the potential for group interviews to enhance data richness through collective insights. Complementing these perspectives, Phothongsunan (2010) underscores interviews as a central data collection method within the interpretive paradigm, reinforcing the interpretivism commitment to capturing the depth and complexity of social phenomena through qualitative inquiry. This collective discourse underscores the interdisciplinary nature of interpretivism and its emphasis on contextual understanding and participant perspectives in social research.

In terms of the strength of this paradigm, Gichuru (2017) and Pham (2018) delineate the robust facets of interpretivism in comprehending social phenomena, albeit with differing emphases. Gichuru (2017) underscores the paramount significance of context within the interpretive research paradigm. He contends that interpretivism, not only acknowledges, but embraces the multifaceted contextual intricacies underlying human action, recognising that it is shaped not solely by external determinants but by human agency imbued with values, beliefs, and cultural nuances. Consequently, interpretive research facilitates an in-depth exploration of participants lived experiences within their natural

milieu. Moreover, Gichuru (2017) posits that interpretivism has the capacity to engender novel theoretical frameworks and practical applications, as it conceptualises research problems as embedded within a socially constructed context ripe for qualitative exploration. Conversely, Pham (2018) elucidates the strengths of interpretivism through a different lens, focusing on its efficacy in accessing authentic and valuable information. He underscores interpretivism's adeptness in delving into the complexity of phenomena, which, albeit not explicitly stated, implies a recognition of the contextual nuances inherent in social research. Pham (2018) also accentuates interpretivism's prowess in fostering a deeper understanding and knowledge of phenomena, particularly through the probing of interviewees' thoughts, perceptions, views, feelings, and perspectives. Although theory generation and practical applications are not explicitly addressed, Pham (2018) highlights interpretivism's role in providing nuanced insights into the intricacies of social phenomena.

While both Gichuru (2017) and Pham (2018) extol interpretivism's ability to illuminate the intricacies of social phenomena, their divergent emphases shed light on different dimensions of its strength. Gichuru (2017) foregrounds interpretivism's recognition of context and its potential for theory generation and practical application. Pham (2018) underscores its capacity to access authentic information and foster a deeper understanding of phenomena, particularly through qualitative inquiry.

In the context of this study, the perceptions of subject supervisors across the eleven educational governorates are of paramount significance, as they oversee a diverse array of subjects (section 5.4.6). The choice of data collection methods reflects a commitment to interpretivism's fundamental principles. This paradigm recognises the nuanced and socially constructed nature of truth, as highlighted by Creswell (2014). As Bryman (2012) underscores, interpretivism seeks to explore a spectrum of perspectives and critically examine phenomena from multiple angles. Thus, selecting methods conducive to delving into the varied experiences and viewpoints of subject supervisors seamlessly aligns with the interpretive framework. Utilising interviews as a data collection method, as advocated by Phothongsunan (2010), further enriches this discourse, facilitating a comprehensive exploration of subject supervisors' insights and perceptions, thereby addressing the research questions at hand.

The interpretive nature of this research is in its philosophical implementation, through gathering data from the subject supervisors about their perspectives of meaningful and functional ways to improve the implementation of QMSs within their supervisory works.

4.6 The Ontology, the Epistemology, and the Axiology:

When considering the philosophical underpinnings of research, Phothongsunan (2010), Gichuru (2017), and Pham (2018) provide insights into ontology, epistemology, and axiology, as detailed below.

4.6.1 Ontology:

As elucidated by Phothongsunan (2010), Gichuru (2017), and Pham (2018), ontology encompasses the study of existence and being. It delves into what exists, what can be known, and how knowledge is attainable within a particular research framework

Epistemology, as discussed by Phothongsunan (2010), Gichuru (2017), Pham (2018) and Rosida et al. (2023), delves into the theory of knowledge acquisition and its structure, origins, validity, dynamics, and methodology. While Rosida et al. (2023) offer a broader definition, emphasising its roots in philosophy, Phothongsunan (2010) and Pham (2018) underscore epistemology's focus on understanding human experience and meaning rather than uncovering objective facts. Gichuru (2017) aligns with this perspective, emphasising the importance of empirical observation and social interactions in generating knowledge.

4.6.2 The Axiology:

As outlined by Phothongsunan (2010), Pham (2018), and Gichuru (2017), axiology pertains to the study of values and ethics in research. They highlight the importance of researchers' values, beliefs, and biases, alongside the ethical considerations inherent in the research process. This collective viewpoint underscores the necessity of ethical conduct and the acknowledgement of researchers' perspectives in shaping research design and outcomes.

This current study adopts the three philosophical approaches, in the ontological perspective, positing that reality is subjective and constructed by individuals. Specifically, the perceptions and experiences of subject supervisors' regarding the implementation of ISO 9001:2015 are not uniform; rather, they are influenced by their personal, social, and

organisational contexts. Therefore, the reality of the QMS's impact is not fixed but is understood through the lived experiences and interpretations of the subject supervisors. This ontological stance acknowledges the multiplicity of realities and the importance of context in shaping these realities. In the epistemological perspective, combining positivist and interpretivism approaches, this study reflects a belief in the value of objective, measurable data collected through questionnaires and subjective, contextual insights gathered through interviews. Consequently, this dual approach aims to provide a comprehensive understanding of the implementation and impact of QMS according to ISO 9001:2015 standards. In an axiological perspective, the study ensures ethical standards are upheld throughout the research process by obtaining informed consent, ensuring confidentiality, addressing potential biases (section 4.16) and valuing participants' perspectives and experiences. Accordingly, ethical considerations guide the design, data collection, and analysis processes.

4.7 The researcher's positionality and reflexivity:

4.7.1 Positionality:

My professional background plays a crucial role in shaping my research, echoing the arguments put forth by Mercer (2007) and Ross (2017) regarding the significant influence of researchers' backgrounds on their academic work. I am currently employed by the Ministry of Education of the Sultanate of Oman where I am a supervisor in biology and am studying for my PhD in the United Kingdom. This role has sharpened my organisational skills, enabling me to plan and execute tasks methodically and in alignment with work requirements. Hence, Mercer (2007) emphasises the necessity of analysing how a researcher's background, characteristics, "insiderness", and "outsiderness" impact research, particularly in organisational settings where power dynamics are complex. Reflecting on my subjectivity and how personal experiences shape research perspectives is crucial for understanding positionality and its influence on research outcomes. Thus, my supervisory position and the skills I have developed within, have facilitated my involvement in various science-related activities organised by the Ministry, such as the Science Festival, held quadrennially, and the oversight of the implementation of the Trends in International Mathematics and Science Study (TIMSS). Furthermore, I have contributed to the design of science curricula, particularly in biology, and have prepared both short and monthly assessments during my tenure as a teacher, as well as national

examinations since assuming my supervisory role. These responsibilities, which constitute only a fraction of my professional career, have profoundly shaped my personality and professional expertise, influencing my perspective on this study. So, by acknowledging and reflecting on these influences, I align with Mercer's (2007) view that recognising and examining the influence of the researcher's background and characteristics is an essential aspect of the research process. This reflection allows me to gain insight into my positionality and how it may impact the research process and outcomes. Moreover, Mercer (2007) states that "the challenge of unmarked "insiderness" within the professions is an issue in need of further analysis" and more research is required to investigate the impact of the researcher's background, characteristics, "insiderness", and "outsiderness" on the research process and outcomes. She explains that insiderness or outsiderness is especially crucial in organisational settings, where power relationships can be complex and have an impact on the research. Also, Mercer (2007) emphasises the need for researchers to reflect on their own subjectivity and how their background and experiences shape their views and approach to the research topic. By doing so, researchers can gain insight into their own positionality and how that may influence the research process and analysis. Therefore, Mercer highlights the importance of recognising and examining the influence of the researcher's background and characteristics as an essential aspect of the research process.

According to Dwyer and Buckle (2009), the researcher's experience influences their approach to the topic of their research. Chavez (2008) clarifies that the background and characteristics of the researcher are an important aspect of the research process because they are implicitly grounded and always situated in a dual and mutual identity. Dwyer and Buckle (2009) and Chavez (2008) emphasise the profound impact a researcher's background can have on their methodology and interpretation of research. Similarly, Holmes (2019) asserts that the backgrounds, experiences, and characteristics of researchers significantly impact the research process. These elements shape researchers' positionality, which in turn affects their research interactions, the methods they employ, and their interpretation of findings. Consequently, an individual's positionality should be openly and honestly acknowledged in their work.

Dwyer and Buckle (2009) further discuss how research can be affected by the researcher's personal biases and perspectives, regardless of whether the researcher is an insider or outsider. They argue that researchers must reflect on their personal biases and

perspectives to mitigate any potential influence on the research process. To address these concerns, Dwyer and Buckle (2009) suggest that researchers should be aware of their personal biases and preconceptions and take steps to minimise their impact on the research process. For example, they advocate for bracketing, a process of suspending one's beliefs and prejudices, coupled with detailed reflection on the subjective research process. Dwyer and Buckle's (2009) reference to "bracketing your assumptions" is not about physically marking parts of the interview but approaching the data as though you know nothing about it. This allows the insider researcher to view the data objectively, focusing on participants' experiences rather than their prior knowledge.

Holmes (2019) supports view of Dwyer and Buckle (2009) by advocating for a reflexive approach, which involves recognising and disclosing the researcher's influence on the research process to better understand this impact. He underscores that attention to the researcher's stance and its influence is crucial for conducting ethical research. This perspective aligns with the arguments of Dwyer and Buckle (2009) and Chavez (2008), highlighting the necessity for researchers to engage in continuous self-reflection and transparency regarding their positionality to enhance the integrity and credibility of their research.

In alignment with these perspectives, my background as a biology supervisor at the Ministry of Education has had a significant impact on my ability to apply this research. As outlined in Chapter One (section 1.2), my educational experience has provided a strong impetus to undertake this research. The experience I gained in the education sector was a key motivation to apply this knowledge in my research and to share it with other education experts. This dissemination of knowledge is critical for advancing educational practices, exemplifying the crucial role of the researcher's background, as highlighted by Dwyer and Buckle (2009), Chavez (2008), and Holmes (2019). The experiences described align closely with Chavez's assertion regarding the significant impact of a researcher's background on their methodology and interpretation (Chavez, 2008). My journey from science teacher to biology subject supervisor has influenced the approaches I employ in educational research and the lenses through which I interpret findings (see Chapter 1, Section 1.2). My practical experiences in curriculum development, teacher training, and school visits have infused me with a nuanced understanding of the educational landscape, shaping the methodologies I employ and the interpretations I derive from each school visit. Similarly, Holmes's assertion regarding shaping

researchers' positionality by their backgrounds, experiences, and characteristics resonates deeply with my professional trajectory (Holmes, 2019). My transition from a classroom educator to a supervisory role has afforded me diverse experiences that have profoundly influenced my position as a researcher. These experiences have informed my interactions with educators, the methods I employ in research endeavours, and the interpretations I draw from research findings. By acknowledging and embracing the impact of my background on my positionality, I strive to conduct research that is reflective, transparent, and attuned to the diverse needs of stakeholders in the educational domain.

Regarding subjectivity in addressing the teacher's concerns, such as over workload distribution, my background in communication with educational leaders enables me to engage with multiple perspectives empathetically. Balancing the advocacy for teachers' quality teaching practices while understanding administrative constraints underscores the importance of effective communication skills. Through collaborative dialogue with school managers, alternative solutions can be explored, reflecting a professional commitment to finding equitable resolutions. This background in navigating diverse educational dynamics informs my approach to research interactions, facilitating an inclusive and balanced exploration of viewpoints, even when adopting an outsider stance. Furthermore, as a PhD student, my current academic role introduces distinct separations from participant samples. Engaged in elevated levels of academic inquiry and analysis, this role distances me from prior professional engagements and participants' everyday experiences. Geographical and relational distances further contribute to my outsider position, as participants address diverse educational governorates, representing varied contexts without personal relationships with me. This objective analytical lens, essential in my PhD enrolment, fosters critical inquiry and offers fresh perspectives often overlooked by insiders. Hence, my professional journey in science education underscores the intricate interplay between researchers' backgrounds, experiences, and characteristics, as highlighted by Chavez (2008) and Holmes (2019). These insights underscore the imperative of reflexive and transparent educational research, ensuring methodological integrity and nuanced interpretations grounded in the complexities of educational landscapes.

4.7.2 The compass within - guiding researcher positionality in depth:

Swati Parashar (2019) discusses the complexities of researchers who occupy both insider and outsider positions. And, by navigating both insider and outsider positions (sections 4.7.2.1 and 4.7.2.2), I strived to conduct research that is reflective, transparent, and attuned to the diverse needs of stakeholders in the educational domain. This dual awareness enabled me to leverage my insider and outsider perspectives while maintaining the critical distance necessary for robust and objective research. Hence, below is more about my dual positions.

4.7.2.1 Insider Position:

As a researcher, my insider status is anchored in my role within the Ministry of Education in Oman and my professional experience as a biology subject supervisor. The QMS has been implemented in the Ministry since 2012 and within the supervisory directorate since 2019. This intrinsic connection to the research context enables me to access unique insights, build trust with participants, and understand subtle nuances that might elude an outsider.

In data collection, my insider status allows me easier access to participants and fosters a deeper understanding of their experiences, which can support more open and comprehensive data sharing (Muasya, 2023). While some may argue that participants might be less candid with an insider due to pre-existing relationships (Gore-Gorszewska, 2024), I have addressed this by maintaining confidentiality and using neutral questioning techniques (probing questions) to minimise perceived bias. Rather than leveraging my role as a supervisor, my familiarity with supervisory duties informs the development of my interview questions, ensuring they are both relevant and sensitive to participants' experiences. Research supports the advantages of insider perspectives in qualitative studies, where familiarity with the setting can build trust and promote openness (Bonner and Tolhurst, 2002; Campbell et al., 2022)

Regarding contextual understanding, an intimate knowledge of the research environment allowed for more contextually grounded data collection methods, such as questionnaires and semi-structured interviews. Participants were familiar with these tools, as many researchers from the Ministry of Education had previously employed various research methods, including questionnaires and interviews, for their research needs. This familiarity enhanced my insider position by fostering a sense of trustworthiness among

participants. They were more likely to engage openly and honestly, knowing that these methods were consistent with established practices within the Ministry. Furthermore, my insider status enabled me to tailor these tools more precisely to the specific context of the Ministry. I could incorporate terminology such as QMS, and examples like awareness, effectiveness training and organisational skills resonated deeply with the participants' experiences, thereby enhancing the relevance and clarity of the questions (Section 4.13.1). This contextual tailoring facilitated richer, more detailed responses, as participants found the questions more relatable and pertinent to their daily roles and responsibilities. Additionally, my understanding of the culture and operational dynamics of the Ministry allowed me to navigate any bureaucratic or logistical challenges more effectively. This ensured smoother data collection processes and minimised disruptions, further reinforcing participants' trust and cooperation (section 4.13). Overall, my insider position significantly enhanced the depth and quality of the data collected. By utilising electronic platforms, particularly Google Forms, I efficiently distributed the questionnaire to supervisors across the eleven educational governorates through the corresponding system. The MOE's correspondence system is designed to reach all ministry employees. Through this system, supervisors' get and send decisions and other necessary directives to their teams. It also allows employees to receive requests to voluntarily participate in research surveys, though participation is not mandatory. This approach facilitated a more nuanced and comprehensive understanding of the data under investigation. Furthermore, my experience as a teacher and supervisor, which involved utilising data, charts, and tables to analyse student performance, has further developed the analytical skills essential for conducting research. However, my familiarity with the context improved data collection, yet it also presented opportunities for ensuring objectivity and accuracy. Reflecting on that, I engaged in continuous reflexive journaling to identify and address biases that might influence the research process. I also shared these reflections with academic supervisors on this study to ensure a more balanced perspective. Further details on how these measures were implemented are discussed in (section 4.14).

4.7.2.2   Outsider position:

Simultaneously, my outsider status arises from my experience, as a PhD researcher, studying abroad in the United Kingdom. This background gives me a unique perspective that allows me to approach the research context with new eyes and critical distance. This detachment enabled me to view the research environment from different angles,

potentially unveiling insights and perspectives that insiders may overlook due to their close involvement.

With regards to data collection, it was crucial to take an objective stance. As an outsider, I have maintained a degree of impartiality, enabling me to observe and question aspects of the context that insiders might take for granted. This approach has been particularly valuable in uncovering latent themes and patterns within the data. For instance, in the quantitative analysis, I noticed a significant correlation between certain research variables, particularly in the realm of organisational skills, where awareness emerged as a more influential factor than the effectiveness of training. Delving deeper into these findings, I provided subjective insights and further elaboration in the subsequent Analysis and Discussion chapter (sections 7.6). Nevertheless, it is crucial to recognise that being an outsider presents specific methodological challenges. The inherent limitations of this status require a more structured approach to data collection (Murphy, 2023; Turner, 2023). To ensure consistency and replicability, I rigorously piloted both the questionnaire questions and the questions used in semi-structured interviews (section 4.13.1.2 and section 4.13.2). This careful approach aims to mitigate potential biases created by my outside perspective and maintain the integrity of the research process (Dwyer and Buckle, 2009).

4.7.3   *Reflexivity:*

In addressing the power and privilege of insider researchers, reflexive practices played a critical role in ensuring that biases were managed, and research integrity was upheld. My approach to reflexivity was closely aligned with the methods described by Chavez (2008) and Dwyer and Buckle (2009). I employed journaling as a primary tool for self-reflection, documenting insights, ideas, and participant perspectives with the help of figures and coloured pens. This practice facilitated continuous reflection on the evolving research process and the integration of new knowledge gained through webinars, workshops, and relevant readings.

In addition, feedback from colleagues and administrators at the Ministry was instrumental in refining the research design. Their extensive experience with the QMS significantly influenced the development and structuring of the research questions. This collaborative approach ensured that the questions were well-aligned with the research objectives and

were suitably formatted for a PhD-level study, while remaining accessible and comprehensible for participants.

Furthermore, the adoption of semi-structured interviews was particularly effective in managing the complexities of insider research. By providing participants with examples from their own experiences, the questions became more relatable and understandable. This flexibility in the interview format allowed for real-time adjustments based on participants' responses, enhancing the clarity and relevance of the questions.

Despite my insider status, which could introduce subjectivity, I maintained a formal and systematic approach to conducting interviews and recording responses. This commitment to formality ensured that personal biases did not compromise the integrity of the research. The structured and reflective methods employed helped to mitigate potential biases and uphold the research's credibility, consistent with the approaches of Chavez (2008) and Dwyer and Buckle (2009).

Overall, the reflexive practices implemented—spanning continuous self-reflection, collaborative feedback, and methodological flexibility—were essential in addressing the challenges associated with insider research roles. These practices, not only aligned with established reflexive approaches, but also extended them by ensuring that subjectivity did not undermine the research's validity or ethical standards.

4.8   The Methodology

The research methodology defines the methods by which researchers carry out their work. Indeed, Adams (2012) and Kara (2015) describe the methodology as a contextual framework for research, a coherent and rational structure informed by underlying assumptions, beliefs, and values that shapes the choices made by researchers. It involves learning the various techniques and tools that can be used in the conduct of research, both qualitative and quantitative (Creswell, 2014). Ultimately, it is a systematic technique to address the issue through a process whereby researchers go about their work to describe, explain, and predict phenomena (Stringer, 2014). Bryman (2012) clarified those methodologies present the structure as the basis for the conduct of research.

The core stages involved in implementing an effective research methodology comprised the design of testing procedures, calculation and investigation processes, and the analysis of the raw data collected. This included the appropriate application of research techniques

aligned with the nature of the data, careful management of the interrelationship among these elements, and a clear interpretation of the resulting findings. Prior to initiating the process, it was essential to determine the methods for data collection (Mertens, 2010). A mixed-methods approach was employed during both the data collection and analysis phases of the study

4.9   Mixed method design

4.9.1   Mixed Method Research

Stringer (2014) states that educational research requires deep knowledge based on detailed investigation, to carry answers to the development of the dominant problems of education. A mixed-methods approach integrates elements of both quantitative and qualitative research methodologies, enabling the investigation of research questions that may not be addressable through a single method alone (Weller and Barnes, 2014). In this study, the specific procedures related to sampling, data collection, and data analysis within both the quantitative and qualitative strands will be detailed in the subsequent sections.

Bryman (2016) defines the mixed-methods approach as the application of a justified rationale that enhances the researcher's ability to align research questions with appropriate methodological choices. This approach clarifies the intended contribution of employing multiple methods to the overarching objectives of the study. Additionally, some of the mixed method strengths include the rich, comprehensive data that can be gathered by using words, pictures, and a variety of other artefacts. Furthermore, the mixed-methods approach enables researchers to address a wider and more comprehensive range of research questions (Bryman, 2016). In addition, the convergence and corroboration of findings enhance the robustness of conclusions drawn (Johnson and Onwuegbuzie, 2004). By facilitating the integration of both quantitative and qualitative data, a mixed methods design not only supports the overall outcomes of a study but also strengthens the validity of its findings through triangulation (Wisdom and Creswell, 2013). Moreover, a mixed-methods approach enhances academic interaction (Bryan, 2012), and provides a framework to assemble rich, comprehensive data by investigating quantitative results, the questionnaire, using qualitative data, and interviews (Clark, 2019).

This study employed a mixed methods research design, incorporating both quantitative and qualitative approaches, as Bryman (2016) contextualised. Indeed, Stringer (2014) emphasised the necessity of thorough and detailed investigation in educational research to address its predominant issues, aligning with the comprehensive data collection characteristic of mixed methods. Consequently, this dual approach was particularly effective in addressing the four research questions (section 4.2.3) related to the awareness of the benefits of QMS to the roles and responsibilities of subject supervisors', their perceptions of the quality of QMS training (if it occurred), and its impact on their organisational skills. Additionally, it aimed to gather their suggestions on improving the implementation of QMS in the supervisory directorate. All of this was achieved by capturing both robust quantitative data and qualitative insights from interviews. Also, mixed methods were particularly apt for this study in examining the impact of QMSs on supervisors' organisational skills. This approach facilitated a comprehensive understanding by gathering both numerical data (quantitative) and contextual information (qualitative). Furthermore, Weller and Barnes (2014) posited that mixed methods could address questions that other methodologies could not, thus underscoring its suitability for complex investigations. The quantitative data provided measurable insights, while qualitative data offered rich explanations regarding the 'how' and 'why' behind the impact of the QMS. Moreover, Bryman (2016) asserted that mixed methods offered a rationale for better assessing the relationship between research questions and methods, which was crucial for achieving the study's objectives. This approach allowed for the exploration of unexpected results through qualitative follow-up of quantitative findings, thereby enhancing the investigation's depth. Additionally, the design supported the collection of rich, comprehensive data and enabled triangulation to validate findings, as endorsed by Wisdom and Creswell (2013).

Also, this research refers to subject supervisors', they are the link between the education field in terms of dealing with teachers and other administrative levels in the Ministry of Education by involving them as a sample to implement research tools to involve them in the Ministry of Education to apply any changes in their responsibilities in understanding and analysis of implementing the ISO 9001:2015, thus grounded in participants' experiences (Schoonenboom and Johnson, 2017). Additionally, mixed methods facilitated academic interaction and fostered multidisciplinary research collaboration (Bryan, 2012). By integrating both methods, this study ensured robust answers to the research questions, thus providing a nuanced understanding of the phenomena. As Clark

(2019) indicated, this approach allowed for the examination of quantitative results using qualitative data, thereby assembling comprehensive data and enhancing the overall superiority of the research (see the Analysis and Discussion chapter: section 5.3, section 5.4, section 5.5, section 5.6).

4.10 Research method:

The primary aim of this research is to explore the application of ISO 9001:2015 within the MOE through an examination of subject supervisors' awareness levels, perceptions of training quality, evaluation of its impact on their organisational skills, and the formulation of recommendations for enhancing existing policies and procedures. Yin (2018) and (Cohen, Manion and Morrison, 2018) describe that case study investigation can include a close analysis of individuals, subjects, issues, or programmes. According to Mertens (2010), case studies are employed to address specific research questions by offering detailed descriptions and interpretations within a relatively limited timeframe, typically ranging from several weeks to a year. Additionally, they are used to explore contemporary phenomena to gain insight and understanding (Bryman, 2004). In certain contexts, case studies serve as a means of informing decision-making or identifying causal relationships, particularly in situations where such connections are complex and not immediately apparent (deMarrais and Lapan, 2004), such as the feasibility of implementing ISO 90001:2015 in all the educational governorates in the MOE in Oman. There are various styles of case studies which can be defined by their purposes, outcomes, and the domains of application. A case study emphasising purpose may fall into the categories of 'discovery-led' and 'theory-led', whereas a case study emphasising outcomes may be characterised as exploratory, descriptive, or explanatory. A case study based on application domains could be historical, psychological, ethnographic, or sociological (Cohen, Manion and Morrison, 2018,). This study adopted an explanatory case study. The research results will be cascaded to the quality management directorate in the MOE, Oman and globally by providing the thesis and a possible publication.

4.10.1 Case study:

As defined by Hollweck (2019), a case study can be distinct as a practical investigation that explores a current phenomenon in detail, situated within its authentic, real-life context. Bryman (2016) defined a case study as a general term for exploring a specific

theme, group, or phenomenon. a case study offers a detailed account of a specific theme, capturing the defining characteristics of the case and associated events. Furthermore, it provides a structured narrative of the process of inquiry, involving the examination and interpretation of a single case to identify variables, relationships, patterns, and dynamics among the participants involved. It may also be used to evaluate theoretical constructs or monitor practical progress during development. As noted by Yin (2018), a case study can simultaneously fulfil both theoretical and practical purposes.

Yin (2018) characterises the case study approach as a means of generating detailed analysis and interpretation aimed at addressing clearly defined research questions within a limited timeframe. Consequently, it aims to provide insights into complex phenomena and decision-making processes (Cleland, MacLeod and Ellaway, 2021). Conversely, Bryman (2016) approach to case studies emphasises generating detailed descriptions and close interpretations bound by time and place to reach explanations. Furthermore, they highlight the significance of context and the intricacies of local activities and innovations in health professions education research (Humphrey-Murto et al., 2020).

While Yin's (2018) definition leans towards addressing focused questions for decision-making purposes, Bryman (2016) emphasises the value of contextually grounded knowledge that can enhance wider comprehension and foster progress within the field of medical and health professions education. (Cleland, MacLeod et al., 2021). Bryman (2016) and Yin (2018) define research methodology differently based on their perspectives on research strategies and paradigms. Also, Yin (2018) emphasises five major research methods, including experiments, surveys, archival analysis, history, and case studies, each with its logic and advantages (Humphrey-Murto et al., 2020). Conversely, Bryman (2016) delves into the ontological and epistemological orientations that inform research methodologies, highlighting the continuum from objectivism to constructionism and from positivism to interpretivism (Sun, 2023) and (Sniukas, 2020). While Yin (2018) focuses on the practical aspects of data collection and analysis methods, Bryman (2016) delves deeper into the philosophical underpinnings that shape researchers' approaches to knowledge acquisition and interpretation (Ndhlovu, 2021). Therefore, both perspectives contribute to a comprehensive understanding of research methodology, incorporating both the applied methodologies and the conceptual models that shape the course of the research.

The research case study on the implementation of ISO 9001:2015 within the Ministry of Education effectively bridges the theoretical frameworks posited by Bryman (2016) and Yin (2018), incorporating both positivist and interpretive methodologies. Yin's (2018) approach, which emphasises in-depth descriptions and interpretations to address specific questions over a short duration, aligns well with the structured questionnaires utilised in this study. These questionnaires, meticulously designed with closed-ended questions, measure the awareness, perceptions, and impacts of ISO 9001:2015 on subject supervisors', thereby producing precise and measurable insights. The statistical analysis of this quantitative data using SPSS ensures reliability and validity, facilitating robust decision-making regarding the implementation process. Moreover, the use of pilot testing and random sampling further enhances the accuracy and applicability of the findings.

Conversely, the interpretive approach, characterised by semi-structured interviews with open-ended questions, resonates with Bryman's (2016) emphasis on generating thick descriptions and close interpretations within a specific context. These interviews yield qualitative data that provide deep, context-specific insights into the experiences and perceptions of the supervisors. Purposive sampling facilitates the selection of participants according to defined criteria, thereby capturing the distinct context of the MOE. Moreover, thematic analysis serves as a qualitative analytical approach for recognising, examining, and articulating recurring patterns within the dataset. According to Braun and Clarke (2006), thematic analysis involves a six-step process that ensures a thorough and systematic analysis of qualitative data (section 6.1), which involves identifying and analysing codes and themes, uncovering underlying patterns and meanings, thereby contributing to an understanding of ISO 9001:2015 implementation within this setting.

Braun and Clarke's (2006) six-phase framework is applied in this study. The first phase involves becoming thoroughly acquainted with the data through repeated reading and the documentation of preliminary observations. The second phase entails systematically coding notable data features across the entire dataset. In the third phase, these codes are organised into potential themes, with relevant data collated under each theme. The fourth phase requires a review of the themes to ensure their coherence about the coded extracts and the dataset. During the fifth phase, each theme is refined, clearly defined, and appropriately named. The final phase involves composing the analytical report, selecting illustrative data excerpts, and linking the interpretation to the research questions and relevant literature.

And so, in this current study, thematic analysis was applied within the case study approach to systematically analyse the qualitative data collected. By following Braun and Clarke's (2006) six steps, the researcher ensured a comprehensive and detailed analysis of the data from each case study. This approach allowed for identifying and exploring key themes related to the research questions, providing deeper insights into the phenomena under investigation. The themes identified helped construct a rich, detailed account of the case studies, enhancing the overall understanding of the research problem. The interviews were conducted, and the participants were asked the prepared questions according to the interview guide. The procedures were formally set in preparation and execution, including the storage and subsequent transcription and analysis of the interview texts.

By integrating both quantitative and qualitative methods, this research design aligns with Yin's (2018) practical data collection and analysis methods and adheres to Bryman's (2016) focus on the ontological and epistemological orientations that inform research methodologies. Consequently, the study produces comprehensive insights that address the practical aspects of the research problem while also capturing the complexities and contextual factors highlighted by Bryman (2016). This dual approach underscores the significance of combining structured questionnaires and semi-structured interviews to offer a holistic understanding of the ISO 9001:2015 implementation, thereby bridging practical and theoretical dimensions within the research.

4.11 The methodological framework of this study:

Table 9 below summarises the above various aspects of this study as a methodological framework, including ontology, epistemology, axiology, methodology (sections 4.6 and 4.8), and the case study design:

Aspect	Description

Ontology	The belief is that there is an objective reality regarding the implementation and effects of the QMS as ISO 9001:2015 within the Ministry of Education. It investigated the impact of the QMS on the organisational skills of subject supervisors', their awareness, and perceptions toward effective training can be measured and understood through empirical data and subjective experiences.
Epistemology	It combines positivist and interpretivist approaches, reflecting a belief in the value of objective, measurable data (collected through questionnaires) and subjective, contextual insights (gathered through interviews). This approach aims to provide a comprehensive understanding of the implementation and impact of QMS as ISO 9001:2015 standards.
Axiology	Ensures ethical standards are upheld throughout the research process, including obtaining informed consent, ensuring confidentiality, addressing potential biases, and valuing participants' perspectives and experiences. Ethical considerations guide the design, data collection, and analysis processes.
Methodology	A mixed methods approach integrating both quantitative and qualitative methods: - Quantitative (Positivist Approach): Utilising structured, standardised questionnaires with close-ended questions to gather objective, measurable data. Facilitates statistical analysis using SPSS. - Qualitative (Interpretivist Approach): Conduct semi-structured interviews with open-ended questions to explore detailed responses and gain deep insights. Thematic analysis is used to interpret the qualitative data. NVivo Pro 12 is a software used to facilitate the codes and themes. Involves a detailed examination of the specific context of ISO 9001:2015 implementation within the Ministry of Education:
Case Study	- Positivist Approach (Questionnaire): - Designing structured questionnaires with close-ended questions to measure awareness, perceptions, and impacts of ISO 9001:2015 on subject supervisors'. - Ensuring reliability and validity through pilot testing and random sampling. Analysing collected data using statistical methods such as SPSS. - Interpretive Approach (Interview): - Conducting semi-structured interviews with open-ended questions to obtain qualitative insights into supervisors' experiences, perceptions, and suggestions regarding ISO 9001:2015 implementation. - Using purposeful sampling to select participants and thematic analysis to identify and analyse codes and themes within the qualitative data.

Table 9 The methodological framework of this study

4.12 Participants and sampling

4.12.1 Participants:

The participants are the members of the research sample, which, as a small group, relatively represent most of the people or the population in research implementation (Alvi, 2016). For this current study, the sample is the subject supervisors within the eleven educational governorates (section 2.3.3). Their presence plays a major role in setting up the study, by sequences of rationality steps which connect the data (neutral and uncategorised collection of information) to the research questions and its conclusion by using evidence (which originates from the data) to deliver and distinguish the research purpose, objectives, and questions (Cohen, Manion and Morrison, 2018). As a clear declaration of what sampling in social science could lead to, Cohen, Manion and Morrison (2018) clarified that the appropriateness of the study methodology depends on the sampling strategy that has been endorsed, which will lead to mastering the research. He emphasised that determining the appropriate sample size is essential for reaching a clear conclusion with a rational and credible confidence level. The specifics of sampling for both quantitative and qualitative methods are detailed below.

4.12.2 Sampling

4.12.2.1 Quantitative sample (Questionnaire sample)

Selecting an appropriate sample is crucial in quantitative research to guarantee the precision and dependability of the questionnaire findings. Rea and Parker (2014) discussed the significance lies in selecting a sample that accurately reflects the target population and is adequately sized to produce reliable estimates of survey metrics. They emphasise that representativeness ensures that the outcomes can be widespread to the broader population. At the same time, a large sample size reduces the margin of error and increases confidence in the results.

Moreover, Nayak (2010) contends that robust and valid conclusions can be drawn only when an appropriately sized sample is employed. This highlights that the focal point lies in the necessity of possessing a suitable or reflective sample instead of merely a sizable one. A sample that accurately mirrors the target population's characteristics allows researchers to draw valid inferences about that population. Yet, Battaglia *et al.* (2016b) recommend a sample size constituting at least 5 per cent of the total population. This

guideline provides a rule of thumb for researchers to ensure that their sample is sufficiently large to capture the variability within the population. However, it is important to note that this recommendation might not be universally relevant to all research contexts. On the other hand, Memon *et al.* (2020) challenge the notion of standardising sample size across different studies. They argue that researchers should justify their sample size selection based on the specifics of their study. Instead of adhering to a fixed percentage, they suggest using various approaches to conclude an appropriate sample size, taking into consideration the specific research question, study design, and statistical methods involved. This method offers enhanced adaptability and guarantees that the sample size is customised to the specific requirements and limitations of each study.

In summary, no universally agreed standard exists; However, general recommendations on sample size may offer guidance, priority should be given to selecting a sample that is both representative and well-suited to the specific research context. Consequently, researchers must consider the attributes of their target population, the scope and focus of their research questions, and the statistical demands of their analysis when determining the most appropriate sample size for their investigation.

In this study, the participants are subject supervisors in the MOE in Oman. This study's total population reached 2410 based on the Annual Educational Statistics book (Ministry of Education, 2021). Hence, choosing a simple random sample to distribute the questionnaire to the eleven educational governors was deemed suitable for accurately depicting the target demographic. A randomly selected sample of the population is the most straightforward of all probability sampling methods (Taherdoost, 2017; Cohen, Manion and Morrison, 2018). Besides, high internal validity comes when the sample represents the characteristics of a large sample (Singh and Masuku, 2014). Based on Krejcie and Morgan's (1970) formula, the calculation determined that 331 participants were needed to complete the online questionnaire for a population of approximately 2,400. To confirm, the sample was calculated electronically, yielding the same result for the study sample size.

The magnitude of the research sample reached 363 subject supervisors for the quantitative sample (160 Female, 203 Male). According to the demography of each educational governorate, all eleven educational governorates have chosen to implement the research tools.

4.12.2.2 Qualitative sample (Interview sample)

At the end of the questionnaire, participants were requested to indicate if they were willing to contribute to the research further and participate in a semi-structured interview by leaving their contact details. Consequently, forty participants provided their emails and phone numbers. The researcher listed all the details, categorised them according to the eleven educational governorates, and contacted each.
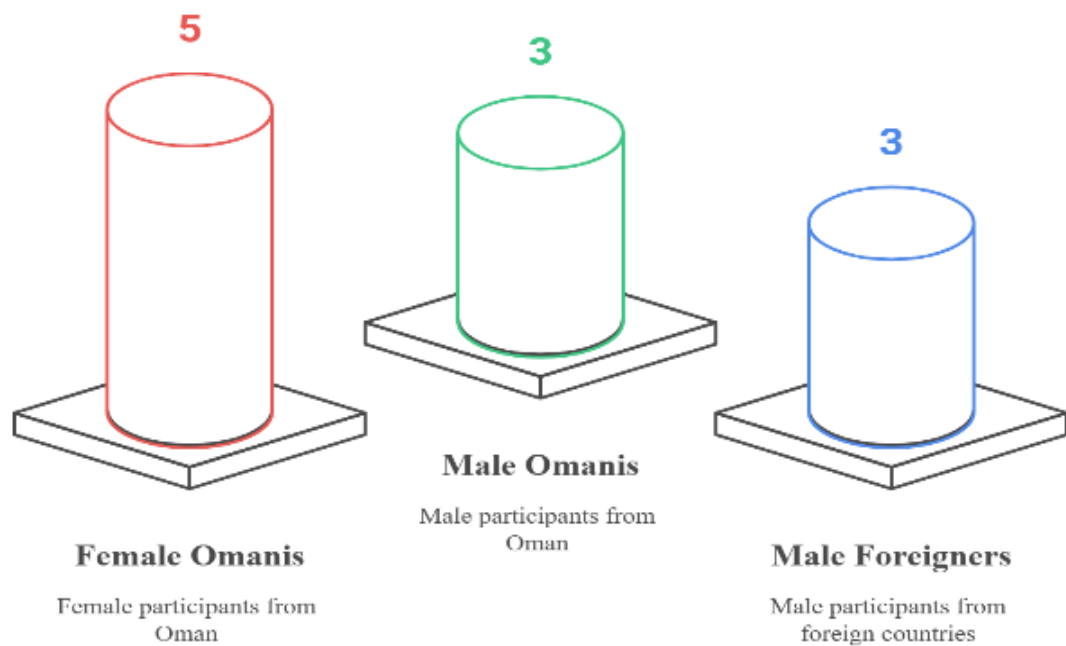
Figure 18 Interview sample

Also, those who responded were chosen to participate in the semi-structured interviews, which ensured representation from each educational governorate (5 Females (Omanis), 6 males (3 Omanis, 3 foreigners) as shown in Figure 18.

Furthermore, consent forms (Appendix D) was sent to be signed before the interviews. A suitable time and day were then decided, considering that all interviews were conducted online via MS Teams and the time difference between the United Kingdom (researcher's location) and the Sultanate of Oman (interviewees' location), which is four hours ahead. By following these detailed steps, the study ensured that the sample was representative and adequate for achieving the research objectives. The approach combined careful planning, thorough coordination, and methodical data collection to provide reliable and valid data collection.

4.13 Data Collection:

Data collection is a critical part of the research process that demands strict confidentiality and precise security measures to ensure the integrity and protection of the collected data (Wilson, Kenny, and Dickson-Swift, 2018). Effective data collection involves a series of methodical steps that must be executed sequentially to achieve the research objectives (Cohen, Manion and Morrison, 2018). In this study, two data collection instruments have been employed: the questionnaire (Appendix (B) and semi-structured interview (Appendix (C)). Both techniques aim to provide a comprehensive understanding of the research questions by obtaining quantitative and qualitative data from MOE employees, specifically subject supervisors. The following sections elaborate on the design and implementation of each instrument, detailing how they were constructed and utilised to gather the necessary information for this study.

4.13.1 *Questionnaire design:*

A questionnaire is a neatly adapted and economical method for collecting data (Bryman, 2012). Similarly, Taherdoost (2022) defines a questionnaire as a set of questions designed to gather information from respondents for a research study. These questionnaires offer advantages such as standardised data collection, ease of administration, and quantifiable results. However, they also have disadvantages, including response bias, limited depth of responses, and potential misinterpretation of questions. Questionnaires can be categorised into various types based on their structure, including open-ended, closed-ended, Likert scale, and multiple-choice questions, each serving different research purposes.

Moreover, Chapman, McNeill and McNeill (2005) noted that a questionnaire is a method of collecting data through a list of written or verbal questions, and it is a useful tool for

gathering large amounts of data from a significant number of respondents in a structured and standardised manner. Additionally, Taherdoost (2022) emphasises the advantages of using a questionnaire, which include standardised and comparable data collection, faster and more accurate data processing, and the ability to collect data from many respondents. However, the disadvantages of using a questionnaire include potential biases and errors, unpredictable responses, and the lack of ability to clarify or probe responses. Designing a questionnaire effectively and pre-testing it before surveying is important to minimise errors and biases.

Furthermore, Colosi (2006) defines a questionnaire as a survey instrument to collect data or information from a group of people or individuals. There are two main types of questions in a questionnaire: open-ended questions and closed-ended questions. As noted by Chapman, McNeill and McNeill (2005), the advantages of questionnaires include efficient data collection, the ability to collect standardised data, and the capacity to compare responses between groups. According to Colosi (2006), one advantage of open-ended questions is that they allow for free expression of responses; however, a disadvantage is the challenge of presenting findings for the whole sample arises from the wide range of potential interpretations associated with each participant's perspective.

In contrast, a key benefit of closed-ended questions lies in providing standardised response options, establishing a uniform interpretive framework for all participants. As the responses are predefined, they tend to offer greater precision than open-ended items and are more likely to enhance consistency among respondents in their comprehension of both the questions and the available answers. Employing closed-ended response options facilitates a more efficient and structured approach to analysing the collected data, enabling the generalisation of results across respondents. However, disadvantages include possible response bias or errors, difficulty developing effective questions, and challenges in motivating respondents to complete the questionnaire (Chapman, McNeill and McNeill, 2005). Considering this study, the questionnaire was designed to include closed-ended items, as suggested by Chapman, McNeill and McNeill (2005). This method was employed to gather extensive data to address the research questions precisely and clearly.

4.13.1.1 Content of the questionnaire:

As elucidated in the literature review chapter (section 3.2.5), the current study is founded on fundamental pillars (employee awareness, practical training, and organisational skills),

which subsequently guided the structure of the questionnaire. Following a comprehensive review of numerous studies, this, in turn, facilitated their inclusion in the analysis and discussion chapter, aiding in the analysis of both quantitative and qualitative findings.

Moreover, the research sample specifically focuses on subject supervisors', whose experiences and perspectives on the implementation of the QMS are pivotal. The focal points include their awareness, the effectiveness of training, and the impact of this training on their organisational skills. Thus, their responses are essential for addressing the questionnaire based on these pillars. The questionnaire commenced with a clear introduction, outlining the research title, the researcher's name, and the university affiliation. Participants were also informed of their right to withdraw from the survey at any point, and assurances were given that all responses would remain confidential, by the university's standard regulations. These were general, explanatory, and cautionary guidelines for the participants. The questionnaire was structured with closed-ended questions to evaluate the perceptions of subject supervisors' regarding the research pillars (section 3.2.5).

The questionnaire was divided into two main categories: demographic data and three sections based on the research pillars. The first category, demographic data, includes questions about the respondent's age, sex, educational governorate, number of years in the profession and country of origin. The second category is divided into three sections, each comprising ten questions. Firstly, the first section focused on the supervisors' awareness of the quality system implemented by the Ministry of Education, particularly in their supervisory roles. Secondly, the second section assessed the effectiveness of the training provided on the quality system. Finally, the third section evaluated how their organisational skills were affected by applying the QMS.

Moreover, a five-point Likert scale was employed (Bell, Bryman and Harley, 2022) to investigate participants' perceptions and opinions regarding the implementation of the QMS within the supervisory directorate. This approach was crucial for assessing their awareness, the effectiveness of the training, and the impact of the QMS on their organisational skills. The scale comprised the following options: 5 denoting strong agreement, 4 denoting agreement, 3 representing a neutral stance, 2 denoting disagreement, and 1 signifying strong disagreement (Appendix B).

4.13.1.2 Piloting the questionnaire:

The term 'pilot study' refers to a preliminary investigation, conducted on a limited scale, intended to inform the design and implementation of the primary study or to facilitate the pre-testing of a research instrument (Van Teijlingen and Hundley, 2001). Moreover, Fraser et al. (2018) assert that the principal aim of a pilot study is to enhance the likelihood of success in the primary research by evaluating the feasibility of participant enrolment and retention processes, thereby contributing to the assessment of content validity and credibility.

Conducting a pilot study evaluates the likelihood of a methodology intended for application in a larger-scale investigation. Thus, a participant could negotiate with them to finalise the research tools in their best interest. Ordinarily, an academic and specialist subject, nearly ten, from different disciplines, education, engineering, and mathematics fields, are selected as participants for the pilot questionnaire. The participants from those fields highly represent the type of participant in the main questionnaire Cohen, Manion and Morrison (2018). based on their experience in quality management and dealing with employees. In addition to the ten volunteers who completed the questionnaire and provided feedback during the pilot stage, support was also sought from a senior administrator from the Ministry of Education's Quality Management Directorate. This senior administrator participated in an online interview, offering valuable insights and expertise to further enhance the study. The purpose was to gain information about determining which aspects of the subject supervisors' organisational skills need to be evaluated. defining them in several ways, pilot contacting with senior administrations to gather those attributes which they faced during implementing QM tools with the Human Resource Directorate, particularly with subject supervisors.
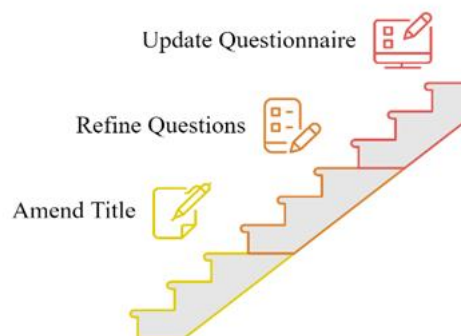
Figure 19 Piloting process

As shown in Figure 19, reflection on the process of the pilot study, as well as the feedback from the participants, resulted in several changes being made in readiness for the actual study, as outlined in the next section.

4.13.1.3 Main amendments to the research title and research questions:

Content: the main changes to the content that have been made because of the pilot are to focus on the integration between the title of the research and the questions that were given further attention. Identify and articulate the key descriptive verbs that accurately represent the study's main, particularly those that define the nature of the study.   The changes were made to ensure that the title of the study and the questionnaire were aligned better. From the pilot study, it was determined that it was necessary to focus more on the reflection of the research title with the content of the questionnaire questions posed. Moreover, the previous title (Implementing the Six Sigma DMAIC strategy (Define, measure, analyse, improve, and control) to analyse the organisational skills of the subject supervisors' in implementing the ISO 9001/2015 QMS in the Ministry of Education in the Sultanate of Oman) the modified title is (Crafting Excellence: Impact of Quality Management System ISO 9001:2015 on Subject Supervisors' Organisational Skills in the Ministry of Education in Oman). The second title demonstrates a more concentrated focus on the research objective due to its clarity and conciseness. By adopting a more straightforward approach, the modified title effectively conveys the primary elements of the study. It clearly delineates the relationship between the ISO 9001:2015 system and the organisational skills of subject supervisors', avoiding the complexity introduced by the Six Sigma DMAIC strategy. This simplification ensures that the research objective is immediately apparent to the reader. Moreover, the revised title places a direct emphasis on the core objective of the research: understanding the specific impact of the Quality Management System on organisational skills. In contrast, the previous title included the Six Sigma DMAIC strategy, which, while relevant, introduced an additional layer of complexity that could potentially divert attention from the primary focus. By removing this element, the new title ensures that the reader's attention is firmly directed towards the relationship between the ISO system and the supervisors' skills, aligning more closely with the central research objective. Finally, the revised title simplifies the scope of the study by concentrating solely on the impact of ISO 9001:2015, which is the focal point of the research. The original title, with its emphasis on the Six Sigma DMAIC strategy, suggested a broader or more complex focus, potentially diluting the research's main

objective. By homing in on the ISO system and its impact, the new title provides a more targeted and specific representation of the research objective, enhancing its alignment with the study's purpose.

According to the pilot study feedback, using descriptive verbs that convey the study's title and objectives in research questions is particularly important. It is important to use these verbs to guide participants' understanding of the questions and to clarify the nature of the research. For instance, the initial version, "*Can DMAIC Method of Six Sigma Strategy benefit the understanding of subject supervisors' towards conducting the quality management system?*" was broader and less focused. It introduced the DMAIC method of Six Sigma, which, while relevant, added an extra layer of complexity that might distract from the central aim of the research. The inclusion of this method shifted the focus away from the direct assessment of supervisors' awareness and towards evaluating a specific strategy's influence, which could have diluted the primary research objectives. The intermediate version, "*Are subject supervisors' aware of the benefits of implementing ISO 9001:2015?*" made progress by narrowing the focus to the awareness of benefits. Still, it remained somewhat binary and less nuanced. It posed a yes/no question, which might limit the depth of insight gained from the research. In contrast, the final version of research question number one focuses more on the research objective due to its precise articulation and direct alignment with the study's core aim. The question, "*How aware are subject supervisors' of the benefits associated with implementing the ISO 9001:2015 QMS?*" is crafted to explicitly measure the level of awareness among subject supervisors' regarding the benefits of the ISO 9001:2015 Quality Management System (QMS). This specificity directly ties into the research objective, which is to assess and understand the awareness levels of these supervisors in relation to the ISO standard.

The final modification improves upon this by asking, "*How aware are subject supervisors'...?*" This phrasing allows for a more detailed exploration of the levels of awareness, capturing a range of understanding rather than a simple affirmative or negative response. It better aligns with objective number one (section 1.3), the section on assessing awareness, enabling a more comprehensive analysis of the subject supervisors' familiarity with the benefits of implementing ISO 9001:2015. Overall, the final version of the research question is more precise, aligned, and nuanced, ensuring that it directly targets the research objective while allowing for a richer and more detailed understanding of the awareness levels among subject supervisors.

4.13.1.4 Main amendments to the questionnaire:

The amendments to the questionnaire were essential to enhance its structure and effectiveness (Rattray and Jones, 2007). Moreover, ordering to organise the following of the questionnaire, the structure of the question, and the forward-backword translation main points been touched into the questionnaire. The primary adjustment involved making the flow of the questions more systematic. Organising the questions in a logical sequence, progressing from general to more specific topics, makes the questionnaire easier for participants to navigate and answer. This method aligns with established best practices in survey design, as outlined by Krosnick (2009). It ensures that participants are gradually introduced to the subject matter, thereby improving their comprehension and leading to more accurate and considered responses. A systematic ordering of questions also reduces cognitive load, making the questionnaire more user-friendly and enhancing the overall quality of the data collected. Moreover, the length of the questionnaire and each question have been considered in response to feedback from the pilot participants. For instance, in question three of section one of the questionnaire (Appendix B), the two sentences differ significantly in focus, scope, tone, and structure. Firstly, the original sentence ("I am aware of the importance of the ISO 9001:2015 as a QMS in the organisation's success.") places emphasis on the speaker's awareness of the system's significance, highlighting the importance of ISO 9001:2015 without specifying its direct impact. Conversely, the modified sentence ("ISO 9001/2015 quality management system improves the work of the whole organisation.") shifts focus to the impact of the system, asserting that it enhances the organisation's work comprehensively. Secondly, the original sentence is broader in scope, discussing the system's role in the organisation's success in general terms. In contrast, the modified sentence is more specific, stating the tangible benefits the system provides to the entire organisation. In addition, the tone and language differ; the original sentence is formal and reflective, using phrases like "I am aware" to convey personal recognition, making it a subjective statement. In contrast, the modified sentence adopts an assertive and direct tone, presenting an objective, fact-based statement without personal reference. Furthermore, the verb usage differs, with the original sentence using the present continuous ("I am aware") to express an ongoing state of awareness, while the modified sentence uses the simple present ("improves") to state a general truth about the system's effect. Finally, the structural complexity of the original sentence is greater, with a longer, more explanatory clause. In contrast, the modified sentence is shorter and more straightforward, focusing on action and result rather than elaboration.

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These differences highlight the shift from a subjective, reflective statement to an objective, outcome-focused assertion. Lastly, forward-backward translation (section 4.14.1) means to reach equivalence between the modified and the resource/original edition (Lee et al., 2019)

4.13.2 Interview design.:

According to Richards (2009), semi-structured interviews facilitate the exploration of individuals' experiences and perspectives, enabling the researcher to investigate underlying issues from the viewpoint of each participant. In the present study, semi-structured interviews were employed as a supplementary instrument to the questionnaires to better understand the participants' views and the information provided. Additionally, interviews provide the researcher with opportunities to explore in greater detail some related aspects that could not be explored through the questionnaire (Rutledge and Hogg, 2020). Rahman (2019) explains that the benefits of semi-structured interviews are appropriate for finding previously unidentified qualitative trends and issues. In this study, the interview design was crafted to align with the research questions and research pillars, a semi-structured interview approach was adopted because as Rutledge and Hogg (2020) posits, this type of interview provides the researcher with the flexibility to explore related aspects in greater detail than a questionnaire. This method ensures the ability to probe further into responses, thereby obtaining richer and more nuanced insights. Initially, the interview questions were designed to elicit detailed responses pertinent to the research objectives, ensuring a thorough examination of the subject matter. To ensure the validity of these questions, the study was piloted and assessed by a panel of academic experts. Subsequently, based on their feedback, certain amendments were made. Specifically, some questions were altered to improve their precision and entirety, they recommended sequencing the questions in alignment with the research pillars. For instance, the sequence began with questions on awareness that directly relate to the first research question (in the same sequence as the rest), thereby maintaining the same sequence used in the literature review, the research questions, and the questionnaire sections. These revisions were crucial in refining the questions to better capture the depth and breadth of the investigated topics (Appendix C 'English version' and Appendix G 'Arabic version'). Furthermore, as detailed earlier in the section on interview sampling, the process for selecting the interview sample followed this step. Interviewees were selected based on criteria that ensured they could provide valuable insights pertinent to the research

question. A detailed consent form, included in the appendices (Appendix (D)), was provided to all interviewees to ensure that ethical considerations were thoroughly addressed.

4.14 Data analysis and techniques:

Data analysis involved interpreting information and identifying patterns from mixed-method approaches (Creswell, 2014). Accordingly, this section details the analysis of quantitative and qualitative data, including the techniques and software employed. Quantitative data were analysed using statistical methods, such as descriptive statistics and regression analysis utilising SPSS software (section 5.2, section 5.3, section 5.4, section 5.5, and section 5.6). Conversely, qualitative data underwent thematic analysis, with the aid of NVivo 12 Pro software (section 6.2.1, section 6.2.2, section 6.2.3, and section 6.2.4). Moreover, integrating these data sets through a mixed-methods approach provided a comprehensive understanding of the research findings and, consequently, a robust and reliable analysis.

4.14.1 Quantitative Analysis:

Bryman and Cramer (2004) spotlight quantitative tools such as SPSS so quantitative data analysis can be represented graphically in terms of different types of charts (or bar charts) and numerically represented in tables. Also, SPSS can be used to describe the data gathered to determine what results and findings will be found. Mostly, this approach was analysed by using a valid and reliable questionnaire (Brandão, 2015). In this current study, quantitative data, facilitated by SPSS software, underwent thorough statistical scrutiny, encompassing the assessment of validity and reliability using Cronbach's alpha coefficient. A range of descriptive statistical methods, including frequency distributions, percentage values, and central tendency measures (namely the mean and mode), were utilised to present an inclusive depiction of the data.

To examine the statistical disparities across demographic variables within each questionnaire section, nonparametric tests, namely the Mann-Whitney U Test and Kruskal-Wallis Test, were applied (section 5.4). Concurrently, the normality of the data was evaluated using the Kolmogorov-Smirnov and Shapiro-Wilk tests, confirming that the data distributions did not adhere to normality assumptions. Furthermore, the interrelationships among different sections of the questionnaire were investigated using

correlation and regression analyses (Chapter Five, sections 5.6). These analytical techniques contributed to a nuanced understanding of how variables within the questionnaire sections interacted and influenced each other.

4.14.2 *Qualitative analysis:*

The analysis of the qualitative interview data commenced following the completion of the quantitative data analysis, employing thematic analysis as previously outlined. According to Cohen, Manion, and Morrison (2018), this process entails identifying units of meaning, categorising them, and interpreting these categories through narrative construction. The interview data were examined using thematic analysis, a systematic approach to identifying, organising, and interpreting patterns of meaning, or themes, within the dataset (Braun and Clarke, 2012).

Brandão (2015) outlines the process of coding, which encompasses several stages, including the coding of the primary concepts derived from the interviews, revisiting the initial codes, developing a comprehensive list of central themes associated with the coding, making adjustments, reviewing the categories and sub-categories, and, finally, extracting conclusions from these categories.

Braun and Clarke (2006) proposed a framework for thematic analysis, consisting of six phases, to guide the identification of research themes within qualitative data. The first phase involves gaining an in-depth understanding of the data. Subsequently, the process included generating initial codes, searching for themes, reviewing themes, defining themes, and writing up. Specifically, for this study, Braun and Clarke's (2006) technique was used (section 6.1) and has been applied in Chapter Six on qualitative findings. Brailas, Tragou and Papachristopoulos (2023) recommended using software over manual methods for coding qualitative data. Consequently, it is deemed more convenient and flexible for researchers, facilitating easier handling of coding and transferring extracts to various categories (Paulus, 2022). In this current study, NVivo 12 Pro software was utilised (Chapter Six). As Dhakal (2022) elaborated, NVivo 12 Pro can effectively manage and organise large amounts of qualitative data from interviews, documents, videos, and images. Specifically, in this study, NVivo 12 Pro was employed to manage transcripts from eleven interviews, organising each interview's analysis separately. Furthermore, within the main interface of NVivo 12 Pro, 143 codes were created and associated with pertinent themes. By following the six phases of thematic analysis as described above by Braun and Clarke (2006), this process culminated in the identification

of four distinct themes. Further information about the interview process can be found in this chapter relating to "Ethical Considerations, Phase Two" (section 4.16.2.2).

4.14.3 Triangulation:

Triangulation, as discussed by Denzin (1978) and Wilson (2014), represents a methodological approach intended to improve the validity and interpretation of research findings using multiple data sources, methods, and perspectives. Originally conceived to validate research outcomes and ensure accurate interpretations (Flick, 2020), triangulation involves employing various techniques to gather and analyse data within a single study of social phenomena (Flick, 2020). This approach is particularly valuable for reviewing and corroborating findings across various methods of data gathering, such as questionnaires and semi-structured interviews (Bryman, 2012). Yet, Denzin (1978) identifies four types of triangulations: data triangulation, which integrates various aspects such as people, time, and space; investigator triangulation, involving multiple researchers correlating their findings; theory triangulation, where multiple theoretical perspectives are employed and compared; and methodological triangulation, which combines data from diverse data collection methods.

In this current study, data triangulation has been thoroughly employed to enhance the credibility and depth of the research findings. To achieve this, a comprehensive approach was adopted, incorporating 363 questionnaires and 11 semi-structured interviews. This combination illustrates methodological triangulation, which not only increased the accuracy of the responses but also provided detailed insights into the research topic. Additionally, data triangulation was employed by including input from subject supervisors across eleven educational governorates. This diverse participation offered a broad spectrum of perspectives, which significantly strengthened the validity of the results, as noted by Foster (2020). The integration of these varied data sources is extensively explored in the Analysis and Discussion chapter (sections 7.2 and 7.3 and 7.4, and 7.6), showcasing how the systematic combination of different methodologies and sources contributes to a robust and comprehensive understanding of the research outcomes.

4.15 The validity and reliability of data:

In terms of validity, Zohrabi (2013) and Cohen, Manion, and Morrison (2018) offer complementary perspectives. Zohrabi (2013) defines validity as the extent to which research data and findings are accurate and truthful, categorising it into six criteria: face validity, content validity, criterion-related validity, construct validity, internal validity, and external validity. Additionally, Zohrabi (2013) introduces the utility criterion as an extra measure to enhance the validity process. Meanwhile, Cohen, Manion, and Morrison (2018) differentiate validity in quantitative research, where it pertains to how accurately an instrument measures the intended concept, from qualitative research, where it involves the accuracy and credibility of the findings. Together, these perspectives underscore the multifaceted nature of validity, encompassing both the precision of measurements and the trustworthiness of results. Zohrabi (2013) emphasises internal reliability in mixed-method research, which can be ensured through the investigator's position, triangulation, and audit trails. Notably, triangulation was employed in this study using both methodological approaches for data collection and data triangulation (Denzin, 1978). Furthermore, Zohrabi (2013) suggests that external reliability can be enhanced by considering five critical aspects of the inquiry: the researcher's status, the selection of participants, contextual factors and circumstances, analytical frameworks and assumptions, as well as the methods for gathering and analysing data. Below is an explanation of the validity and reliability before and after implementing the questionnaire in this study.

4.15.1 Validity and reliability pre-implementing the questionnaire:

Adeyemi (2024) elucidates that the accuracy of a questionnaire is paramount in research. Validity assessments play an essential role in this process by ensuring that the questionnaire accurately measures its intended construct (Arundel, 2023; Adeyemi, 2024). This verification process guarantees that the data obtained faithfully represents the constructs under investigation, thereby strengthening the overall credibility of the research outcomes. According to Hadie *et al.* (2021), establishing the construct validity of a measurement instrument is fundamental to the credibility of the data and the conclusions drawn from it. Bushmakin and Cappelleri (2022) emphasise this step is necessary to safeguard the integrity of the research outcomes. In addition to accuracy, consistency is a decisive reason in the reliability of a questionnaire (Hadie et al., 2021). Reliability tests, such as Cronbach's Alpha, ensure that the questionnaire produces

consistent results across different items and over time (Adeyemi, 2024). High reliability indicates that the results can be trusted to reflect true scores rather than random errors. Tavakol and Dennick (2011) emphasise the importance of internal consistency in research instruments, noting that reliable measures are necessary to draw valid inferences. Thus, ensuring high reliability is indispensable for the credibility and reproducibility of research findings (Bushmakin and Cappelleri, 2022).

Moreover, a validated and reliable questionnaire significantly enhances the credibility of the research findings. By demonstrating that rigorous steps have been taken to ensure data quality, the researcher can guarantee the robustness of the study. Kimberlin and Winterstein (2008) argue that the validation and reliability testing of measurement instruments are crucial for producing credible and trustworthy research results. The researcher's dedication to ensuring reliability, as highlighted by Kimberlin and Winterstein, is a key factor in the study's credibility. Consequently, the credibility of the research is bolstered, increasing its acceptance within the academic community. Furthermore, pre-testing the questionnaire can reveal problematic items that may be ambiguous, confusing, or irrelevant. This process allows for refinement before the full study, thereby improving the overall quality of the data collected. Van Teijlingen and Hundley (2001) emphasise the significance of pilot studies in detecting and addressing problems within research tools. By addressing these issues during the pre-testing phase, researchers can ensure that the final version of the questionnaire is clear, concise, and relevant, which ultimately enhances the quality of the research data. In this study, pilot data were collected from a small sample (30 participants, n=30) to determine the clarity of the items as detailed in sections (4.15.1 and 4.15.2).

4.15.1.1 Validity and reliability of the questionnaire for exploratory sample (n = 30):

4.15.1.1.1 Validity (n=30):

The validity of the questionnaire was verified through internal consistency by calculating the correlation coefficient between the items of each section and the general section. The correlation coefficients between the questionnaire sections and the general questionnaire were also calculated using the Pearson test in SPSS. This involved a rigorous process of data analysis and statistical testing to ensure the validity of the questionnaire. A pilot study with an exploratory sample of 30 was conducted in this study to test the questionnaire. Pilot studies helped identify and rectify any issues with the questionnaire before it was used in the full study (Connelly, 2008; Van Teijlingen and Hundley, 2001).

Consequently, the data collection process became more robust and reliable. Subsequently, statistical analysis, including validity tests like correlation coefficients and reliability tests such as Cronbach's Alpha, on the pilot data ensured that the questionnaire accurately and consistently measured the intended constructs (Field, 2013; DeVellis, 2016). This step was imperative, as it underpinned the methodological rigour of the study. Moreover, validity tests confirmed that the questionnaire accurately measured what it was intended to measure. This was assessed through internal consistency checks and correlation coefficients (Nunnally and Bernstein, 1994; Kline, 2000). Thus, ensuring the construct validity of the questionnaire was crucial for the integrity of the research findings. Furthermore, reliability tests ensured that the questionnaire produced consistent results across different items and over time. High reliability, indicated by measures such as Cronbach's Alpha, was crucial for the trustworthiness of the results (Cronbach, 1951; Tavakol and Dennick, 2011). Therefore, ensuring high reliability was essential for establishing the internal consistency of the instrument. Additionally, adjusting the questionnaire based on the statistical analysis allowed researchers to address any issues identified during the pilot testing phase. This refinement process significantly improved the overall quality of the data collected in the full study (Fink, 2003; Dillman, Smyth and Christian, 2014). Hence, it was a critical step in the development of a robust data collection tool. Finally, ensuring the validity and reliability of the questionnaire before applying it to the full study sample was paramount. This process enhanced the research findings' accuracy, consistency, and credibility. It demonstrated that rigorous steps had been taken to ensure data quality (Kimberlin and Winterstein, 2008; Bolarinwa, 2015). Consequently, the study's findings were more likely to be accepted and trusted by the academic community.

4.15.1.1.1.1 *The internal consistency validity of the awareness (n=30):*

Table 10 shows the values of the correlation coefficients of items in awareness with the mean of awareness. The results show there is a strong positive correlation between Section 1 and its items. The significance values show that all correlation coefficients are statistically significant, as the significance value was less than 0.05 for all elements. Therefore, there is a statistically significant correlation between awareness and its items, which indicates the validity of the internal consistency of the items in awareness.

| No | Awareness items | Pearson correlation | |
		Coefficients	P-value
A1	Implementing the ISO 9001/2015 quality management system continuously enhances the supervisor's work	0.906	0.000
A2	ISO 9001/2015 quality management system contributes to the self-assessment of the subject supervisors'	0.806	0.000
A3	ISO 9001/2015 quality management system improves the work of the whole organisation	0.825	0.000
A4	ISO 9001/2015 quality management system encourages supervisors to create and innovate.	0.893	0.000
A5	The subject supervisors are aware of the processes of quality management connected to their supervisor roles	0.751	0.000
A6	The annual plan of subject supervisors' is linked to the implementation of the ISO 9001/2015 quality management system and is designed to meet its standards	0.806	0.000
A7	My department uses the supervisors' feedback on the ISO 9001/2015 quality management system to improve its implementation	0.897	0.000
A8	Implementing ISO 9001/2015 quality management system improves the performance of the subject supervisors'	0.894	0.000
A9	ISO 9001/2015 quality management system empowers subject supervisors to perform their job roles	0.851	0.000
A10	ISO 9001/2015 quality management system contributes to continuously improving the supervisor's work	0.878	0.000

Table 10 The correlation coefficients between the mean of awareness and its items

4.15.1.1.1.2 *The internal consistency validity of the effectiveness of the QMS training (n = 30):*

Table 11 shows the values of the correlation coefficients of items in the effectiveness of the QMS training with the mean of the effectiveness of the QMS training. The results show there is a strong positive correlation between the effectiveness of the QMS training and its items, The significance values show that all correlation coefficients are statistically significant, as the significance value was less than 0.05 for all elements. Therefore, there

is a statistically significant correlation between the effectiveness of the QMS training and its items, which indicates the validity of the internal consistency of the items in the effectiveness of the QMS training.

No	The effectiveness of the QMS training items	Pearson correlation	
		coefficients	P-value
B1	ISO 9001/2015 quality management system contributes to the improvement of the performance of subject supervisors in their roles and responsibilities	0.848	0.000
B2	Experts have trained you on the ISO 9001/2015 quality management system	0.875	0.000
B3	ISO 9001/2015 quality management system provides the opportunity to enhance the productivity of the subject supervisors'	0.703	0.000
B4	The Quality Management department holds periodic assessments to improve the processes of the ISO 9001/2015 quality management system.	0.770	0.000
B5	The training on the ISO 9001/2015 quality management system is clear	0.896	0.000
B6	The training on ISO 9001/2015 quality management system covers all stages, which are planning, implementation, and assessment	0.872	0.000
B7	There is a how-to guide for supervisors' work on ISO 9001/2015 quality management system	0.821	0.000
B8	The comments of the subject supervisors on the ISO 9001/2015 quality management system are considered by the specialists in the quality management department	0.739	0.000
B9	The length of the training programmes was enough to provide subject supervisors with the knowledge to implement the quality management system in their jobs.	0.850	0.000
B10	The subject supervisors are trained to use technology to document the processes of the quality management system.	0.802	0.000

Table 11 effectiveness of the QMS training and its items.

4.15.1.1.1.3 The internal consistency validity of the organisational skills (n = 30):

Table 12 shows the values of the correlation coefficients of items in organisational skills with the mean of organisational skills. The results show there is a strong positive correlation between organisational skills and its items. The significance values show that all correlation coefficients are statistically significant, as the significance value was less than 0.05 for all elements. Therefore, there is a statistically significant correlation between organisational skills and its items, which indicates the validity of the internal consistency of the items in organisational skills.

No	Organisational skills items	Pearson correlation	
		Coefficients	P-value
C1	Improves time management skills of subject supervisors.	0.852	0.000
C2	Provides chances for the supervisors to cooperate.	0.912	0.000
C3	Contributes to identifying the supervisors' priorities in their duties.	0.947	0.000
C4	Helps subject supervisors in the situation analysis.	0.865	0.000
C5	Helps subject supervisors to schedule their job responsibilities according to the requirements of the quality management system.	0.946	0.000
C6	Develops the subject supervisors' problem-solving skills.	0.948	0.000
C7	Contributes to the improvement of dialogue and discussion skills among subject supervisors'	0.877	0.000
C8	Equips the subject supervisors with teamwork skills	0.945	0.000
C9	Enhances the planning skills of subject supervisors'	0.920	0.000
C10	Enables the subject supervisors to think creatively in developing their professional performance	0.919	0.000

Table 12 The correlation coefficients between the mean of organisational skills and its items.

4.15.1.1.1.4 Correlation between the overall questionnaire and its sections (n = 30):

Table 13 shows the values of the correlation coefficients in three sections and the overall questionnaire. The results indicate the validity of the questionnaire's internal consistency, revealing a significant, strong positive correlation between the three sections and the entire questionnaire.

Sections	Overall	
	Correlation coefficients	**P-value**
Awareness	0.942	0.000
The effectiveness of the QMS training	0.893	0.000
Organisational skills	0.909	0.000

Table 13 Correlation coefficients between each section and the overall questionnaire

4.15.1.1.2   Reliability (n = 30):

The reliability of the questionnaire and the three sections was calculated using Cronbach's Alpha coefficient. The results are shown in Table 14.

Sections	No of items	Cronbach Alpha Coefficients
Awareness	10	0.955
The effectiveness of the QMS training	10	0.944
organisational skills	10	0.978
Overall	30	0.978

Table 14 Cronbach Alpha Coefficients for the three sections and the overall questionnaire.

The coefficients for the three sections and the overall questionnaire are quite high (ranging from 0.944 to 0.978), suggesting a high level of internal consistency and reliability for the items within each domain and the questionnaire.

4.15.2 Validity and reliability post-implementing the questionnaire:

This study involved conducting 363 questionnaires and 11 semi-structured interviews, thereby employing methodological triangulation (section 4.13.3) to enhance the accuracy of responses and to provide in-depth insights into the findings obtained. Additionally, data triangulation (section 4.13.3) included the participation of subject supervisors from eleven educational governorates as a source of data triangulation. This approach not only provided additional information but also, as Foster (2020) noted, bolsters the validity of the findings. Moreover, in this research, data were collected using a mixed-method approach and analysed using SPSS and NVivo 12 Pro, ensuring a high level of data analysis reliability. Moreover, in the quantitative findings chapter (Chapter Five, part one), the validity (section 5.2.1, section 5.2.1.1, section 5.2.1.2, and section 5.2.1.3) and reliability (section 5.2.2) of the questionnaire were calculated using Cronbach's alpha and Pearson correlation. Similarly, Cohen, Manion, and Morrison (2018) describe reliability in quantitative research as the consistency or stability of measurement over time, while in qualitative research, it refers to the consistency or stability of the findings (Chapter Six). This alignment of methods and consistent application of rigorous analytical techniques contribute to the robustness and dependability of the research outcomes. This rigorous approach, particularly the forward-backwards translation (section 4.15.4), was implemented to ensure that the translated content accurately mirrored the original, preserving the intended meanings and information essential for the research. This step helped maintain the integrity and consistency of the data across both languages, thereby bestowing consistent performance reliability and content validity.

4.15.3 Validity and reliability of the semi-structured interview questions:

Ensuring the validity and reliability of interview questions prior to implementation was essential for obtaining accurate and consistent data. Initially, to establish content validity, a panel of experts in the field was required to review the interview questions. In this study, after drafting the semi-structured interview questions, they were reviewed by the academic supervisors. They were submitted to the ethics reviewers to ensure the research objectives and questions were aligned. Subsequently, an academic expert revised the questions to confirm that the validity and reliability steps had been appropriately followed, incorporating diverse opinions from each expert to refine the question structure (DeVellis, 2016). Thereafter, face validity was improved by pre-testing the questions with

a small, representative sample of participants, which allowed for feedback on their clarity and relevance (Fink, 2003). Moreover, construct validity was ensured by aligning each question with the theoretical constructs intended to be measured, guided by literature and theoretical frameworks (Nunnally and Bernstein, 1994). Additionally, criterion validity was assessed by comparing the interview responses with those from established measures known to be valid, using correlational analysis (Kimberlin and Winterstein, 2008). Furthermore, reliability was evaluated through test-retest reliability, involving interviewing the same participants at two different times to determine the stability of their responses (Tavakol and Dennick, 2011). In this study, conducting pilot interviews was also crucial. The questions were piloted with three subject supervisors, which revealed issues such as ambiguity, confusion, or irrelevance. This process led to minor adjustments to improve the coherence and comprehensibility of the questions, thereby significantly enhancing the overall quality of the data collected in the full study (Elsherif, Van Teijlingen and Hundley, 2001).

In conclusion, by involving expert reviews, conducting pre-tests, aligning questions with theoretical frameworks, comparing responses with established measures, and assessing both test-retest and inter-rater reliability, the validity and reliability of the interview questions were ensured. Consequently, these steps resulted in more accurate and trustworthy research findings.

4.15.4 *Forward-backword translation (questionnaire and semi-structured interview):*

Forward-backword translation means equating between the modified and the resource's original edition. (Lee et al., 2019). This section will delve into the comprehensive process of translating data for thorough analysis, which will be elaborated upon in the following section. The study originates from the United Kingdom and applies to the Sultanate of Oman. This application is specifically within the Ministry of Education, where the official language in all governmental ministries is Arabic. The translation process is crucial to ensure accurate data interpretation and application in a context where language and cultural nuances are significant. For this reason, after piloting the research instruments, and receiving approval from the academic supervisors' and the ethical team at the university (Appendix L), the researcher prepared the Arabic version of the research instruments, specifically the questionnaire and the semi-structured interview. This Arabic version underwent an extensive and meticulous revision process to ensure the highest

standards of accuracy in terms of format, spelling, grammar, and overall coherence of the questions. This rigorous process involved multiple experts: an accomplished professional in the Arabic language, two senior Arabic teachers from the Ministry of Education in Oman, and an academic researcher. Each of these contributors played a crucial role in verifying that the questions in both the questionnaire and the interview were coherent, culturally appropriate, and clear in both meaning and intention.

The finalised Arabic version of the research instruments (Appendix E) was then utilised in the online questionnaire, which was hosted on Google Forms (Appendix F). Additionally, these carefully crafted questions were used during the semi-structured interviews (Appendix B). This thorough approach ensured that the research tools were reliable and valid for the context of the study, providing a solid foundation for gathering meaningful and accurate data. Following this and considering the requirement for the thesis to be in English for submission to Staffordshire University, a meticulous back-translation process was undertaken. This process involved two additional academic researchers from Oman, who translated the Arabic version of the research instruments back into English. This crucial step was implemented to ensure that the translated content accurately mirrored the original, preserving the intended meanings and information essential for the research. This rigorous approach helped maintain the integrity and consistency of the data across both languages (see the Validity and Reliability section 4.15 for more details). Moreover, the quantitative data did not require translation or further verification, as the responses to all thirty questions were in numeric format. This simplified the analysis process, as numeric data is inherently language independent.

In contrast, the qualitative data necessitated a more detailed approach. The qualitative responses were initially transcribed in Arabic, and these transcripts were used for the analysis. This method ensured that the nuances and contextual meanings specific to the Arabic language and culture were preserved and accurately interpreted. The process of handling and analysing the qualitative data is explained and explored in greater depth in Chapter Six (Section 6.2 and Section 6.2), in which the measures implemented to guarantee the precision, consistency, and validity of the qualitative data analysis will be comprehensively outlined. This thorough approach ensured that quantitative and qualitative data were processed according to the highest academic standards, establishing a solid basis for the research outcomes.

4.16 Ethical considerations:

The design of educational research is a deliberate and principled endeavour, inherently grounded in ethical responsibility (Cohen, Manion and Morrison, 2018). Therefore, all research involving human participants must obtain ethical clearance to guarantee that the dignity, rights, safety, and welfare of those involved are upheld as central priorities throughout the study. Before its commencement, this study was presented to the university's ethics committee, including its title, research questions, and tools. It was subsequently approved (Appendices K and L) Moreover, one of the responsibilities of the collective body of scholars engaged in educational research is: "All educational researchers should aim to protect the integrity and reputation of educational research by ensuring that they conduct their research to the highest standards. Researchers should contribute to the community spirit of critical analysis and constructive criticism that generates improvement in practice and enhancement of knowledge" (BERA, 2018, p. 29). Steps taken to ensure adherence to BERA's (2018) guidelines are sufficiently robust to apply to the later (and post-study) BERA (2024) guidelines. More about the power and privilege of insider researcher/ subject supervisors' is covered in section 4.7.2.

4.16.1 Ethical Principles:

According to Brooks, te Riele, and Maguire (2014), securing participants' informed consent, safeguarding their privacy and confidentiality, and complying with established ethical standards are foundational obligations in conducting educational research. These guidelines include respect for persons (autonomy, dignity), beneficence (maximising benefits, minimising harm), justice (fair treatment, equal opportunity), and maintaining integrity and honesty in research conduct. Moreover, gaining informed consent (providing clear information, allowing voluntary participation), protecting participant confidentiality and anonymity, handling sensitive data and vulnerable populations, disseminating findings ethically and responsibly, avoiding deception or coercion, minimizing risks and harm to participants, and maintaining objectivity and integrity in data collection and analysis are critical aspects of ethical research.

4.16.2 Phases of Ethical Approval:

Accordingly, to cater to research prerequisites, particularly regarding ethical considerations, the process unfolded across two distinct phases: initial oversight by the

University Ethics Committee, followed by engagement with the Technical Office for Studies and Educational Development (TOSD) under the auspices of the Ministry of Education in Oman. Consequently, the following sections will go into more detail about each phase and outline the processes carried out within them.

4.16.2.1 Phase One:

Upon completing the design and review of the questionnaire, the final version was approved by the supervisors. Furthermore, it underwent rigorous evaluation by the University Ethics Committee, which also endorsed the questionnaire design and the semi-structured interview questions on 20 May 2020. Moreover, the consent form (Appendix (D)) of the interview was meticulously reviewed and approved by the committee. Thus, with these necessary approvals secured, the research tools were validated, marking the commencement of Phase Two of the study.

4.16.2.2 Phase Two:

Phase Two began after the approval of the questionnaire and interview questions. During this stage, contact was made with the TOSD office at the Ministry of Education in Oman. The Technical Studies Office at the centre approved the research tools. Following this, they proceeded by sending an electronic link for the research instrument. The TOSD office then promptly distributed the questionnaire to training centres across the educational governorates, which subsequently forwarded it to supervision departments within each governorate. Subject supervisors responded electronically via a link provided by the researcher through the TOSD office.

4.16.3 Informed Consent:

As Cohen, Manion and Morrison (2018) explain, the participant information sheet is intended to outline the purpose of the survey, emphasise its significance, provide assurances regarding confidentiality, and encourage participation. In the context of this study, participants were informed that the questionnaires were unrelated to any form of performance assessment and that there were no correct or incorrect responses. Additionally, they were assured at the outset that all information provided would remain strictly confidential and that they retained the right to withdraw from the study at any stage (Appendix D).

Moreover, participants were asked for permission to use the information they provided and to do so freely; practical steps were taken to guarantee the anonymity of their responses. Thus, to ensure anonymity, participants were assigned numerical codes instead of their names, facilitated by Google Forms, which automatically assigned anonymous numbers. Furthermore, data were securely stored in password-protected files. Additionally, access to the data was restricted to authorised research personnel only. Also, informed consent forms are crucial for enabling individuals to make informed decisions about their participation in research involving human subjects; in this study, it is the impact of QMS on their organisational skills (Wade et al., 2017). These forms are generally guided by the principles underlying the nature of the research, the structure of the questions, and other relevant information concerning both the researcher and the participants. Additionally, Wade et al. (2017) emphasise that well-crafted informed consent forms ensure that participants fully understand the nature and purpose of the study, the potential risks and benefits, and the voluntary aspect of their participation.

4.17 Summary

This chapter outlined the methodologies employed in the current study. The research involved administering a questionnaire to subject supervisors' undergoing training on QMSs across eleven educational governorates. Additionally, semi-structured interviews were conducted with eleven subject supervisors to gather comprehensive insights. Detailed within this chapter is the construction process of the questionnaire used in the research. The questionnaire underwent rigorous development, pilot testing, and refinement with expert input before distribution to participants, ensuring its reliability and relevance. The chapter also describes the statistical methods utilised to analyse the collected data. Quantitative data from the questionnaire were analysed using SPSS, while qualitative data from the interviews were processed using NVivo12 Pro, ensuring a comprehensive analysis of both data types. Significantly, the rigorous forward-backwards translation process was implemented to enhance the accuracy and reliability of the questionnaire and interview questions, aligning them closely with the study's objectives and ensuring clarity across different language contexts.

The next chapter will present the quantitative and qualitative findings derived from both the questionnaire and semi-structured interviews. This will provide a detailed exploration

of the research outcomes, offering insights into the perceptions and experiences of subject supervisors' regarding QMS training in educational settings.

5   Chapter Five: The Quantitative Findings

The Quantitative Findings chapter delivers an in-depth analysis of data gathered through questionnaires distributed to 363 participants within Oman's Ministry of Education, providing a solid understanding of ISO 9001:2015's influence on subject supervisors. Specifically, the questionnaire (Appendix B), used as a research tool, investigated similarities and differences in participants' views regarding supervisors' awareness of the Quality Management System (QMS) and their views on associated training programmes. Also, using SPSS for data analysis, the chapter identifies notable patterns and correlations that reveal supervisors' levels of awareness, the training's effectiveness, and its impact on organisational skills. Moreover, the findings indicate significant demographic differences, offering insights into ISO 9001:2015's overall effectiveness. This quantitative data forms a basis for evaluating the QMS's impact and supports recommendations to enhance current policies and procedures (section 3.10).

The examination of quantitative data on implementing the ISO 9001:2015 QMS is divided into five distinct parts (Figure 19). Each part is designed to offer comprehensive insights into various aspects of subject supervisors' perceptions and experiences. Section 4.2 outlines the methodological and analytical framework employed to elucidate patterns, associations, and insights inherent within the quantitative dataset.

5.1   The chapter structure:

The chapter structure outlined below depicts the analysis of quantitative data, which is presented in five parts as follows:

Part 1		• The validity and reliability of the questionnaire
Part 2		• Frequencies, percentages, mean, and mode for items of each section, As follow: • **Section One:** The Awareness and Knowledge: • **Section Two:** Effectiveness Training: • **Section Three:** The Organisational Skills
Part 3		• Frequencies and percentages for levels of each demographic data.
Part 4		• Studying the statistical differences between the levels of demographic variables for each section.
Part 5		• Investigate the relationship between sections of the questionnaire by correlation and regression analysis

Figure 20 Chapter Five structure

Part 1 – The validity and reliability of the questionnaire were figured out through internal validity using the Pearson correlation coefficient. The reliability of the questionnaire and its three sections was calculated using Cronbach's alpha coefficient.

Part 2– Frequencies, percentages, mean, and mode for items of each section. As follows:

Section one: Awareness and Knowledge: The understanding and awareness of subject supervisors of the importance of the ISO 9001:2015 QMS and its implementation.

Section two: Effectiveness Training: ISO 9001:2015 QMS learning, and training opportunities provided for subject supervisors based on their roles and responsibilities.

Section three: Organisational Skills: The Impact of Implementing the ISO 9001: 2015 QMS on the Organisational Skills of Subject Supervisors'.

Part 3– Frequencies and percentages for levels of each demographic data/variable i.e. nationality, age, gender, years of experience in a place of work of the participants, and Subjects of supervision.

Part 4– In inferential statistics, the ability to make generalisations about a population is primarily drawn from sample analysis. Parametric statistical methods, which rely on normality assumption in continuous data, allow conclusions about various groups based on data collected from study participants. The normality of the data was tested using the Kolmogorov-Smirnov and Shapiro-Wilk tests (sections 4.11.2.1 and 8.4.3), which indicated that the data were not normally distributed. Given this non-normal distribution, nonparametric tests were selected, specifically the Mann-Whitney test for nationality and gender and the Kruskal-Wallis test for other demographic variables. These tests do not depend on the assumption of normality, making them suitable for the data in this study.

Part 5– Investigates the relationship between sections of the questionnaire by correlation analysis between three sections i.e. section 1 (Awareness), section 2 (Effectiveness of the QMS training), and section 3 (Organisational skills) and regression analysis to determine the effect of section 1 (Awareness), and section 2 (Effectiveness of the QMS training) as independent variables on section 3 (Organisational skills) as a dependant variable by regression analysis.

5.2 Part 1- Validity and reliability of the questionnaire:

5.2.1 Validity

The validity of the questionnaire was verified through internal consistency by calculating the correlation coefficient between the items of each section and the general section. The correlation coefficients between the questionnaire sections and the general questionnaire were also calculated using the Pearson test in SPSS.

5.2.1.1 The internal consistency validity of the awareness.

Table 15 shows the values of the correlation coefficients of items in awareness with the mean of awareness. The results show there is a strong positive correlation between Section 1 and its items, as the correlation coefficient values ranged from 0.682 for item A5 to 0.878 for item A8. The significance values show that all correlation coefficients are statistically significant, as the significance value was less than 0.05 for all elements. Therefore, there is a statistically significant correlation between awareness and its items, which indicates the validity of the internal consistency of the items in awareness.

No	Awareness items	Pearson correlation	
		Coefficients	P-value
A1	Implementing the ISO 9001:2015 QMS continuously enhances the supervisor's work	0.806	0.000
A2	ISO 9001:2015 QMS contributes to the self-assessment of subject supervisors'	0.804	0.000
A3	ISO 9001:2015 QMS improves the work of the whole organisation	0.822	0.000
A4	ISO 9001:2015 QMS encourages supervisors to create and innovate.	0.843	0.000
A5	The subject supervisors are aware of the processes of quality management connected to their supervisor roles	0.682	0.000
A6	The annual plan of subject supervisors' is linked to the implementation of the ISO 9001:2015 QMS and is designed to meet its standards	0.730	0.000
A7	My department uses the supervisors' feedback on ISO 9001:2015 QMS to improve its implementation	0.766	0.000
A8	Implementing ISO 9001:2015 QMS improves the performance of subject supervisors'	0.878	0.000
A9	ISO 9001:2015 QMS empowers subject supervisors to perform their job roles	0.843	0.000
A10	ISO 9001:2015 QMS contributes to continuously improving the supervisor's work	0.875	0.000

Table 15 the correlation coefficients between the mean of awareness and its items

5.2.1.2   The internal consistency validity of the effectiveness of the QMS training:

Table 16 shows the values of the correlation coefficients of items in the effectiveness of the QMS training with the mean of the effectiveness of the QMS training. The results show there is a strong positive correlation between the effectiveness of the QMS training and its items, as the correlation coefficient values ranged from 0.755 for item B3 to 0.883 for item B5.

No	The effectiveness of the QMS training items	Pearson correlation	
		coefficients	P-value
B1	ISO 9001:2015 QMS contributes to the improvement of the performance of subject supervisors in their roles and responsibilities	0.809	0.000
B2	Experts have trained you on the ISO 9001:2015 QMS	0.846	0.000
B3	ISO 9001:2015 QMS provides the opportunity to enhance the productivity of subject supervisors'	0.755	0.000
B4	The Quality Management department holds periodic assessments to improve the processes of the ISO 9001:2015 QMS.	0.792	0.000
B5	The training on ISO 9001:2015 QMS is clear	0.883	0.000
B6	The training on ISO 9001:2015 QMS covers all stages which are planning, implementation, and assessment	0.865	0.000
B7	There is a how-to guide for supervisors' work on ISO 9001:2015 QMS	0.802	0.000
B8	The comments of subject supervisors on the ISO 9001:2015 QMS are considered by the specialists in the quality management department	0.873	0.000
B9	The length of the training programmes was enough to provide subject supervisors with the knowledge to implement the QMS in their jobs.	0.865	0.000
B10	The subject supervisors are trained to use technology in documenting the processes of the QMS.	0.810	0.000

Table 16 correlation coefficients between the mean of the effectiveness of the QMS training and its items.

The significance values show that all correlation coefficients are statistically significant, as the significance value was less than 0.05 for all elements. Therefore, there is a statistically significant correlation between the effectiveness of the QMS training and its items, which indicates the validity of the internal consistency of the items in the effectiveness of the QMS training.

5.2.1.3 The internal consistency validity of the organisational skills:

No	Organisational skills items	Pearson correlation	
		Coefficients	P-value
C1	Improves time management skills of subject supervisors'.	0.848	0.000
C2	Provides chances for the supervisors to cooperate.	0.906	0.000
C3	Contributes to identifying the supervisors' priorities in their duties.	0.894	0.000
C4	Helps subject supervisors in the situation analysis.	0.879	0.000
C5	Helps subject supervisors to schedule their job responsibilities according to the requirements of the QMS.	0.885	0.000
C6	Develops the subject supervisors' problem-solving skills.	0.900	0.000
C7	Contributes to the improvement of dialogue and discussion skills among subject supervisors'	0.904	0.000
C8	Equips the subject supervisors with teamwork skills	0.887	0.000
C9	Enhances the planning skills of subject supervisors'	0.886	0.000
C10	Enables the subject supervisors to think creatively in developing their professional performance	0.902	0.000

Table 17 correlation coefficients of items in organisational skills

Table 17 shows the values of the correlation coefficients of items in organisational skills with the mean of organisational skills. The results show there is a strong positive correlation between organisational skills and its items, as the correlation coefficient values ranged from 0.848 for item C1 to 0.906 for item C2. The significance values show that all correlation coefficients are statistically significant, as the significance value was less than 0.05 for all elements. Therefore, there is a statistically significant correlation

between organisational skills and its items, which indicates the validity of the internal consistency of the items in organisational skills.

5.2.1.4   Correlation between the overall questionnaire and its sections:

Sections	Overall	
	Correlation coefficients	**P-value**
Awareness	0.919	0.000
The effectiveness of the QMS training	0.897	0.000
organisational skills	0.932	0.000

Table 18 correlation coefficients in three sections and the overall questionnaire

Table 18 shows the values of the correlation coefficients in three sections and the overall questionnaire. The results indicate the validity of the questionnaire's internal consistency, revealing a significant, strong positive correlation between the three sections and the entire questionnaire.

5.2.2   Reliability

The reliability of the questionnaire and the three sections was calculated using the Cronbach's Alpha coefficient. Table 19 shows the results.

Sections	No of items	Cronbach Alpha Coefficients
Awareness	10	0.939
The effectiveness of the QMS training	10	0.948
organisational skills	10	0.971
Overall	30	0.976

Table 19 The reliability of the questionnaire and the three sections

The coefficients for the three sections and the overall questionnaire are quite high (ranging from 0.939 to 0.976), suggesting a high level of internal consistency and reliability for the items within each domain and the questionnaire.

5.3 Part 2– Frequencies and percentages for items of each section.

5.3.1 Section One: The Awareness and Knowledge:

Initially, the investigation began by exploring the awareness and knowledge of subject supervisors' concerning the ISO 9001:2015 QMS. Examining frequencies, percentages, means, and modes within each section proved essential to the study. This preliminary analysis facilitated a nuanced understanding of supervisors' perceptions of the QMS's significance and practical application. A comprehensive examination of supervisors' knowledge and awareness was conducted, and the gathered data was then correlated with demographic data (Part 4 of this chapter) to assess any potential significance. This analytical endeavour provided invaluable insights to inform interpretations regarding the broader implementation of ISO 9001:2015 in this context.

	Items		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Mode
A1	Implementing the ISO 9001:2015 QMS continuously enhances the supervisor's work	N	62	168	90	33	10	3.658	4.0
		%	17.1	46.3	24.8	9.1	2.8		
A2	ISO 9001:2015 QMS contributes to the self-assessment of the subject	N	34	180	99	39	11	3.515	4.0
		%	9.4	49.6	27.3	10.7	3.0		
A3	ISO 9001:2015 QMS improves the work of the whole organisation	N	60	169	97	33	4	3.683	4.0
		%	16.5	46.6	26.7	9.1	1.1		
A4	ISO 9001:2015 QMS encourages supervisors to create and innovate	N	46	116	113	72	16	3.287	4.0
		%	12.7	32.0	31.1	19.8	4.4		

A5	The subject supervisors are aware of the processes of quality management connected to their	N	18	117	126	78	24	3.074	3.0
		%	5.0	32.2	34.7	21.5	6.6		
A6	The annual plan of subject supervisors' is linked to the implementation of the ISO 9001:2015 QMS and is designed to meet its standards	N	26	141	113	70	13	3.267	4.0
		%	7.2	38.8	31.1	19.3	3.6		
A7	My department uses the supervisors' feedback on ISO 9001:2015 QMS to improve its implementation	N	31	121	109	92	10	3.196	4.0
		%	8.5	33.3	30.0	25.3	2.8		
A8	Implementing ISO 9001:2015 QMS improves the performance of the subject supervisors'	N	29	146	112	64	12	3.320	4.0
		%	8.0	40.2	30.9	17.6	3.3		
A9	ISO 9001:2015 QMS empowers subject supervisors to perform their job roles	N	33	149	103	70	8	3.355	4.0
		%	9.1	41.0	28.4	19.3	2.2		
A10	ISO 9001:2015 QMS contributes to continuously improving the supervisor's work	N	38	148	106	63	8	3.399	4.0
		%	10.5	40.8	29.2	17.4	2.2		

Table 20 Frequencies, percentages, Mean, and Mode of Section One in the questionnaire

Table 20 presents a descriptive statistical analysis of ten items including objective supervisors' understanding and awareness of ISO 9001:2015 QMSs. According to Table 20, the average (M) for the first section of the total form (363) ranges between 3.074 and

3.683. While the mode value was 4 for all items except for item A5, the mode value was 3. As Table 21 shows, from the frequencies and percentages, the highest percentage of participants was at the level of agreement (agree) in most of the items, which indicates that most of the participants agreed that they understand and realise the importance of the ISO 9001:2015 QMS and its implementation. This is consistent with the result of the mean and mode. Furthermore, the mean values for questions A1, A2, and A3 (3.658, 3.515, and 3.683, respectively) indicate a strong consensus among participants regarding the positive impact of implementing the ISO 9001:2015 QMS on supervisors' work, its contribution to their self-assessment, and its overall enhancement of organisational processes. Conversely, the mean value for question A5 (3.074) suggests a relatively lower level of agreement or potential disagreement regarding subject supervisors' awareness of QMS associated with their roles. These aspects will be discussed in more detail in the Analysis and Discussion Chapter (see Chapter Seven)

5.3.2 Section two: Effectiveness training:

Section Two of the study shifted its focus towards assessing the effectiveness of training provided for the ISO 9001:2015 QMS, specifically tailored to the roles and responsibilities of subject supervisors within the organisation. Consequently, this evaluation entailed a meticulous examination of frequencies, percentages, and means concerning the training's efficacy. Similarly, drawing comparisons with the methodology employed in Section 5.3.1, which had concentrated on examining supervisors' awareness and understanding of the ISO 9001:2015 QMS, with Section Two adopting a systematic approach to evaluate the training's effectiveness. Furthermore, the comprehensive analysis of training efficacy, combined with potential correlations with demographic data in subsequent sections of the study, was intended to uncover significant insights into supervisors' perceptions and experiences regarding the training provided. Thus, this analytical endeavour yielded valuable findings, enriching the understanding of the broader implications of ISO 9001:2015 implementation, especially concerning training effectiveness and its impact on organisational practices and performance.

	Items		**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagre**	**Mean**	**Mode**
B1	ISO 9001:2015 QMS contributes to the improvement of the performance of subject supervisors in their roles and responsibilities	N	18	127	114	88	16	3.12	4.0
		%	5.0	35.0	31.4	24.2	4.4		
B2	Experts have trained you on the ISO 9001:2015 QMS	N	19	89	110	104	41	2.84	3.0
		%	5.2	24.5	30.3	28.7	11.3		
B3	ISO 9001:2015 QMS provides the opportunity to enhance the productivity of subject supervisors'.	N	28	132	108	85	10	3.23	4.0
		%	7.7	36.4	29.8	23.4	2.8		
B4	The Quality Management department holds periodic assessments to improve the processes of the ISO 9001:2015 QMS.	N	24	134	120	67	18	3.22	4.0
		%	6.6	36.9	33.1	18.5	5.0		
B5	The training on ISO 9001:2015 QMS is clear	N	20	105	116	96	26	2.99	3.0
		%	5.5	28.9	32.0	26.4	7.2		
B6	The training on ISO 9001:2015 QMS covers all stages which are planning, implementation, and assessment	N	25	121	125	71	21	3.16	3.0
		%	6.9	33.3	34.3	19.6	5.8		
		N	19	91	115	106	32		

B7	There is a how-to guide for supervisors' work on ISO	%	5.2	25.1	31.7	29.2	8.8	2.89	3.0
B8	The comments of subject supervisors on the ISO 9001:2015 QMS are considered by the specialists in the quality	N	21	78	111	114	39	2.80	2.0
		%	5.8	21.5	30.6	31.4	10.7		
B9	The length of the training programmes was enough to provide subject supervisors with the knowledge to implement the QMS in their jobs.	N	12	69	121	128	33	2.72	2.0
		%	3.3	19.0	33.3	35.3	9.1		
B1 0	The subject supervisors are trained to use technology in documenting the processes of the QMS.	N	16	102	110	108	27	2.92	3.0
		%	4.4	28.1	30.3	29.8	7.4		

Table 21 Frequencies, percentages, Mean, and Mode of Section Two in the questionnaire

Table 21 presents a descriptive statistical analysis of ten items including objective supervisors' effectiveness of the QMS training. According to the data gathered and depicted in Table 22, the average (M) for the second section of the total form (363) ranges between 2.72 - 3.23. While the mode value was 4 for all items (B3, and B4) the item mode value was 3 (B2, B5, B6, B7and B10), with the mode value being 2 for B8 and B9. As Table 22 illustrates, from the frequencies and percentages, the highest percentage of

participants was at the level of agreement (agree) in items B1, B3, and B4, and the highest percentage of participants was at the level of agreement (Neutral) in items B2, B5, B7, and B10. The data findings (Table 21) can be summarised into the following two themes:

5.3.2.1   Consensus on System Effectiveness:

Participants, as seen in Table 21, broadly agree on the effectiveness of the ISO 9001:2015 QMS in enhancing subject supervisors' productivity (B3, M=3.23) and the efficiency of periodic assessments conducted by the Quality Management department (B4, M=3.22). There is also strong consensus (B1, M=3.12) on the system's positive impact on improving subject supervisors' performance in their roles and responsibilities.

5.3.2.2   Disagreement on Training Effectiveness:

However, there is a lower level of agreement (Items B7, B8, B9) among participants (Table 21) regarding the perceived effectiveness of various training aspects associated with implementing the ISO 9001:2015 QMS. Participants express varying opinions on the availability of a how-to guide for supervisors' work (B7, M=2.89), the consideration of subject supervisors' comments by specialists in the quality management department (B8, M=2.80), and the adequacy of training programme length (B9, M= 2.72) to equip supervisors with the necessary knowledge for system implementation.

These two themes and their implications are further discussed in section two of the Analysis and Discussion Chapter (section 7.3.2). This provides insights into the participants' perceptions and areas for improvement in implementing the ISO 9001:2015 QMS.

5.3.3   Section three: The Organisational skills:

This section delves into the impact of implementing the ISO 9001:2015 QMS on the organisational skills of subject supervisors. The analysis will be guided by frequencies, percentages, and mean scores for specific items related to organisational skills (Table 22), laying the groundwork for further exploration in Part 4, where demographic data will be integrated to provide deeper insights into this relationship.

	Items		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	Mode
C1	Improves time management skills of subject	N	40	151	97	59	16	3.39	4.0
		%	11.0	41.6	26.7	16.3	4.4		
C2	Provides chances for the supervisors to cooperate.	N	38	129	109	76	11	3.30	4.0
		%	10.5	35.5	30.0	20.9	3.0		
C3	Contributes to identifying the supervisors' priorities in their	N	45	152	99	56	11	3.45	4.0
		%	12.4	41.9	27.3	15.4	3.0		
C4	Helps subject supervisors in the situation analysis.	N	31	154	99	67	12	3.34	4.0
		%	8.5	42.4	27.3	18.5	3.3		
C5	Helps subject supervisors to schedule their job responsibilities according to the requirements of the QMS.	N	46	153	105	47	12	3.48	4.0
		%	12.7	42.1	28.9	12.9	4.4		
C6	Develops the subject supervisors' problem-solving skills.	N	31	127	111	78	16	3.22	4.0
		%	8.5	35.0	30.6	21.5	4.4		
C7	Contributes to the improvement of dialogue and discussion skills among subject	N	37	122	111	74	19	3.23	4.0
		%	10.2	33.6	30.6	20.4	5.2		
C8	Equips the subject supervisors with teamwork skills	N	38	135	103	73	14	3.30	4.0
		%	10.5	37.2	28.4	20.1	3.9		

C9	Enhances the planning skills of subject supervisors'	N	43	163	95	50	12	3.48	4.0
		%	11.8	44.9	26.2	13.8	3.3		
C10	Enables the subject supervisors to think creatively in developing their professional performance	N	38	119	118	69	19	3.24	4.0
		%	10.5	32.8	32.5	19.0	5.2		

Table 22 Frequencies, percentages, Mean, and Mode of Section Three in the questionnaire

Table 22 presents a descriptive statistical analysis of ten items including the impact of implementing the ISO 9001: 2015 QMS on the organisational skills of subject supervisors. According to the table above, the average (M) for the first section of the total form (363) ranges between 3.22- 3.48; while the mode value was 4 for all items. As shown in table 22, the frequencies and percentages reveal that the highest proportion of participants expressed agreement (agree) on most items, indicating that the majority believed they possessed the organisational skills required for ISO 9001:2015 QMS and its implementation. This is consistent with the result of the mean and mode. Moreover, Table 22 shows that participant responses regarding the impact of implementing the ISO 9001:2015 QMS on subject supervisors' organisational skills reveal notable insights. High mean scores of 3.48 for items C5 and C9 indicate a strong consensus among participants regarding the system's positive influence on scheduling job responsibilities and enhancing planning skills. Conversely, item C10 received a slightly lower mean score of 3.24, suggesting less agreement on the system's effectiveness in fostering creative thinking. These findings highlight varied perceptions among participants, offering valuable insights for further analysis and improvement efforts. These results and their implications are further discussed in section three of the Analysis and Discussion chapter (section 7.3.3)

5.4   Part 3– Frequencies and percentages for levels of each demographic variable:

Figure 20 depicts the demographic traits of the participants, as outlined in the first segment of the general information section, given to them via the questionnaire (see Appendix B). The questionnaire was administered across all eleven educational governorates in the Sultanate of Oman, utilising a random sampling method (as detailed in the Methodology Chapter 3, Section 3.13), resulting in a total of 363 participants. Figure 18 illustrates six elements regarding Demographic data, namely, nationality, age, gender, years of experience, educational governorate, and supervision subjects, with explanations for each.
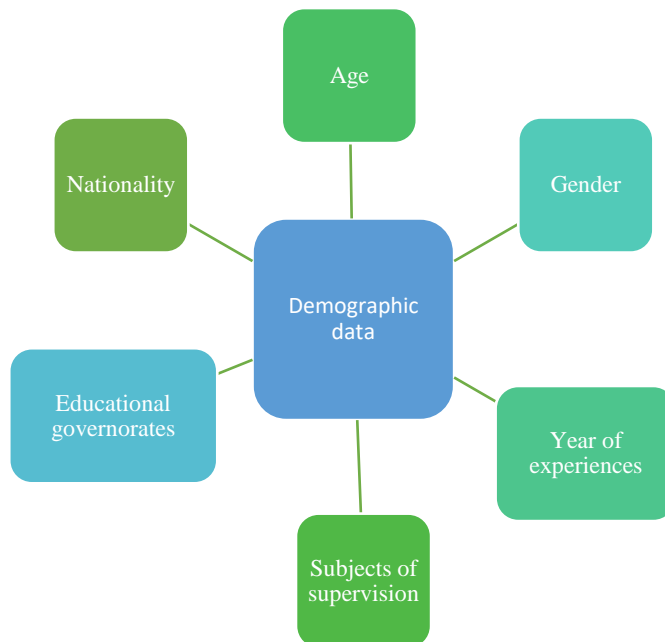
Figure 21 Demographic data

Figure 20 and Table 23 illustrate the findings for the demographic characteristics, as gathered from the sample from the questionnaire.

Variable	Levels	Frequencies	Percentage (%)
Nationality	Omani	292	80.4
	Foreigners	71	19.6
Age	21-30	2	0.5
	31-40	118	32.4
	41-50	198	54.4
	51-60	46	12.6
Gender	Male	203	55.9
	Female	160	44.1
Years of Experience	1-5	29	8.0
	6-10	32	8.8
	11-15	55	15.2
	16-20	87	24.0
	21-25	90	24.8
	26-30	70	19.3
Educational governorate	Al-Buraimi	32	8.8
	Al-Dakhilia	25	6.9
	Al-Dhahira	35	9.6
	Al- Wosta	31	8.5
	South of Batna	25	6.9
	South of Sharqia	38	10.5
	North of Batna	26	7.2
	North of Sharqia	49	13.5
	Dhofar	36	9.9
	Muscat	37	10.2
	Musandam	29	8.0

Table 23 Frequencies and percentages for levels of demographic data

5.4.1 Nationality

Table 23 shows the nationality of questionnaire participants, along with the number of responses out of a total of 363 and the corresponding percentages. Out of the total number of responses, 292 individuals were Omani, representing 80.4% of the total responses, while 71 individuals were foreigners, representing 19.6% of the total responses.

5.4.2   Age

According to the data presented in Table 23, most participants, accounting for 54%, belonged to the age group of 41-50. Participants aged 31-40 accounted for 32.4% of the total, while 12.6% were aged between 51-60. Participants in the age group of 21-30 were the minority, comprising only 0.5%. Therefore, there are 86.40% of participants in categories 31–40 and 41–50; with 13.6% in other categories.

5.4.3   Gender

Table 23 indicates that, out of 363 participants, 55.9% were male (203) and 44.1% were female (160).

5.4.4   Years of Experience

According to years of experience, the distribution of participants is shown in Table 23. As a result, we can observe that 24.8% of participants had 21 to 25 years of experience, and 8% had 1 to 5 years of experience.

5.4.5   Educational governorate

Regarding educational governorates results indicated that the number of participants was homogeneous in all governorates (Table 23), as they were all around the average of 33. The lowest number was 25, in Al Dakhiliya Governorate, with the highest number being in the North Al Sharqiyah Governorate, with 49 participants.

5.4.6   Subjects of supervision:

The questionnaire was collected from over 23 subject areas belonging to the supervision directorate of the MOE, as shown in Table 24.

The main domain of subjects	Specific subjects	Frequencies	Percentage (%)	The total Main domain of subjects	Percentage (%)
Religion	Islamic	23	6.3	24	6.61
	Quran memorisation	1	0.3		
Language	Arabic Language	18	5	51	14.05
	English Language	33	9.1		
Applied Sciences	Chemistry	16	4.4	111	30.58
	Physics	31	8.5		
	Biology	23	6.3		
	Mathematics	27	7.4		
	Information Technology	14	3.9		
Social Sciences and Humanities	Geography	9	2.5	20	5.51
	History	7	1.9		
	Social Studies	4	1.1		
Basic Education (G1-G4)	First domain	29	8	53	14.60
	Second domain	24	6.6		
Skills	Physical Education	16	4.4	52	14.33
	Musical skills	14	3.9		
	Fine Arts	8	2.2		
	Life skills	14	3.9		
Special Education	Continuous education	1	0.3	19	5.23
	Learning difficulties	13	3.6		
	Special needs	5	1.4		
Kindergarten	Kindergarten	17	4.7	17	4.68
Activities	Other	16	4.4	16	4.41
	Total	363	100	363	100

Table 24 Frequencies and percentages for subjects of supervision and total main domain of subjects

Based on Table 24, presented above, it is evident that the supervisors in applied sciences were the most represented subject group, with a percentage of nearly 31; the sample used in this study was chosen randomly. The annual educational statistics book for the academic year 2020-2021 was used to determine the number of participants in the study

sample. The book states that the population of applied sciences supervisors was 439 (Ministry of Education, 2021, pp. 194-195).

In addition, data about supervision, the researcher collected demographic data to determine which subject areas had not undergone QMS training. As shown in Table 24, above, all subject areas had received training (albeit in different ways, as detailed in the qualitative findings). The names of the subject domains were obtained from the annual educational statistics for 2020-2021. This will be elaborated upon further in the Analysis and Discussion chapter, in section three.

Summary:

A summary of the frequencies and percentages for levels of each demographic data is found below in Figure 22
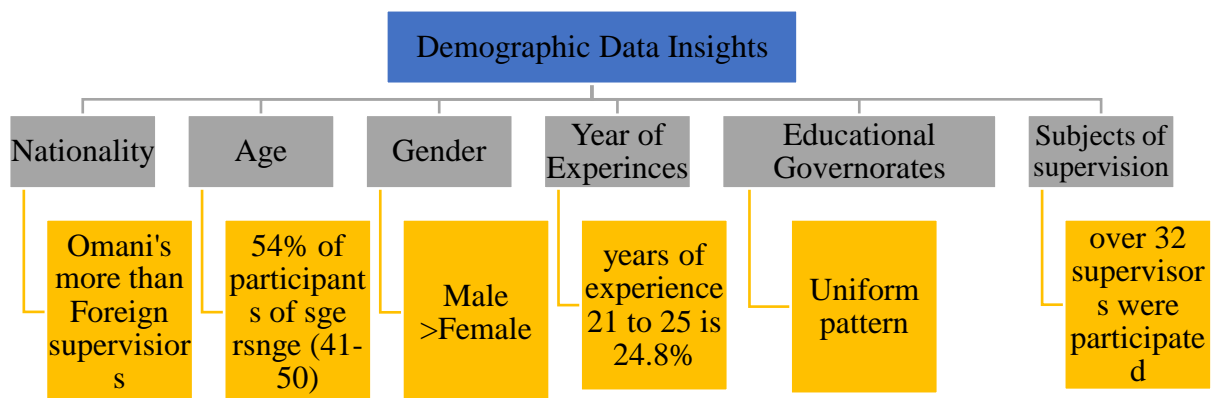
Figure 22 Demographic Data Insights

5.5   Part 4– Studying the statistical differences between the levels of demographic variables for each section.

Some statistical methods were used to test the differences between levels of demographic variables in each section of the questionnaire (research pillars). The test of normality determines whether parametric or nonparametric tests should be used for each case of the demographic variables, as shown in Table 25.

5.5.1 *Normality test:*

Sections	Kolmogorov-Smirnov		Shapiro-Wilk	
	Statistic	Sig.	Statistic	Sig.
Section (1):	0.084	0.000	0.981	0.000
Section (2): Effectiveness training	0.045	0.076	0.991	0.034
Section (3): Organisational	0.107	0.000	0.970	0.000

Table 25 Normality test

Table 25 shows the test statistics and significance of the normality test for each questionnaire section. It is clear from the results of the Kolmogorov-Smirnov test that the first and third sections do not follow the normal distribution, as their significance value was 0.000, which is less than 0.05, while the effectiveness of the QMS training had a significant value of 0.076 and therefore is subject to normal distribution. Regarding the Shapiro-Wilk test, the results showed that the data from the organisational skills were not normally distributed, as the significance value was less than 0.05 for all sections. As a result, nonparametric tests were used to test the difference between the levels of demographic variables in the sections of the questionnaire (see Table 25).

5.5.2 Test: Nationality and Degrees of agreement in each section:

Sections	Nationality	N	Mean Rank	Mamm-Whitney U	Z	Sig.
Awareness	Omani	292	169.33	6666.5	-4.671	0.000
	Foreigners	71	234.11			
	Total	363				
Effectiveness training	Omani	292	167.56	6149.0	-5.232	0.000
	Foreigners	71	241.39			
	Total	363				
Organisational skills	Omani	292	168.62	6460.0	-4.938	0.000
	Foreigners	71	237.01			
	Total	363				

Table 26 Test statistics and significance for Mann- Whitney for nationality for each section

Table 26 presents the results of the Mann-Whitney test, which studied the difference in degrees of agreement in each section of the questionnaire according to nationality. The results show that there are statistically significant differences between Omanis and foreigners in each section of the questionnaire, as the significance value is less than 0.05. This means that the degree of agreement in each section of the questionnaire varies according to the nationality variable.

5.5.3 Test: Age and Degrees of agreement in each section:

Table 27 shows the test statistics and significance of the Kruskal-Wallistest to study the difference in degrees of agreement in each section of the questionnaire according to age levels. The results indicated that there are statistically significant differences between levels of age in awareness, as the significance value is less than 0.05.

Sections	Age	N	Mean Rank	Kruskal-Wallis H	Sig.
Awareness	21-30	2	298.00	8.579	0.035
	31-40	118	183.38		
	41-50	197	172.38		
	51-60	46	214.60		
	Total	363			
Effectiveness training	21-30	2	239.25	4.103	0.251
	31-40	118	185.57		
	41-50	197	173.93		
	51-60	46	204.93		
	Total	363			
Organisational skills	21-30	2	240.75	5.373	0.146
	31-40	118	182.06		
	41-50	197	174.43		
	51-60	46	211.73		
	Total	363			

Table 27 Test statistics and significant for Kruskal-Wallis for age for each section

This means that the degree of agreement in this section varies according to levels of age. The significance value for the effectiveness of the QMS training and organisational skills was greater than 0.05, indicating no significant difference in the participants' approvals in the second and third sections according to age levels.

5.5.4 Test: Gender and Degrees of agreement in each section:

Table 28 presents the results of the Mann-Whitney test to study the difference in degrees of agreement in each section of the questionnaire according to gender.

Sections	Gender	N	Mean Rank	Mamm-Whitney U	Z	Sig.
Awareness	Male	203	172.70	14353	-1.903	0.057
	Female	160	193.79			
	Total	363				
Effectiveness training	Male	203	172.78	14367	-1.888	0.059
	Female	160	193.70			
	Total	363				
Organisational skills	Male	203	176.63	15150	-1.101	0.271
	Female	160	188.81			
	Total	363				

Table 28 Test statistics and significance for Mann- Whitney for gender for each section

It is clear from the results that there are no statistically significant differences between males and females in each section of the questionnaire, as the significance value is greater than 0.05. This means that the degree of agreement in each section of the questionnaire does not differ depending on the gender variable.

5.5.5 *Test: Years of Experience and Degrees of agreement in each section:*

Table 29 shows the test statistics and the significance of the Kruskal-Wallis test in studying the difference in degrees of agreement in each questionnaire section according to years of experience levels.

Sections	Years of Experience	N	Mean Rank	Kruskal-Wallis H	Sig.
Awareness	1-5	29	237.21	10.506	0.062
	6-10	32	173.39		
	11-15	55	191.71		
	16-20	87	180.85		
	21-25	90	170.94		
	26-30	70	171.08		
	Total	363			
Effectiveness training	1-5	29	235.40	11.892	0.036
	6-10	32	191.38		
	11-15	55	194.43		
	16-20	87	177.94		
	21-25	90	173.61		
	26-30	70	161.67		
	Total	363			
Organisational skills	1-5	29	232.29	10.019	0.075
	6-10	32	165.56		
	11-15	55	190.84		
	16-20	87	185.04		
	21-25	90	176.39		
	26-30	70	165.17		
	Total	363			

Table 29 Test statistics and significance for Kruskal-Wallis for years of experience for each section

Results show statistically significant differences between levels of years of experience in the effectiveness of the QMS training, as the significance value is less than 0.05. This means that the degree of agreement in this section varies according to levels of years of experience. The significance value for the awareness and organisational skills was greater than 0.05, which shows that there is no significant difference in the participants' approvals in the first and third sections according to years of experience.

5.5.6 *Test: Educational Governorates and Degrees of agreement in each section:*

Table 30 shows the test statistics and significance of the Kruskal-Wallis test to study the difference in degrees of agreement in each section of the questionnaire according to the educational governorate.

Sections	Educational governorate	N	Mean Rank	Kruskal-Wallis H	Sig.
Awareness	Al-Buraimi	32	143.89	37.960	0.000
	Al-Dakhilia	25	166.06		
	Al-Dhahira	35	204.11		
	Al- Wosta	31	247.00		
	South of Batna	25	164.02		
	South of Sharqia	38	213.79		
	North of Batna	26	153.17		
	North of Sharqia	49	132.16		
	Dhofar	36	183.07		
	Muscat	37	207.04		
	Musandam	29	192.24		
	Total	363			
Effectiveness training	Al-Buraimi	32	141.81	44.739	0.000
	Al-Dakhilia	25	174.34		
	Al-Dhahira	35	191.19		
	Al- Wosta	31	257.27		
	South of Batna	25	152.02		
	South of Sharqia	38	215.04		
	North of Batna	26	134.62		
	North of Sharqia	49	136.20		
	Dhofar	36	192.68		
	Muscat	37	206.27		
	Musandam	29	199.59		
	Total	363			
Organisational skills	Al-Buraimi	32	155.38	35.297	0.000
	Al-Dakhilia	25	156.24		
	Al-Dhahira	35	181.84		
	Al- Wosta	31	253.35		
	South of Batna	25	188.70		
	South of Sharqia	38	220.13		
	North of Batna	26	152.25		
	North of Sharqia	49	136.50		
	Dhofar	36	184.24		
	Muscat	37	197.16		
	Musandam	29	183.19		
	Total	363			

Table 30 Test statistics and significance for Kruskal-Wallis for educational governorate for each section.

The results indicated statistically significant differences between educational governorates in each section, as the significance value is less than 0.05. This means that the degree of agreement in this section varies according to the educational governorate.

5.5.7 Test: Subject of Supervision and Degrees of agreement in each section:

Tables 31, 32, and 33 show the test statistics and significance of the Kruskal-Wallis test, which was used to study the difference in degrees of agreement in each section of the questionnaire according to the subjects of supervision.

Sections	Subjects of supervision	N	Mean Rank	Kruskal-Wallis H	Sig.
Awareness	Islamic	23	174.96	55.169	0.000
	Quran memorisation	1	48.00		
	Arabic Language	18	210.97		
	English Language	33	140.39		
	Chemistry	16	174.97		
	Physics	31	186.47		
	Biology	23	187.72		
	Mathematics	27	182.56		
	Information	14	157.46		
	Geography	9	149.17		
	History	7	87.29		
	Social Studies	4	61.25		
	First domain	29	223.95		
	Second domain	24	166.19		
	Physical Education	16	140.50		
	Musical skills	14	257.93		
	Fine Arts	8	161.38		
	Life skills	14	144.46		
	Continuous education	1	241.00		
	Learning difficulties	13	232.69		
	Special needs	5	229.30		
	Kindergarten	17	273.50		
	Other	16	163.56		
	Total	363			

Table 31 Test statistics and significance for Kruskal-Wallis for Subjects of supervision of their Awareness

Sections	Nationality	N	Mean Rank	Kruskal-Wallis H	Sig.
Effectiveness training	Islamic	23	164.65	36.224	0.029
	Quran memorization	1	165.00		
	Arabic Language	18	196.11		
	English Language	33	171.09		
	Chemistry	16	177.38		
	Physics	31	183.63		
	Biology	23	162.39		
	Mathematics	27	167.30		
	Information Technology	14	187.96		
	Geography	9	169.72		
	History	7	132.71		
	Social Studies	4	61.13		
	First domain	29	210.36		
	Second domain	24	154.10		
	Physical Education	16	166.81		
	Musical skills	14	256.82		
	Fine Arts	8	120.94		
	Life skills	14	151.57		
	Continuous education	1	203.00		
	Learning difficulties	13	246.65		
	Special needs	5	271.20		
	Kindergarten	17	221.29		
	Other	16	196.41		
	Total	363			

Table 32 Test Statistics And Significance For Kruskal-Wallis For Subjects Of Supervision Of Effectiveness Training

Sections	Nationality	N	Mean Rank	Kruskal-Wallis H	Sig.
Organisational skills	Islamic	23	190.70	35.691	0.033
	Quran memorization	1	11.00		
	Arabic Language	18	212.44		
	English Language	33	158.12		
	Chemistry	16	175.63		
	Physics	31	210.03		
	Biology	23	155.89		

Mathematics	27	179.43
Information	14	189.89
Geography	9	133.00
History	7	120.79
Social Studies	4	60.13
First domain	29	228.22
Second domain	24	161.33
Physical Education	16	158.06
Musical skills	14	212.50
Fine Arts	8	183.38
Life skills	14	154.21
Continuous education	1	122.50
Learning difficulties	13	211.15
Special needs	5	256.70
Kindergarten	17	214.53
Other	16	157.25
Total	363	

Table 33 Test Statistics And Significance For Kruskal-Wallis For Subjects Of Supervision Of The Organisational Skills

Results show that there are statistically significant differences between subjects of supervision in each section, as the significance value is less than 0.05. Thus, the degree of agreement in this section varies according to the subjects of supervision.

5.6 Part 5- Relationship between sections of the questionnaire (research pillars)

1. Correlation analysis

Table 34 shows the values of the correlation coefficients between the three sections. The results show there is a significant, strong positive correlation between section 1 and section 2 (0.728). Also, the results show there is a significant strong positive correlation between section 1 and section 3 (0.737). Moreover, there is a significant strong positive correlation between section 2 and section 3 (0.813). As a result, greater awareness of the QMS increases the impact of Organisational skills. However, the training programme has a significant effect on the acquisition of Organisational skills by subject supervisors' (Chapter 7, Section 7.6)

Research pillars/sections	Correlation Coefficient	Sig.
Awareness and the Effectiveness Training (section 1 & section 2)	0.728	0.000
Effectiveness training & Organisational skills section 2 & section 3	0.813	0.000
Awareness and Organisational skills (section 1 & section 3)	0.737	0.000

Table 34 Correlation coefficients between the three sections (research pillars).

2. Regression analysis

The regression analysis approach was used to estimate the extent to which the first section (Awareness) and the second section (Effectiveness of the QMS training) contributed to the change in the third section (Organisational skills), estimating the coefficient of determination (R^2) and the amount of change (regression coefficients), which express the change in the organisational skills whenever the first or second sections change.

Given the significant positive correlation between awareness and the effectiveness of the QMS training, organisational skills were used as explanatory variables to explain the change in the impact of Organisational skills. It is clear from Table 35 that the regression model of organisational skills on awareness and the effectiveness of the QMS training is significant, as the significance value was less than 0.05 for the model, as well as for the regression coefficients. Looking at the coefficient of determination (R^2), its value is 0.71, meaning that awareness and the effectiveness of the QMS training contribute 71 % of the change in organisational skills.

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	206.88	2	103.44	432.11	0.000
Residual	86.18	360	0.239		
Total	293.05	362			
R^2			0.71		

	Regression coefficient	t statistic	Sig.
Constant	0.066	0.571	0.568
Awareness	0.678	14.090	0.000
Effectiveness training	0.331	7.448	0.000

Table 35 Regression model, regression coefficients, and coefficient of determination to explain the change in organisational skills by Awareness and the effectiveness of the QMS training

From the results of the regression coefficients, the regression coefficient of the organisational skills is on awareness, which means that the increase in the acquisition of Organisational skills depends on awareness of the quality system with a regression coefficient of 0.678, meaning that the more awareness increases by one unit, the greater the acquisition of Organisational skills by 0.678. Regarding the regression of the third section on the second section, it transpires that the regression coefficient of the third section on the second section has a positive value, which means that the increase in the acquisition of Organisational skills depends on training in the quality system. Here, the value of the regression coefficient was 0.331, meaning that the more training increases by one unit, the greater the acquisition of organisational skills by 0.331. To sum up, both the impact of the QMS on the subject supervisors' awareness and effectiveness training, serving as independent variables, exhibit notable positive correlations with the dependent variable, organisational skills. Notably, the coefficient associated with Awareness (0.678) surpasses that of Effectiveness training (0.331), implying a stronger association between awareness and organisational skills, compared to effectiveness training and the same dependent variable.

To validate the correlation and regression analysis among the variables Awareness, Effectiveness of Training, and Organisational Skills, a structural equation model (SEM) was analysed using Smart PLS. The main findings of this analysis (Appendix J) reveal that both awareness and training significantly influence organisational skills.

5.7 Summary

This chapter focused on the study's quantitative analysis (frequencies, mode, mean). Also, participants were described by demographic variables. The validity and reliability of the

study tool were also evaluated for the reliability of the results obtained from that tool. The differences between their responses in each of the sections were also determined according to the demographic variables to verify the extent to which each of the three sections was affected by the levels of demographic variables, and thus determine the best levels in each of these variables that would achieve the highest values for the first section (Awareness) and the second section (Effectiveness of the QMS training) and the third section (Organisational skills).

The intensity of the relationship between the three sections of the study was studied, and it was found that there was a significant direct correlation between the sections of the study. To determine the amount of contribution and the explanatory percentages of awareness and the effectiveness of the QMS training in the organisational skills, the regression method was used, the results of which showed that the acquisition of Organisational skills depends on knowledge, understanding, and training, but it turned out that the first section (awareness of QMS has a greater impact on the acquisition of organisational skills than the second section (the effectiveness of the QMS training).

6   Chapter Six: The Qualitative Findings

This chapter's qualitative findings were thoroughly analysed using NVivo 12 Pro, as advocated by Jackson and Bazeley (2019). The postgraduate school training team provided courses related to this software to enhance understanding. Furthermore, the university's subscription to LinkedIn Learning was utilised to facilitate the learning process of NVivo 12 Pro. Additionally, a link to download NVivo 12 Pro was provided through the university's Software and Digital Skills website.

Dhakal (2022) and Maher et al. (2018) elucidate that NVivo 12 Pro software significantly recommends the process of coding, categorising, and analysing the data into themes. This comprehensive support structure ensured that the analysis was rigorous and systematic, allowing for a deeper understanding of the qualitative data. The software's capabilities in organising complex data sets and generating meaningful insights were instrumental in achieving the study's objectives. Forty participants provided their e-mails at the end of the questionnaire, to facilitate communication with the interview sample. The strategy chosen, of who to interview, was that one subject supervisor was selected to collect qualitative data for each of the eleven educational governorates (section 4.12.2.2). Microsoft Teams offers several benefits as a tool for research to record interviews. It facilitates asynchronous online focus groups, enhancing conversational sequence, discussion moderation, nonverbal cues, supporting information, and technical competencies (Frey and Bloch, 2023). Additionally, Microsoft Teams provides advantages such as organising various educational activities, effective collaboration, access to educational content, and reflection and assessment, while also requiring skills in its use and being dependent on internet access (Harrison and Hernandez, 2022). Furthermore, the collaborative view of human conversation in Microsoft Teams can improve user interface design by enabling clarification of questions, leading to more accurate responses and increased understanding between users and the system (Buchal and Songsore, 2019).

Microsoft Teams offers numerous advantages as a research tool, particularly for recording interviews. It efficiently facilitates asynchronous online focus groups, significantly enhancing the flow of conversation, the moderation of discussions, the interpretation of

nonverbal cues, the provision of supporting information, and the development of technical competencies (Frey and Bloch, 2023). Moreover, Microsoft Teams provides benefits such as organising a variety of educational activities, fostering effective collaboration, granting access to educational content, and enabling reflection and assessment. However, it also necessitates certain skills in its use and is heavily dependent on a reliable internet connection (Harrison and Hernandez, 2022). Furthermore, the collaborative nature of human conversation in Microsoft Teams can significantly enhance user interface design. It allows users to clarify questions, leading to more accurate responses and improved understanding between users and the system. Additionally, conversations can be recorded and transcribed for later use in the coding (Buchal and Songsore, 2019).In this current study, Microsoft Teams was selected as one of the programmes approved for educational and academic use by the MOE because it is one of the easiest programmes to use by both the researcher and the participants in terms of communication based on geographical distances. After conducting the semi-structured interviews, the use of NVivo 12 Pro assisted in managing the process of saving and extracting the transcripts. The semi-structured interview questions were designed to address the following research questions:

1. Is the Ministry of Education keen on spreading the culture of quality and practically applying its principles at the level of all units in the institution? Explain how this is done.

2. What role or practices do you participate in to implement the QMS in the Ministry of Education?

3. What is the role of the training programmes you received in changing your convictions/attitudes about the QMS?

4. Did the field application of the training programmes contribute to developing the organisational skills of subject supervisors? Explain that.

5. How are the results of the QMS evaluation dealt with in developing procedures for implementing the entire system's operations?

6. What learning opportunities and training programmes to improve the organisational skills of employees should the MOE provide from your point of view?

7. What are your suggestions for improving the policies and procedures for implementing the QMS in the MOE?

This chapter will be divided into two sections: the thematic analysis of the data and the NVivo Pro 12 findings.

6.1 Thematic Analysis of The Data

Figure 22 provides a general overview of thematic analysis, elucidating its purpose and significance in qualitative research. Specifically, it explains why thematic analysis an appropriate method is for examining complex data sets. Furthermore, in section 4.11, the chosen research methodology, the interpretive approach, is discussed. This section elaborates on how this approach aligns with using thematic analysis to interpret qualitative data effectively. Additionally, in section 4.14.2, the specifics of thematic analysis are explored, providing a comprehensive explanation of its processes and techniques. This section ensures a thorough understanding of how thematic analysis is applied within the context of the study, thereby enhancing the overall coherence and comprehensibility of the research methodology. An analysis of datasets can reveal thoughts, behaviours, or trends (Kiger & Varpio, 2020). An analysis of a thematic dataset identifies themes, i.e., patterns, and uses those themes to address the research questions or express opinions on a subject (Delahunt, Everitt-Reynolds et al., 2013). Specifically, as used in this current study, Braun and Clarke (2006) advocate six phases of thematic analysis as a framework for qualitative data to discover research themes, as outlined below in Figure 23.

Figure 23 Six phases of thematic analysis (Braun and Clarke, 2006)

6.1.1 *Became familiar with the data:*

Saldaña (2024) suggested that interviews are more effective when conducted in the participants' native language. In this study, interviews were conducted in Arabic, and all were recorded via Ms Teams. I kept and used the original Arabic transcript, as well as translating it into English (Stevens, 2020), which I translated to PhD requirements for the PhD supervisors' to be familiar with the process. Therefore, all texts were read and reread

twice while listening at the same time to each interview and checking the statements of all participants, and to familiarise myself with the data.

As stated, the interviews were conducted via Teams. Alongside the previous reasons (section 6.1) given for this, geographical distance was the most relevant, as I was in the United Kingdom and the sample was in the Sultanate of Oman. Each participant stood for an educational governorate out of 11. Another reason for the use of MS Teams was that all participants were familiar with it. Moreover, it could record the video clips and quickly extract transcripts directly from the programme after each interview.

6.1.2 *Generate initial codes:*

The second phase of Braun and Clarke's (2006) approach to thematic analysis is to generate initial codes. Each interview transcript was read and coded separately using the NVivo 12 Pro. software. The participants' (and researcher's) native language of Arabic was the preferred language for the interviews because, as Saldaña (2024) noted, the research is more robust when conducted in the participant's own language. Moreover, the work involved transcribing each interview into Arabic and processing it in NVivo 12 Pro. All transcripts were uploaded and managed in Arabic using the software. The analysis in NVivo 12 Pro was conducted using Arabic language settings, as evidenced by screenshots displaying coded segments of the work (Appendix O).

NVivo 12 Pro, a widely recognised software for qualitative analysis (Tang, 2023), provides crucial support for the open coding process in qualitative research. Open coding within NVivo 12 Pro involves the meticulous and systematic categorisation and examination of text-based data, thereby effectively allowing researchers to generate codes (Vuylsteke, 2023). This process enables the retrieval of information based on these codes. It facilitates the establishment of connections between various codes or categories, ultimately contributing to the development of conceptual frameworks and theories (Tang, 2023). This approach is particularly essential for conducting thematic analysis and interpretative phenomenological analysis, as it offers researchers a structured and methodical way to analyse and interpret their data (Allsop et al., 2022). By adeptly employing NVivo 12 Pro for open coding, researchers can proficiently manage extensive datasets, discern key insights, and utilise the software's advanced features to significantly enhance the depth and rigour of their qualitative analyses (Tang, 2023). In this study,

according to Braun and Clarke (2006), codes with maximum specificity and comprehensiveness are advised. A total of sixty distinct codes were generated, as shown in the middle column of the table Appendix M). Some of these codes repeated, resulting in 144 instances overall, as indicated in the final column (Appendix M). The initial seven themes generated (Appendix N) provide details on these repetitions and outline the seven initial themes that were subsequently identified.

6.1.3 Search for themes:

Braun and Clark's (2006) third stage involves refocusing the analysis by sorting the codes into themes. First, by considering how different codes relate to one another and then identifying potential themes and collating all relevant coded data extracts within them (Braun and Clark, 2006). Figure 22 shows the initial step of coding and gathering the data into seven themes using Word from MS Office, after extraction from NVivo 12 Pro. Some codes had common and general characteristics, while others were grouped into one theme, as detailed shortly. This process framed all the codes into a table. The process to determine the final themes focused on the research questions of this study, recommended by Braun and Clarke (2006). This phase entails assigning meaningful labels to segments of the dataset that are pertinent to the research question. As the coding process advances, the researcher begins to identify similarities and discern patterns within the data. Nevertheless, it is essential to remain focused on coding the entire dataset before transitioning from coding to developing themes and ultimately addressing the research question. The coding approach must be well-suited to the analytical objectives and the research question (Braun and Clarke, 2006).

To ensure the final themes accurately addressed the research questions of this study, this current study employed an iterative process of review and refinement. This involved critically mapping the themes against the study's objectives and seeking feedback from peer researchers. A secondary coding review was also conducted to validate the themes' consistency and coherence. This rigorous approach ensured that the final themes were comprehensive, well-aligned with the research focus, and robust in their data representation.

In refining the thematic framework, an additional process was undertaken after initially grouping codes into potential themes using NVivo 12 Pro and Microsoft Word. Following

the guidelines of Braun and Clarke (2006), the initial step involved sorting the codes into themes by considering their interrelationships. The initial themes, as depicted in Appendix M, were derived through this method. For instance, theme one was renamed "Publicity, theme 1" and retained its previous designation as a sub-theme. Then, themes three, four, and five were consolidated into a single theme titled "Training, theme 2", each maintaining its categorisation as a sub-theme under this primary theme, as illustrated in Appendix N. Furthermore, theme six from Appendix M was reclassified as theme three, now titled "Organisational Skills, theme 3" while keeping its prior categorisation as a sub-theme. Similarly, themes two and seven were integrated to form a new theme, "Improvement, theme 4", while preserving their original sub-theme classifications (Appendix N).

6.1.4   Review themes:

The fourth stage of Braun and Clark's (2006) thematic analysis relates to reviewing the themes that have emerged from the coding and subsequent categorisation of the data. The seven themes were reduced to four, seven sub-themes and sixty codes, as elucidated in Section 6.1.3. The concept of generating a theme essentially arises from accumulating specific codes under the same sequence or idea, which then form sub-themes and, at times, themes. In this study, Appendix N illustrates the process: codes, when gathered, lead to the formation of sub-themes (indicated by the blue arrow). Subsequently, a similar process with specific sub-themes results in the development of themes (indicated by the green arrow).

As part of this process, the transcripts were reread, and all the codes were rechecked to ensure no missing data (Appendix N). For accuracy, it is essential to determine whether the themes "work" in the dataset, as suggested by Braun and Clark (2006).

6.1.5   Define themes:

This penultimate, fifth stage is where the themes are identified. According to Braun and Clarke's (2006) explanation, this final step in refining themes aims to identify the core of the findings and how these findings relate and interrelate with each other within themes and subthemes. Appendix M and Appendix N show evidence of how each theme has been developed from the codes and categories that preceded its development. The final themes provide a clear vision of constructing precise findings for each research question.

 Four main themes were generated, with Figure 24 showing the final thematic analysis extracted from the transcripts of each semi-structured interview.

6.1.6   Write up:

Braun and Clark's (2006) concluding stage encompasses the final analysis and composition of the report. Data extracts are embedded within an analytical, evidence-based narrative that effectively demonstrates the story conveyed by the collected data. This narrative extends beyond merely presenting research findings and constructing a coherent argument concerning the research questions.

6.2   The NVivo Pro 12 FINDINGS:

Figure 24 shows the main themes and categories based on the implementation of Braun and Clark's (2006) stages of thematic analysis.
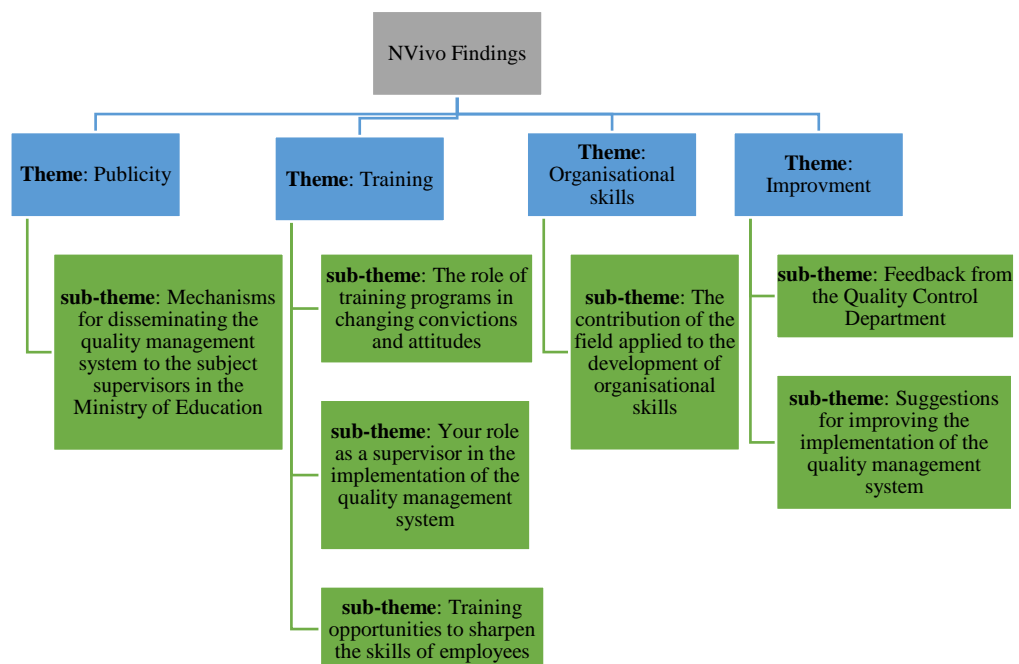
Figure 24 NVivo 12 Pro findings

The four themes, as demonstrated in Figure 24, are Publicity, Training, Organisational Skills, and Improvement in implementing ISO 9001:2015 in the Ministry of Education of Oman, particularly in the supervisory departments in the eleven educational governorates.

The following is a comprehensive explanation of Figure 24, which provides an overview of all extracted elements, including themes, sub-themes, and codes.

6.2.1   Publicity:

Publicity, as a first theme, relates to the mechanisms of disseminating the QMS to the subject supervisors in the Ministry of Education. As a sub-theme (Figure 25) and with its code in Figure 24, it is centred on the sample interviewees (section 4.12.2.2) and reflects the response to the first question in the interviews. Figure 24 shows this sub-theme with its codes.
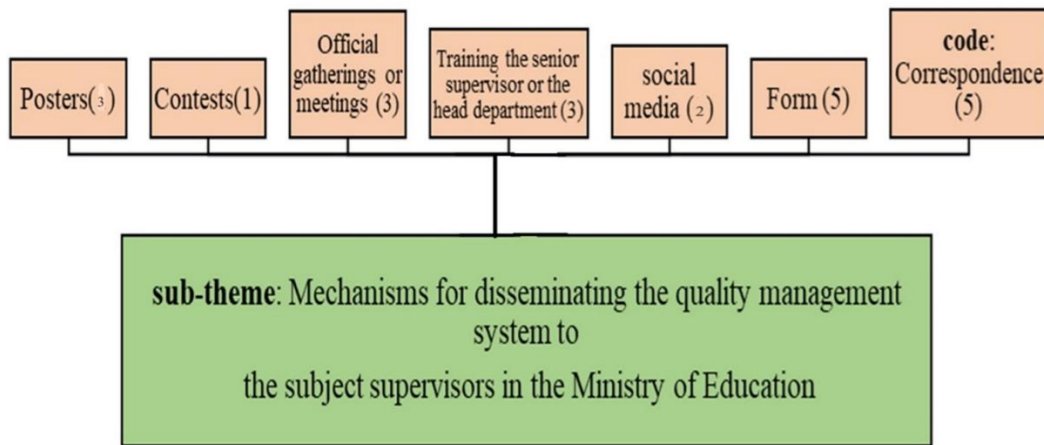
Figure 25 The Sub-themes of: Mechanisms for Disseminating the Quality Management System

The interviewees' experiences highlighted the significance of the correspondence system in disseminating the principles of the QMS and ensuring structured communication within the Ministry of Education. The correspondence system was the primary facilitator of spreading the philosophy of the QMS to the subject supervisors', as the correspondence system in the ministry is considered the first official facilitator of a communication platform to publish, send and notify all employees of any instructions and/or activities, where Interviewee (9) said:

> *All through the correspondence system, through the instructions that come to us through correspondence system*

Also, Interviewee (9) denotes:

Direct supervisors utilise social media platforms, such as WhatsApp, to disseminate information regarding quality control and its associated requirements

Also, all employees, including subject supervisors', complete the QMS forms to record and evaluate their performance about quality standards within the MOE. These regular forms capture the progress made by supervisors in their monthly supervisory plans. Thus, the QMS forms act as facilitators that help to promote awareness of the QMS, as confirmed by the interviewees. They are disseminated through the correspondence system, which serves as the official communication platform to reach all employees, ensuring that subject supervisors become familiar with the QMS.   Interviewee (1) said:

Each month, subject supervisors' conduct a comparison between their initial supervisory plans and their post-activity results. Subsequently, they complete QMS forms based on the comparison outcomes; the initial plan outlines their intended actions, while the post-activity results indicate their actual achievements. They then analyse these findings and record the outcomes as percentages. Thereafter, the head of the supervision department forwards these completed forms to the Quality Management Department, where further analysis is conducted.

Moreover, the official meetings between subject supervisors and their seniors had helped, to an extent, to understand the principles and basics of completing the forms that were distributed through the correspondence system, as a facilitator for providing publicity for training regarding the QMS through meetings between the subject supervisors and their seniors. (See Figure 24), where Interviewee (8) said:

The first thing was to send through the correspondence system, then to the Quality Management Department, which is where my Directorate is located.

The outlined process above involves a sequential method comprising two clear stages. It begins with using the correspondence system as the primary mode of communication. Following this, it advances to interaction with the Quality Management Department, situated as the focal point of the participant's Directorate, ensuring adherence to quality management standards and procedures.

They held several meetings in the departments and other directorates as well, and we attended periodically. Still, I could attend more than my colleagues, so

> *I helped the department do things, as a coordinator, you can say, between my*
> *department and the quality management department.* Interviewee (4)

The interviews in this study revealed that the attendees of the meetings held by the QMS departments in each educational governorate were not all subject supervisors. Instead, a representative from the supervision department in each educational governorate attended. According to the information provided, the representative was either the head of the supervision department, the subject coordinator, or a colleague's delegate as interviewee 6 said:

> *My presence as a subject supervisor's coordinator is more than that of my*
> *colleagues in the meetings of the quality department in identifying the*
> *developments and things required of the QMS department to deliver them*
> *within the corresponding system. Interviewee (6)*

Training workshops about QMS, as noted by Interviewee (3):

> "*Through workshops*".

In addition to workshops, Interviewee (1) noted the presence of posters in the corridors of this educational governorate, highlighting the implementation of the QMS within the Ministry of Education. These posters provide all employees with clear information on the mission, vision, goals, and benefits of the QMS, along with other valuable insights, as he said:

> *Helped to raise awareness and educate the supervisors' and other employees*
> *about this new system*

All interviewees commented on the variety of methods used for distributing publicity about implementing quality management systems. For example, a contest was held in one of the governorates to raise subject supervisors' awareness about the main content of the QMS (section 3.2.5.1), with other methods including posters, email, social media, and the official corresponding system (section 3.2.5).

6.2.2 Training:

The second theme, training, emerges from the interviewees' responses and relates to their experiences with training. This theme is divided into three sub-themes (Figure 26), namely,

1. *The role of training programmes in changing convictions and attitudes.*
2. O*ur role as a supervisor in the implementation of the QMS*; and
3. The training *opportunities to sharpen the skills of employees*.
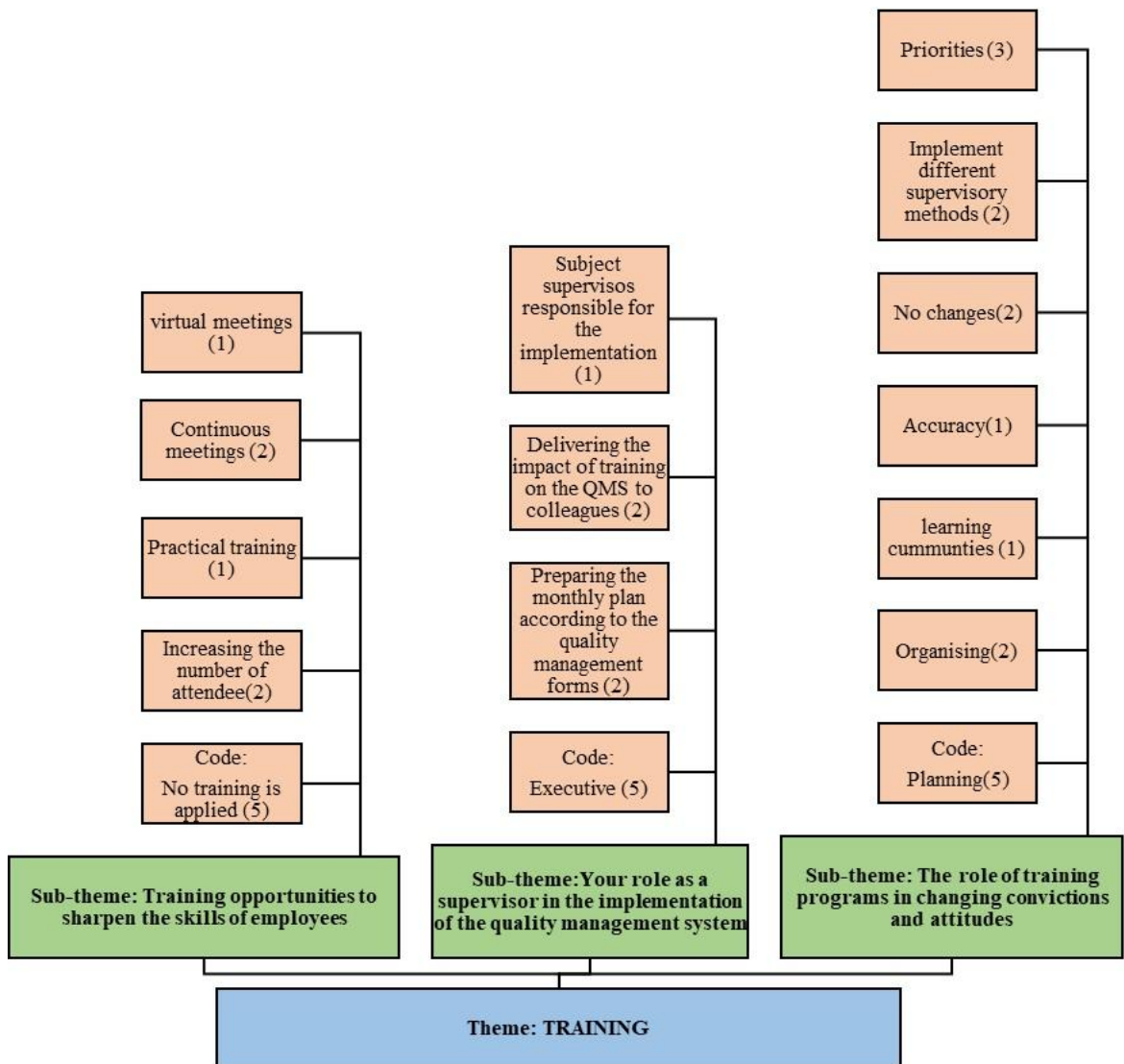
Figure 26 The training theme

6.2.2.1   The role of training programmes in changing convictions and attitudes:

The responses to changing attitudes and convictions varied in reflecting the differing opinions across the various educational governorates regarding the implementation and impact of the QMS on employees. While some interviewees thought that the introduction of the QMS helped them better prioritise their monthly and annual plans, they noted that they were already accustomed to managing their tasks in a structured manner even before the QMS was implemented, as noted by Interviewee (5):

> *This is our work. They just set it in an orderly and organised way.*

And Interviewee (2) said:

> *We have done it before, but not as systematically as the QMS required.*

Some participants highlighted that the implementation of QMS has greatly improved workplace organisation. They attributed this improvement to effective planning and satisfying different requirements, as Interviewee (7) said:

> *The QMS enabled us to preserve and organise our work that was not*
> *previously saved in an organised way, such as research, making it easier for us*
> *to include it in our CVs.*

The training helped to form learning communities, as stated in one of the answers, where Interviewee (4) said:

> *As a supervisor, the effort is usually on you alone, but the advantage of*
> *learning communities or teamwork is that a team can follow the impact.*
> *Imagine the follow-up being conducted collectively, as part of teamwork.*

The training also contributed to the supervisor's awareness of the accuracy of the work and the depth of completing it, as Interviewee (10) said:

> *We have gained accuracy. Accuracy is in preparing a monthly plan. Accuracy*
> *is in writing goals.*

The role of the QMS programme in changing the subject supervisors' convictions and attitudes was minimal, as indicated by interviewees 2 and 5, who mentioned that there were no significant changes in their beliefs and attitudes because there was no training provided relating to QMS and therefore the work was performed according to the tasks

required in the quality management department forms by the sense of responsibility and automatic discipline among them as Interviewee (2) said:

> *We didn't receive any training programme—nothing at all. So, I can confirm that we haven't had any training on this.*

This emphasises a clear lack of formal training on the QMS, which may suggest that employees, including Interviewee 2, are left to form their interpretations of the system without structured guidance. This absence could impact how effectively the QMS is understood and applied.

Moreover, as stated by Interviewee (2)*: "Any understanding I have of the QMS is based only on what I've observed or figured out here, not from any formal training."*

Here, the interviewee acknowledges that their understanding is based purely on personal observation and experience, not formal instruction.

It also highlights the individual's acquisition of knowledge and skills in quality management through reading, self-reflection, practical experience, and professional expertise, as mentioned by Interviewee (11):

> *Through my understanding as my doctoral thesis highlighted the quality systems in education, and through my reading of the instructions or the quality management, your self-understanding, I practice, my practical experience, and my professional experience.*

Also, interviewee 11 said:

> *I got the opportunity to attend a Lean Six Sigma workshop, here in Oman. It is much better than the QMS, it improves the work continuously, refines the employee skills, and more*

These comments emphasise that the individual's ability to manage tasks depends on their ability, comprehension, and prior professional experience. As noted by Interviewee (11):

> *I can deal with or adapt to what is required, which means that it depends on my abilities, understanding, and previous work experience.*

However, Interviewee (9) said that:

> The *application of the new plans originating from the QMS*

Then he elaborated more:

> *Each month, subject supervisors' conduct a comparison between their initial supervisory plans and their post-activity results. Subsequently, they complete QMS forms based on the comparison outcomes; the initial plan outlines their intended actions, while the post-activity results indicate their actual achievements. They then analyse these findings and record the outcomes as percentages. Thereafter, the head of the supervision department forwards these completed forms to the Quality Management Department, where further analysis is conducted.*

It helped them apply different supervisory methods when comparing the initial and revised plans. For example, the QMS encouraged and facilitated the implementation of various supervisory methods. The plans, which were based on QMS requirements, specified the methods to be used during each supervisory visit, guiding the supervisor when planning the next visit. This led to the preference for creating and applying alternative methods, as explained in the previous quote, interviewee (8) said:

> *Establishing a communication channel that allows you to continuously improve your skills or meet supervisory needs.*

The implementation of a QMS requires subject supervisors to prioritise, as interviewee (4) said:

> *We need to prioritise each school, which supervisory method should be implemented, and other ways we should incorporate into our work.*

This underscores the importance of prioritising subject supervisors' school requirements, selecting suitable supervisory methodologies, and exploring additional approaches to integrate into operational frameworks.

6.2.2.2 Your role as a supervisor in the implementation of the QMS

Interviewees (1), (7), (2), (5), and (4) commented that it was integral to their job role to complete quality management forms according to their understanding of them. As stated in the narration of Interviewee (7):

> *According to the supervisory plan that I am assigned, whether it is school visits or other objectives, I implement them according to the goals of the plan.*

When asked about the adherence to instructions and their role in the implementation of the QMS, Interviewee (1) commented:

> *As participants in this process, our role is to implement these instructions and directives, putting them into practice. According to these directives, we try to implement them. As we follow it, we evaluate them accordingly.*

After implementing the QMS and its associated forms, supervisors had an additional responsibility: preparing monthly plans following the quality management standards. Interviewees (4) and (5) noted that their role involved completing the monthly plan form according to these QMS standards. As Interviewee 5 explained:

> *Filling either the Supervisory plans or the QMS forms according to their instructions, and the QMS logo should be there!*

The quality management forms are a road plan for what the subject supervisors' must do according to success criteria, and, as noted by interviewees (8) and (10) this needed to be no less than 85% of their goals. Interviewees (9) and (11) indicated that they played a significant role in conveying the impact of the training to their departmental colleagues, owing to their combined administrative and supervisory responsibilities. The decentralised training, which was notably prevalent in several governorates, often involved only a single representative from each department. However, they were informed indirectly through a colleague, direct manager, or senior supervisor, who stated:

> *We started planning in an organised way, so we took and transferred the impact of training from quality management specialists as supervisors to teachers in their schools.*

Interviewee (8) described the quality system forms and standards to analyse their visits and create monthly summaries. Through this process, they developed a better understanding of the types and purposes of the visits, distinguishing between exploratory and supervisory visits. This understanding helped them focus more on the quality of their work rather than the quantity of visits.:

> *My analysis of the visits was also done by the quality system forms. My monthly summary was also by the quality system standards, i.e., As I recorded visits, I developed a stronger ability to analyse their type—whether exploratory*

or supervisory, and to define the purpose of each visit. This growth led me to prioritise quality over quantity

Interviewee (6) elucidated the role of a subject supervisor's responsibilities for the implementation of the QMS:

Follow the specified procedures when performing work. By getting to know my responsibilities as a supervisor, I must first get aware of the QMS needs and know the practices I need to follow.

This entails applying and implementing the instructions or forms provided by the QMS department, as doing so will help them clearly understand their precise responsibilities and duties.

6.2.2.3 Training opportunities to sharpen the skills of employees

This sub-theme centres around a lack of training relating to QMS.   This raises the question of how supervisors can see some changes in their organisational skills if no training is applied to them. Possible reasons for this were given by the Interviewees (4), (5), (7), (10) and (11), with several relevant comments made, for example:

In terms of the QMS training, we did not go through courses or workshops, so I am unable to criticise it now, I took QMS as a know-how to try it. Interviewee (4)

Another interviewee said:

The intent is that no training has been done on applying the quality system, but empty templates in QMS forms are prepared for us, and we generate and write our goals as supervisor goals, inside them. Interviewee (11)

Raising the idea that the QMS departments in each educational governorate in the MOE dealt with them as if they understand the process of the implementation, he said:

In practice, it is as if we were trained only, but nothing was done. They asked to prepare a plan, and we were reminded not to forget to put the logo of the quality control system on any plan form or correspondence. This means that the culture reached us without receiving any training. Interviewee (10)

During the discussion about the potential of the QMS to enhance organisational skills, Interviewees (10) and (6) mentioned that by increasing the number of attendees and not limiting it to the senior supervisors', the direct official, or one of the associates, to convey the impact of the training, will give training to a larger number of supervisors' directly by applying the system in a more understanding, aware and knowledgeable manner. Interviewee 10 said:

> *It is possible to increase training programmes and target a larger segment of subject supervisors in training programmes, which means that it is not limited to one employee*

Further elaboration on how the impact of the training reach out the colleagues, she said:

> *Hence, it will depend on the one who transmits the effect of the training, because you know that the impact of the training cannot be transferred in a 100% manner, which means that the training will be a little incomplete. Interviewee (6)*

Highlighting the importance of maintaining the effectiveness of the training, Interviewee (10) suggested:

> *So, the more attendees from subject supervisors' that will be transmitted quicker, easier, and much deeper in the quality.*

> One of the interviewees mentioned that practical training is crucial for understanding the system and its requirements. However, they explained that, despite some training being provided, the theory alone did not help the supervisor develop practical skills. As a result, they suggested the need for more in-depth practical training, as noted by interviewee 2:

> *Practical training is preferred for subject supervisors in all disciplines. Whether this training is for everyone means decentralisations for all supervisors' alike or through teams.*

Interviewees (2) and (4) mentioned that continuous meetings have a major role in realising the significance of the applied system. One of the demands mentioned in this group is to hold periodic meetings with representatives of the QMS. As Interviewee (2) said:

> *Continuously meetings are also good to hold, to follow up, and to find out where we have come from in terms of quality management*

Furthermore,

> *This means improvement needs continuous feedback at regular intervals and the involvement of those concerned. Interviewee (4)*

Interviewee 4 continued by saying:

> *Forms of quality management are applied to all subject supervisors. The quality management department must achieve its goal in terms of clarifying and explaining to those who fill out these forms what exactly is their role in the culture of quality management and its mechanism and dissemination.*

Interviewee (10) explained that there was no training to sharpen their skills and explained that if the actual periodic meetings were difficult to set up, why are virtual meetings not held to facilitate the supervisors' finding answers to the situations that need to be clarified to apply the system properly, just to open a dialogue facility or hotline. On this issue, Interviewee (8) said:

> *To date, the workshops have not been sufficient. If it is possible to hold a live meeting, of course, via the Internet, using, for example, Microsoft Teams, or Zoom. This means that they can choose the appropriate media to stand quickly on our QMS queries.*

From these findings, an initial conclusion that can be drawn is that the interviewees believed that the training provided was not sufficient (discussed further in the Analysis chapter).

6.2.3 *Organisational skills:*

Interviewees' comments about the development of organisational skills due to the implementation of QMS training emerged (see Figure 27).
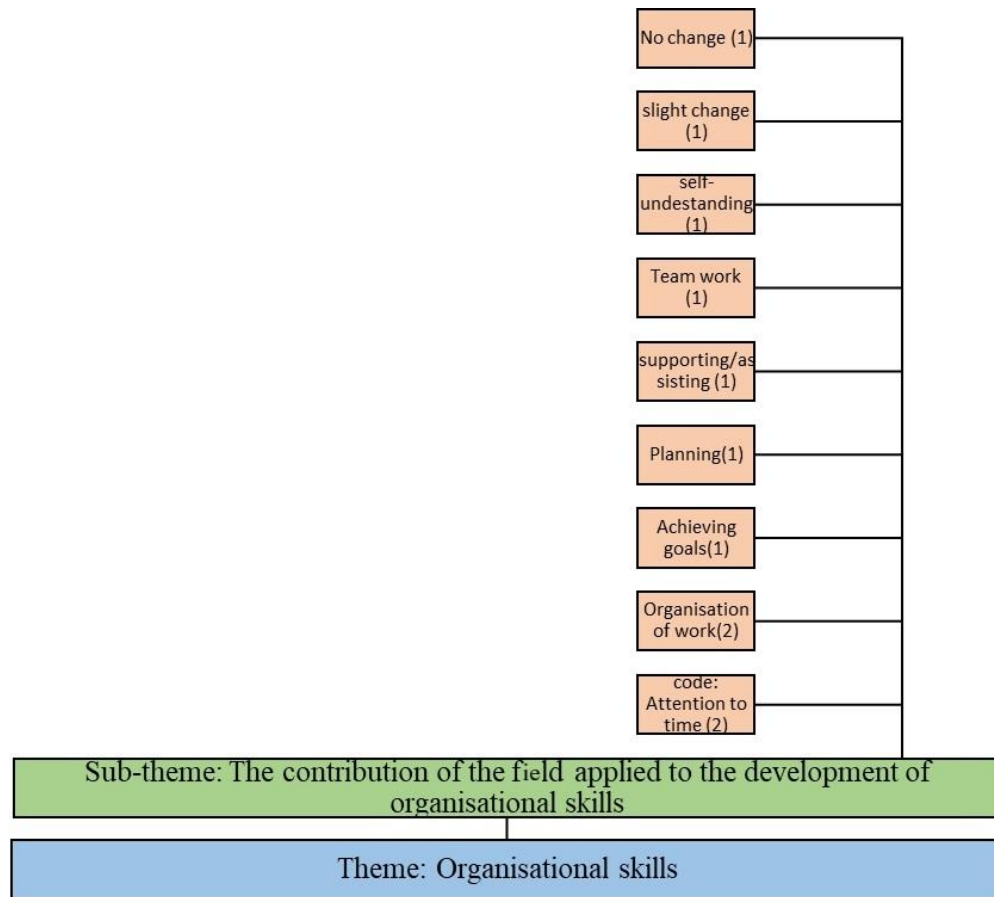
Figure 27 Organisational skills theme

6.2.3.1   Strengthening organisational skills within educational fields through the
implementation of quality management systems

Strengthening organisational skills through quality management system Implementation, by Implementing what is required in the supervisory work environment, led to an enhancement of their organisational skills. As the team integrated the system into their daily operations, they became more adept at managing tasks, streamlining processes, and maintaining a high standard of work.

And (section 6.2.3.1) as a sub-theme, where the interviewees explained in the interviews that the application of what was understood or trained by some, on the QMS helped them in acquiring skills, but the refinement of these skills came beneficially and more deeply through its practice in the supervisory work environment.

Attention to time, interviewee (9) said:

>We *must get rid of many defects, the most important of which is time waste.*

Interviewees expounded views about how the field application (hands-on) contributed to what they focused on and their planning. Interviewee (8) said, "*Away from randomness how the QMS department publicity and applied the QMS, but it led to the organisation of work*". Thus they defined their goals, interviewee (9) said:" *achieving goals at the end*" by planning more than what is positively reflected in setting priorities, which gives the basic picture in their impression that the actions and plans became more organised, as interviewee (1) said: " *it added something more to us, meaning a stronger aspect of planning in our programme planning in general, and even several and new supervisory methods have been implemented*".

Thus, it helped a lot in supporting and assisting the plans and their goals, with Interviewee (9) stating

> *Therefore, quality management for me meant walking on the same path, or that we are walking on the same plan, and therefore it means assistance and support for ideas that exist mainly with me as a person, and I transfer them to the educational field.*

One of the interviewees commented about a shift towards more teamwork, commenting that:

> *Two eyes see better than one eye, and two minds consult better than one mind Interviewee (4)*

The interviewee explained that collaborating with the subject supervisor's team and discussing priorities contributed to developing a more focused plan. Interviewee (5) specifically highlighted the concept of "*self-understanding*" noting that setting clear goals and priorities allowed supervisors to adapt their work to meet the unique needs of each school. This shift replaced the previous practice of applying generalised activities and goals across all schools. Consequently, supervisors independently developed a deeper understanding of how to effectively utilise their performance and data.

Interviewee (3) said there is "*a slight change*" in our organisational skills, and similarly, interviewee (2) said "*there is no change*". Both interviewees considered that, as supervisors', they "*intuitively possess these skills*" through the experience of planning and producing good work. Both interviewees felt that this was the norm for them since

taking on the role, and therefore did not need to make any additional changes to their organisational skills after applying the QMS and its practice in the educational field.

6.2.4 *Improvement:*

This section, as the fourth theme, is divided into two main sub-themes as depicted in Figure 28 below.
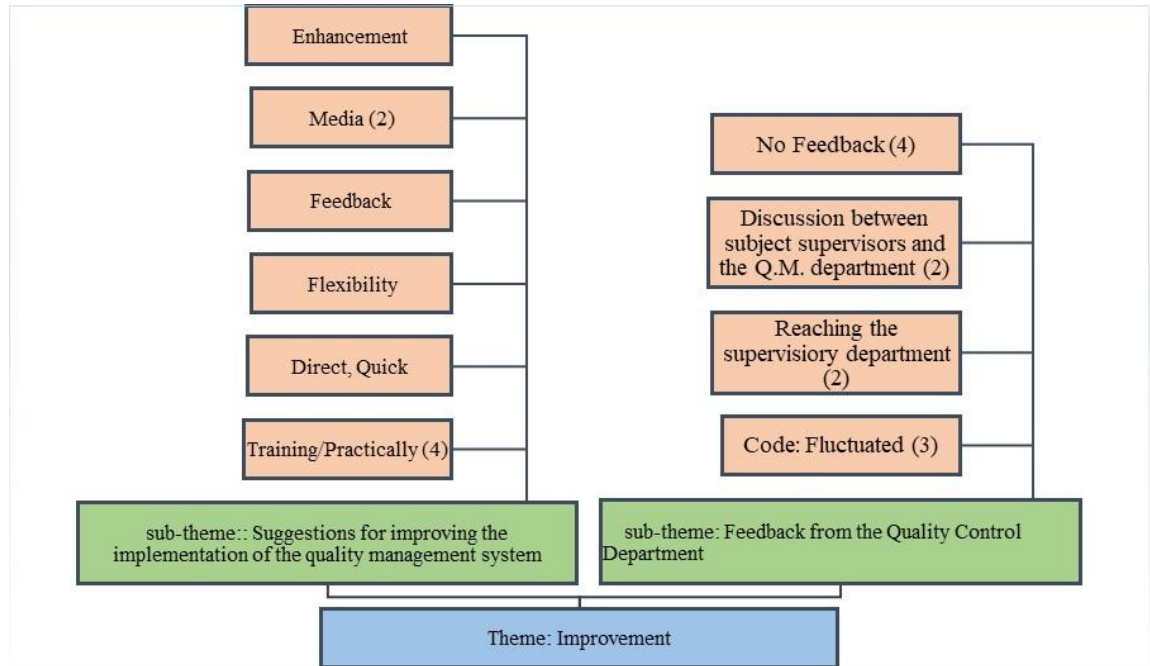
Figure 28 Improvement Theme

6.2.4.1   Feedback from the Quality Management Departments in MOE:

This sub-theme includes the codes in Figure 29, which reveal some variations in how feedback from the QMS department is provided.
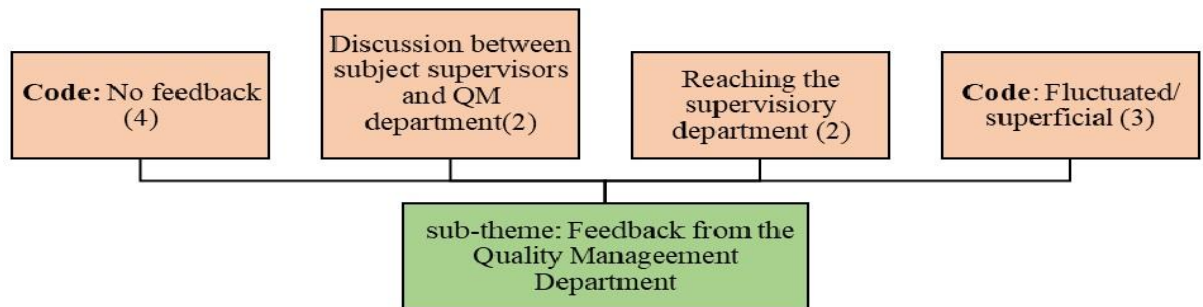
Figure 29 The category of Feedback from the Quality Control Department category

Interviewees (8) and (11) mentioned that the feedback provided was superficial, for example:

> *Things sent by the quality management department are very, very superficial as feedback based on what we did. Interviewee (11)*

Interviewees (1) and (10) contended that it fluctuated during the years of getting feedback from the QM department, as one of them said:

> *Not continuously, sometimes quarterly and sometimes annually, and sometimes they do not send any feedback. This year we did not get any, it did not reach us, whether in the first semester or the second semester. Interviewee (1)*

Interviewees (6) and (8) mentioned the feedback reports from QMS department reaches the supervisory department, and what in the reports is an indicator of your performance, as she said:

> *Yes, feedback is not enough Interviewee (8)*

When asked why, Interviewee (6) clarified: "*Feedback is not sufficient, and we sometimes ask among supervisors' whether we did what we did correctly or not.*"

Senior supervisors' often praise and highlight positives but withhold constructive feedback; timely, comprehensive feedback from past work is desired for better self-development at the start of the new academic year. Interviewee (9) said:

> *The senior supervisor often praises and often presents positive things, and aspects of development remain locked up and they do not declare them, so for how long? We would like to develop ourselves from the beginning, that is, from the beginning of the semester. We hope that they will give us a full list of feedback on what was previously submitted of work during a previous year so that we take it into account with the beginning of the new academic year.*

Interviewees (6) and (9) said that a dialogue takes place between the supervisors' and the quality management department, where Interviewee (6) said:

> *The supervisor who achieves a rate of less than eighty percent is given feedback from the senior supervisor. As for the one who achieved a higher percentage and does not have any remarks or any feedback, he is given a certificate of appreciation.*

However, Interviewees (2), (4) and (11), said that there was no feedback from the Quality Management department following the completion and submission of the forms by the supervision department. Participants comments included:

> *We, as subject supervisors', do not receive this feedback. We have not received the feedback of the evaluation so far during this period during the three years since 2019 until now." Interviewee (4)*

The importance of highlighting more direct dialogue was illuminated, when Interviewee (2) said:

> *It would be beneficial to have a direct dialogue with the supervisors with the quality management officials, and discuss it directly, whether in the positives or the negative feedback, the positives and an attempt to enhance and increase them, or the negatives and ways to overcome them.*

6.2.4.2   Suggestions for improving the implementation of the QMS.

In response to research question four, regarding an improvement to the implementation of the QMS, several suggestions were forthcoming (Figure 30).
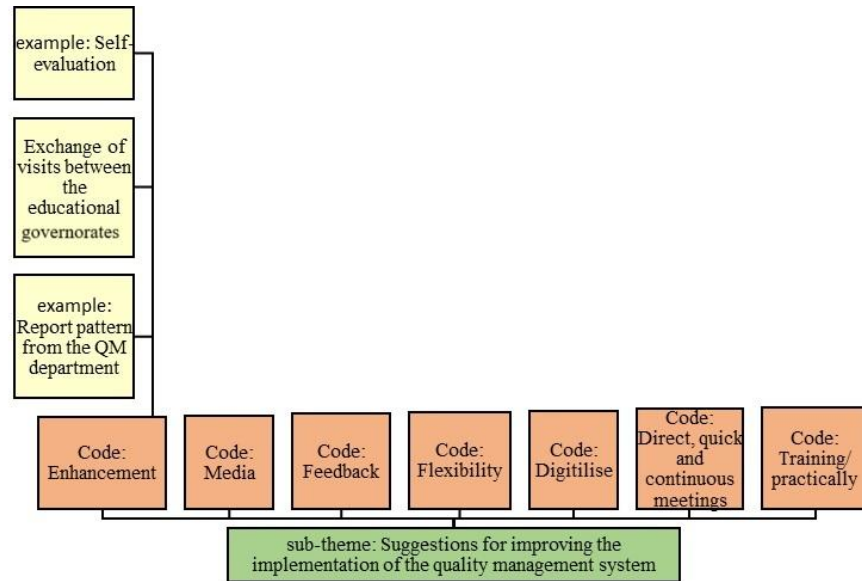
Figure 30 The category of Suggestions for improving the implementation of the QMS.

Improved and/or more training was mentioned by many of the interviewees. Interviewees (4), (9), (10), and (11) indicated the importance of combining the hands-on training instead of just theoretical learning. As interviewee (10) said:

> *Training should be theoretical and practical, by giving some models, and existing models in presentations in which examples are presented, and the examples have to come from the supervisory department, not another department.*

Interviewee (9) said:

> *To better understand these courses, I would like how to implement the QMS. To be more familiar with the skills I need to acquire, I wish to take quality training courses that I will be able to implement in the required way. As a minimum requirement, this must be met.*

Training by experts, not training by colleagues, was also included in Interviewees' (4) and (11) answers. As Interviewee (4) said:

> *I guarantee that there are no gaps in the idea of the QMS, and no gaps in the information, if I take it directly from the experts in Quality Management training.*

Interviewees (1) and (3) raised the issue of supervisor transitions across educational governates, as Interviewee (1) said:

> *The new supervisors' who moved may have been in their educational*
> *governorates and did not receive training about the QMS.*

To develop the QMS training programme, Interviewees (1) and (9) mentioned the importance of providing developmental programmes that benefit the educational process. As Interviewee (9) said:

> *It means more related to the educational field and the development of the*
> *educational process, for example, setting priorities and the development*
> *process in general.*

Interviewees (1) and (6) concluded that the training would be much better and beneficial if concerned with enhancing and enriching training topics such as organisational skills types that benefit supervisory work, as Interviewee (1) said*:*

> *"As, "prioritisation skill" and* interviewee (6) said, *"planning skill".*

Interviewees (1), (4), (6), (8), (9), and (11) stressed the importance of holding continuous, direct, and quick meetings. As Interviewee 4 noted:

> *Away from randomness, we would like to meet with them directly, with the*
> *quality management staff in the governorates, and to meet the supervisors'*
> *face-to-face in the theatre. We listen to them, and they listen to us.*

Interviewee 4 also emphasised the importance of using technology instead of the paper Quality Management Department forms*:*

> *If the whole idea of the quality system was computerised, the technical side, the*
> *leap to the quality system be worthy to computerised with any programme.*

Adding to this view, Interviewee (3) said:

> *Employing mobile phone technology with the appropriate application.*

Interviewee (6) raised the importance of flexibility in applying the QMS:

> *We need flexibility in time and in the work that you can also do outside the scope*
> *of supervisory work.*

Interviewers (9), (10), and (8) highlighted the importance of providing supervisors with feedback from the quality management department. Interviewee (9) said:

> *Giving us the feedback so that this system becomes more effective and more accurate.*

Interviewee (1) and (8) emphasised the importance of using the media to spread the culture of quality management among the Ministry's employees and to increase awareness and familiarity with the system. Interviewee (8) said:

> *Focusing on the advertising the quality management system*

Interviewee (1) added the idea of the proposals by using one of the media publishing patterns:

> *We need posters, we also need brochures. And the infographic design is an example of the quality system media usage, so we can get to know it closely.*

There were three sub-codes (Figure 28) about enhancement of implementation of QMS. The first focuses on the report pattern from the Quality Management Department since they require supervisors to provide them with reports based on the form attached to them since the beginning of the year. Supervisors then complete the form each semester based on the goals written since the beginning of the year, noting if goals and completion rates were achieved. Interviewee (9) suggested that the reports be requested in a shorter period and not at the end of the semester.

> *If not at least quarterly, why not by the end of each semester?*

An interesting comment by Interviewee (8) about the exchange of visits between the educational governorates and their impact on the exchange of experiences on the implementation of the system, was that:

> *I also hope that a programme for exchange visits between supervisors across governorates will be implemented.*

Interviewees (8) and (10) believed that a self-evaluation feature for supervisors should be integrated, allowing them to reflect on whether they have achieved set goals and to what extent:

This system should also contribute to the evaluation of the employee himself.
Interviewee (8)

6.3   Summary

Eleven subject supervisors were interviewed in this research and each one represented his/her educational governorate. The interviews were analysed using the NVivo Pro 12. Programme and Braun and Clark's (2006) process of thematic analysis. From this process, four themes were generated (section 6.2). The first interview question relates to '*What strategies does the Ministry of Education employ to promote awareness of the QMS among all departments within the ministry?*   interviewees highlighted the mechanisms of disseminating the QMS to the subject supervisors in the Ministry of Education in different ways.

From the codes extracted relating to this question, it was notable that this comment highlights the variation in dissemination methods across governorates, suggesting a lack of a standardised, uniform approach to communication within the MOE. While most governorates utilise the correspondence system, this does not indicate full centralisation, as the system may not be the exclusive or consistently implemented method across all regions. Some governorates may rely on additional or alternative methods beyond the correspondence system, contributing to a perception of decentralisation. This highlights the importance of dissemination methods in effectively implementing QMS. As previously mentioned, various methods exist for disseminating awareness of QMS; however, there appears to be a disconnect concerning the importance of QMS, particularly in relation to supervisory roles.

The second question: '*What role did your training programmes play in changing your beliefs/ attitudes toward the QMS?*' reveals training as a second theme, with three subcategories: the role of training programmes in changing convictions and attitudes, their role as a supervisor in the implementation of the QMS, and training opportunities to sharpen the skills of subject supervisors'. Data from this study revealed that training is an essential aspect of a QMS and helps improve employee skills, attitudes, and performance, further discussion will be elaborated on in the next chapter.

The third question: '*What was the impact of the practical implementation of the training programmes on the enhancement of organisational skills among subject supervisors'?'*

yielded a third theme regarding organisational skills. Data from the findings provided an indication of the contribution of the QMS implementation to the development of the subject supervisor's organisational skills. Interviewees were asked whether implementing a quality control system had any impact on their organisational skills or brought anything new to their abilities. The responses varied, with some stating that nothing new had been gained, while others reported that it had reminded them of what they were already applying. Most participants agreed that their understanding, constant questioning, and collaboration with others had led to the acquisition of new organisational skills. However, interviewees attributed this to self-learning more than any formal training (further discussion will be explored in the next chapter).

The final, fourth question was: '*What suggestions would improve the policies and procedures for implementing the QMS in the Ministry of Education?*' The theme that emerged from asking this question relates to the importance of feedback, and how subject supervisors' suggestions were used to improve the implementation of the QMS.

For development and change to occur, systematic feedback must be present to identify the employee's strengths and areas for improvement, either in terms of physical meetings or returning the feedback on the original QMS forms in order to know the strengths of their work, as well as the areas of improvement.

7 Chapter Seven: Analysis and Discussion

The objectives of this study were multifaceted and aimed at gaining a comprehensive understanding of several key aspects related to the implementation of ISO 9001:2015 (Figure 31). The study sought to understand subject supervisors' awareness concerning the benefits of implementing ISO 9001:2015, thereby highlighting their knowledge of the standard's advantages. Furthermore, it aimed to determine subject supervisors' perception regarding the quality of the training programme related to the QMS, focusing specifically on their roles and responsibilities. In addition, the study endeavoured to evaluate the impact of implementing ISO 9001:2015 quality management processes on the organisational skills of subject supervisors.
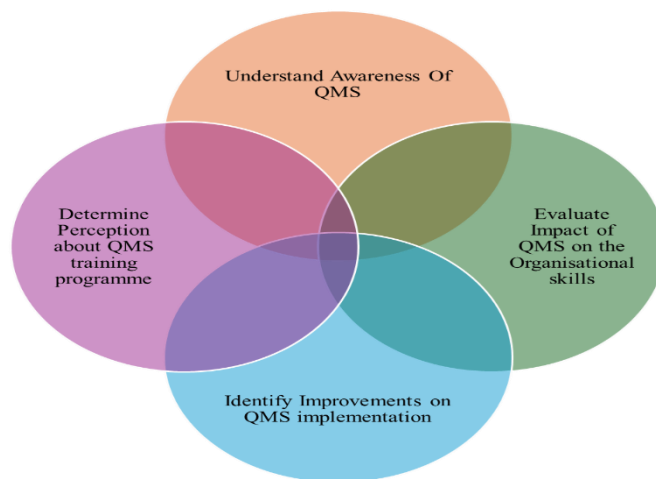
Figure 31 The key to understanding ISO 9001:2015 implementation

Consequently, this evaluation was intended to assess how these processes influenced subject supervisors' professional capabilities. Finally, the research aimed to identify and propose modifications or improvements to the existing policies and procedures for implementing the QMS within the MOE. By doing so, the study sought to offer actionable recommendations for enhancing the effectiveness and efficiency of the QMS in practice.

A mixed methods methodology was adopted for this investigation, encompassing both quantitative and qualitative analyses through the utilisation of questionnaires and interviews (Chapter Five and Chapter Six). The preceding chapters presented the findings from 363 participants on the questionnaire and 11 semi-structured interviews. These were

gathered from participants from 11 educational governorates. For the quantitative data analysis, an SPSS software package was employed, ensuring a rigorous statistical examination (Chapter Five). Concurrently, the qualitative data were analysed using NVivo Pro 12 (Chapter Six), which facilitated a comprehensive and nuanced interpretation of the data, to answer the following research questions:

1. How aware are subject supervisors of the benefits associated with implementing the ISO 9001:2015 QMS?

2. What is the perception of the quality of the training programme on the QMS about the subject supervisor's roles and responsibilities?

3. Does the implementation of ISO 9001:2015 quality management processes impact the organisational skills of subject supervisors?

4. In what ways can the existing policies and procedures for implementing the QMS in the Ministry of Education be modified/improved?

This chapter thoroughly analyses the principal findings derived from the quantitative and qualitative data. It systematically relates these findings to the existing body of literature reviewed in Chapter Three, elucidating the potential implications and contributions to the field of study.

7.1 Chapter structure:

By undertaking a thorough examination of the data collected, this chapter blends quantitative analysis with qualitative insights to unravel the intricacies of QMS implementation within the Ministry of Education, specifically focusing on supervisory functions. This chapter serves as the crucible where numerical data, real-life narratives, and methodological triangulation converge, offering a nuanced and multifaceted understanding of the effectiveness, challenges, and potential improvements associated with the QMS. Through this synthesis, the chapter aims to provide a holistic perspective that is both empirically grounded and contextually rich, thereby contributing to the broader discourse on quality management in educational supervision. By adopting a mixed method approach, melding quantitative metrics with qualitative narratives, to address the research questions holistically and by intertwining statistical findings from questionnaires with in-depth perspectives from interviews, as mentioned in the Chapter Four: Methodology, the vivid picture of the multifaceted landscape of QMS

implementation can be seen. The approaches used to gather and analyse the data have revealed some underlying stories, motivations, and experiences that shape the QMS journey within the supervisory work in the MOE.

As depicted in Table 36, the forthcoming sections of this chapter will systematically unravel the unfolding integration, presenting synthesized insights that intricately bridge empirical numerical data with nuanced qualitative perspectives. By structuring the analysis in this methodical manner and rigorously applying triangulation methods (as detailed in the Chapter Four: Methodology) to corroborate findings, the overarching aim was to establish a robust and comprehensive foundation for comprehending the multifaceted complexities and profound implications inherent in QMS implementation. In undertaking this endeavour, the study aims to provide actionable recommendations aimed at refining policy frameworks and enhancing organisational effectiveness, thereby contributing substantively to the field of educational quality management.

Research Pillars/ Section	Research Questions/pillars	Content
Section 1: Awareness of QMS	Are subject supervisors' aware of the benefits of implementing ISO 9001:2015?	- Integration of quantitative data from Chapter Five, part two, Section One (Awareness of QMS among participants) with qualitative data from Chapter Six, Section One (Participant perspectives on QMS awareness)
Section 2: QMS Effectiveness Training	What is the perception of the quality of the training programme on the QMS in relation to the subject supervisors' roles and responsibilities?	- Integration of quantitative data from part two, section two (Perception of QMS training quality among subject supervisors') with qualitative data from section two (Participant experiences with QMS training)
Section 3: Impact of QMS on Organisational Skills	What is the impact of QMS implementation on organisational skills?	- Integration of quantitative data from part two, section Three (Impact of QMS on organisational skills) with qualitative data from section three (Participant perspectives on QMS impact on organisational skills)
Section 4: Comparison of Demographic Data with Research Pillars	Demographic factors related to research pillars	- Comparison of demographic data with research pillars (Demographic analysis in relation to research objectives) - Integration of quantitative data from part two, section Four (Demographic analysis)
Section 5: Relationships Between Research Pillars	Relationships between different research pillars	- Discussion on relationships between research pillars (Interplay between different research components) - Integration of quantitative data from part two, section 5 (Relationships between research pillars)
Section 6: Suggestion to Improve QMS Implementation in the Supervisory works in MOE	In what ways can the existing policies and procedures for implementing the QMS in the Ministry of Education be modified/improved?	- In-depth qualitative findings analysis (Thematic analysis of qualitative data) - Integration of qualitative data from section 4 (Participant suggestions for policy and procedure modifications)

Table 36 Chapter Seven structure

7.2 Section One: Insight into Subject Supervisors' Awareness of ISO 9001:2015 Benefits

This section addresses the subject supervisors' awareness of the QMS that was implemented (ISO 9001:2015) based on the first research question:

RQ1: How aware are subject supervisors of the benefits of implementing the ISO 9001:2015 QMS?

There is a strong consensus among participants (section 5.3.1) regarding the positive impact of implementing the ISO 9001:2015 QMS on their awareness of their continuous enhancement of supervisors' work, its contribution to their self-assessment, and its overall enhancement of organisational processes. This impact of ISO 90001/2015 implementation was one of the enhancements supported by Matorera (2018), Rohayati and Sari (2019), Al-Jaghoub et al. (2019) and Balahadia, Dalugdog and Cabient (2022) who emphasised the pivotal role of employee awareness and involvement in maintaining a successful QMS aligned with ISO 9001:2015 quality standards.

The studies conducted by Zelnik et al. (2012) and Rogala (2016) underscore the significant repercussions of insufficient awareness of QMSs among employees, which can impede the system's effectiveness and impose additional burdens on management and staff. Specifically, Zelnik et al. (2012) highlight that inadequate awareness of the QMS during job performance inhibits the system from achieving its intended purpose. Similarly, Rogala (2016) points out that such barriers are frequently encountered in daily workplace practices. The quantitative data (section 5.3.1) from the current study resonates with Zelnik et al.'s (2012) findings, with participants recognising that their levels of awareness of implementing QMS, such as ISO 9001:2015, did impact their understanding of continuous improvements in their supervisors' work (Questionnaire item A2). Enhancing awareness of QMS, as facilitated by ISO 9001:2015, can address the challenges identified in this study and by Zelnik et al. (2012) and Rogala (2016), thereby improving organisational practices and overall effectiveness (Questionnaire item A3).

Matorera (2018) provides a comprehensive analysis of QMSs within the educational sector, focusing on the impact on individual behaviour, knowledge, and skills. He advocates leveraging QMS to foster personal and institutional development through self-reflection and personal mastery. Specifically, data from Questionnaire Item 2 aligns with

Matorera's (2018) view, highlighting the significant contribution of ISO 9001:2015 to enhancing individual growth and reflective practices within the organisation.

The qualitative findings underscore the critical need for subject supervisors' to be fully aware of the processes of quality management that are directly connected to their roles. Subject supervisors' awareness is essential, as they are often responsible for guiding their teams and ensuring that QMS procedures are correctly implemented and adhered to. Without this specific awareness, the broader challenges outlined by Zelnik et al. (2012) and Rogala (2016) are likely to be exacerbated, leading to ineffective quality management practices and a lack of alignment with organisational objectives (section 3.2.5.1.2).

Findings from a study by Girmanová et al. (2022) highlighted the need for improved communication channels to enhance internal communication and facilitate staff development. In this study, the participants' consideration of the effectiveness of the available communication channels varied. The qualitative findings (section 6.2.1) of this study highlight variations in how the QMS is communicated and implemented across the eleven educational governorates. These variations raise issues about the consistency with which the MOE standardises the cascading of QMS processes. The effectiveness of a policy or process is heavily reliant on a clear plan for its dissemination, as much as on its implementation itself, as discussed in the literature review (section 3.2.5.1.1). Moreover, qualitative data (section 6.2.2.1) suggests targeted training programmes, improved communication channels like learning communities or when they worked as a team (interviewee 4), and strong leadership are all approaches that could support a heightened awareness of QMS thereby leading to a more successful implementation of it. The responses of the participants (section: 6.2.1) revealed that quality management representatives highlighted a variety of methods employed to disseminate information about quality management across all educational governorates within the Ministry of Education in Oman. Predominantly, in this study, tools such as the corresponding system, posters, social media, and other communication channels have been instrumental in this endeavour (section 6.2.1). Notably, one governorate distinguished itself by implementing competitions to enhance awareness among subject supervisors about the core principles of the QMS. This multifaceted approach to dissemination is supported by previous studies conducted by Wahid (2019), Manders (2015), Dumond and Johnson (2013), and Matorera (2018), which underscore the effectiveness of diverse communication strategies in promoting quality management practices.

Whilst, as noted above, there are different methods for disseminating awareness of QMSs, there seems to be a disconnect regarding the importance of the QMS, particularly to their supervisory roles (section 2.3.3). Highlighting the effectiveness of training emphasises how it improves understanding and awareness of the importance of this system within the MOE, and their specific roles and responsibilities. The importance of the system becomes apparent through effective training, which will be further clarified through their responses in the subsequent section of this chapter.

7.3 Section Two: Exploring Subject Supervisors' Perspectives on Effectiveness of Training Programme Quality for QMSs

This section aligns to research question number two:

RQ2: What is the perception of the quality of the training programme on the QMS in relation to the subject supervisors' roles and responsibilities?

Linked to the overall aim of this study, the data gathered seeks to understand the subjective evaluation of the training's quality concerning the supervisors' roles and responsibilities within the context of the educational governorates. Specifically, this question explores whether subject supervisors' feel adequately prepared by the training to fulfil their duties effectively within the framework of the QMS. Ultimately, the study aims to determine the extent to which the training has equipped supervisors to perform their roles proficiently and whether it aligns with the expectations and requirements of the QMS. Merging the quantitative and qualitative findings (section 5.3.2 and section 6.2.2) yield four themes: 1. Consensus on System Effectiveness, and 2. Disagreement on Training Effectiveness, 3. Role Clarity and Organisational Skills, and 4. Continuous Improvement Through Evaluation.

7.3.1 Consensus on QMS Effectiveness

The quantitative data reveal a widespread agreement among participants regarding the effectiveness of the ISO 9001:2015 QMS in enhancing subject supervisors' productivity, efficiency, and overall performance in their roles and responsibilities (items B1 and B3 in the questionnaire, section 5.3.2.1). Moreover, this finding aligns with the conclusions drawn by Priede (2012) and Bernardo et al. (2015), who emphasised the positive impact of effective QMS implementation on organisational productivity and performance.

Furthermore, Lambert and Ouédraogo (2008) support this consensus by contributing to the overarching idea that ensuring clarity and understanding among employees is crucial for the successful implementation of ISO 9001 standards. Thus, the data reinforce the significant role of QMS in improving organisational outcomes.

7.3.2   Disagreement on Training Effectiveness

In contrast to the consensus on system effectiveness, the data gathered (section 5.3.2.2) indicates a lower level of agreement among participants regarding the perceived effectiveness of various training aspects associated with implementing the ISO 9001:2015 QMS. This discrepancy echoes the findings of Zimon (2016), who highlighted respondents' concerns about additional costs associated with standardised QMS training. While this study does not directly address cost concerns, participants express varying opinions on the availability of training resources and the adequacy of programme length. This suggests a need for further exploration into tailored training approaches, consistent with the recommendations of Deros et al. (2012) and Psomas (2013) for comprehensive and expert-led training aligned with ISO 9001:2015 objectives.

7.3.3   Role Clarity and Organisational Skills

The qualitative findings (section 6.2.2.1 and section 6.2.2.2 and section 6.2.2.3) provide valuable insights into how QMS implementation impacts supervisors' roles and organisational skills. Specifically, this study's findings align with those of Dentch (2016) and Psomas (2013) on the importance of clear role definitions and effective training (section 6.2.2.1).

Moreover, participants' comments reflect a deepened understanding of their responsibilities within the QMS framework and the development of organisational skills through its implementation (section 6.2.2.2 and section 6.2.2.3). This aligns with the conclusions of Dentch (2016) and Psomas (2013), who underscored the significance of a well-designed training regime in promoting role clarity and enhancing organisational skills for effective coordination and management.

7.3.4   *Continuous Improvement Through Evaluation*

Both the quantitative and qualitative data in this study (section 5.3.2.2 and section 6.2.2.3), as well as previous studies (i.e. Bernardo et al. (2015) and Rohayati and Sari (2019), underscore the critical importance of regular evaluation and adjustment of training programmes based on employee feedback for continual improvement in ISO 9001:2015 implementation. Specifically, this emphasis on continuous improvement resonates with the recommendations of Bernardo et al. (2015) and Rohayati and Sari (2019) for ongoing evaluation and refinement of training programmes to ensure their effectiveness. Moreover, further details regarding participant suggestions and proposals to enhance the implementation of the QMS in supervisory roles will be elaborated upon in Section 7.7 of this chapter. Thus, the findings highlight the necessity of continuous evaluation and development of QMS training programme to maintain and improve the QMS.

The data findings (section 5.3.2.2 and section 6.2.2.3) from this study offer valuable insights into the challenges and opportunities associated with QMS implementation. While there is a consensus on the overall effectiveness of the QMS itself, the disagreement on training effectiveness suggests a need for more tailored training approaches that address the specific challenges identified by participants. Furthermore, by synthesising quantitative data, qualitative insights, and findings from previous studies, organisations can develop targeted strategies to enhance role clarity, promote continuous improvement, and ultimately achieve successful QMS implementation aligned with ISO 9001:2015 objectives. Consequently, this comprehensive approach ensures that the training programmes are more effective and responsive to the unique needs of the employees, thereby facilitating the achievement of organisational goals.

7.4   Section Three: Enhancing Organisational Skills: The Influence of ISO 9001:2015 Implementation on Subject Supervisors

This section links to research question number 3:

RQ3: Does the implementation of ISO 9001:2015 quality management processes impact the organisational skills of subject supervisors?

In comparing the findings of this study with Neyestani's (2016) and Aniskina and Terekhova (2019), several similarities and nuanced differences emerge regarding the impact of implementing the ISO 9001:2015 QMS on organisational skills.

Quantitatively, the results of this study resonate with Neyestani's study (2016), which investigated QMS effectiveness within the construction industry. Neyestani found a clear positive effect of QMS implementation on organisational skills, particularly in problem-solving, decision-making, teamwork, and communication. Similarly, the quantitative analysis (section 5.3.3) in this study reveals a consensus among participants regarding the positive influence of QMS on various organisational skills. Specifically, high mean scores (section 5.3.3) were observed for items C5 and C9, related to scheduling job responsibilities and enhancing planning skills, indicating a strong alignment with Neyestani's (2016) findings. Furthermore, the qualitative exploration (section 5.3.3) in this study resonates with Hussein et al. (2017) and Aniskina and Terekhova (2019), emphasising the pivotal role of time management, teamwork, and effective communication in successful QMS implementation. Participants in this study highlighted how QMS facilitated better organisation of work, leading to improved planning and prioritisation skills. This echoes Hussein et al.'s (2017) observations within Lebanese universities, where QMS implementation alleviated time management challenges and fostered effective teamwork. Similarly, Aniskina and Terekhova (2019) underscored the importance of staff involvement and leadership development in QMS implementation within educational institutions, which are findings (section 5.3.3) that echo the participants' voices in this study.

However, some disparities do surface between this current study and previous research. While Neyestani's (2016) focus was primarily on the construction industry, this study delves into the impact of QMS within educational contexts. Despite this contextual difference, both studies converge on the positive influence of QMS on organisational skills, indicating potential generalisability across sectors. Moreover, while previous studies like Escrig-Tena et al. (2018) and Hussein et al. (2017) acknowledge limitations such as sample size constraints and geographic scope, this study also faces challenges in accessing relevant literature specifically on QMS and organisational skills within educational domains. This limitation underscores the need for further research to bridge existing gaps and elucidate the intricate mechanisms through which QMS influences organisational skills, particularly within educational settings.

In summary, the results of this current study align with previous studies, indicating the positive impact of QMS implementation on organisational skills. Despite some differences in focus and contextual factors, the consistent evidence underscores the significance of QMS in enhancing various competencies crucial for organisational success. Further research is warranted to delve deeper into the specific mechanisms underlying this relationship and address existing literature limitations.

7.5   Section Four: Demographic vs Research Pillars

The data analysis elucidated the impact of various demographic data (variables) on participants' perspectives across three sections of a questionnaire (research pillars). Scrutinising the data illustrated how demographic data (variables) influence the observed disparities in participants within each section, shedding light on the nuanced interplay between demographic characteristics and levels of agreement. The level of agreement refers to the extent to which participants with varying demographic characteristics align in their perspectives across the questionnaire sections. The analysis considered how factors such as age, gender, etc influenced participants' responses, thereby highlighting the differences and similarities in their views. It looks at the agreement between groups distinguished by these demographic variables.

The demographic data (variables) under examination spanned a range of variables, each providing unique insights into the perspectives of participants. These variables encompassed nationality, gender, age, years of experience, educational governorate, and subjects of supervision.

Some studies have previously examined the impact of demographic data in a general sense, such as those by Macalos-Galbo (2023) and Neyestani (2016), while others specifically linked it to awareness of the QMS (Balahadia, Dalugdog, and Cabiente, 2022). However, this study is distinguished by its contribution to the field, which links demographic data directly to the research pillars (awareness, effectiveness training, and organisational skills). This represents a significant departure from previous studies and sets a new precedent in the field.

By meticulously examining the intricate connections between these demographic variables and participants' perspectives across the questionnaire sections—encompassing awareness, the effectiveness of QMS training, and organisational skills—this discussion

endeavours to present a nuanced comprehension of the underlying factors. Through this exploration, this section aims to make a substantial contribution to the academic discourse by offering valuable insights into the multifaceted dynamics that shape agreement levels within the context of the study.

The quantitative data in Part 4– Studying the statistical differences between the levels of demographic variables for each section. in the Quantitative Findings Chapter, is shown in the summary in Figure 32.
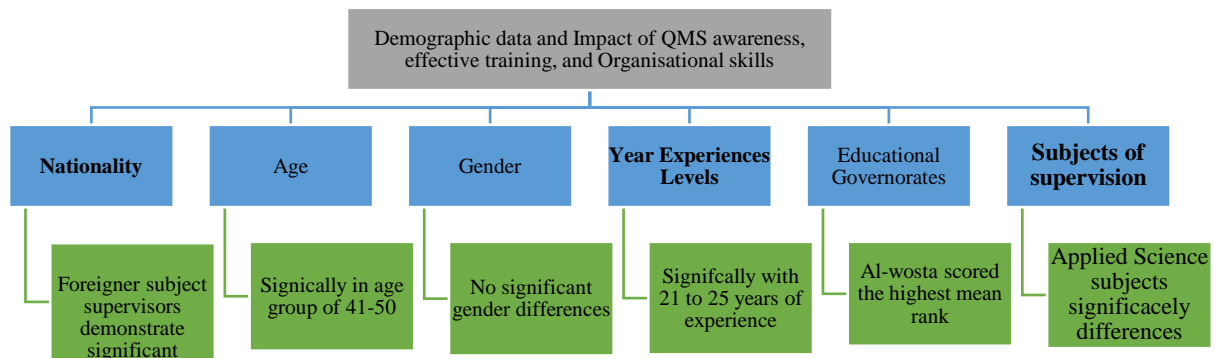
Figure 32 Demographic data and Impact of QMS awareness, effective training, and Organisational skills

The analysis of demographic variables, in conjunction with the research pillars, as delineated in the accompanying figure, will be systematically explored in the next sections.

7.5.1 *Nationality:*

This study underscores the existence of nationality-based disparities in QMS understanding, training effectiveness, and subsequent organisational skills among subject supervisors' (section 5.4.1 and section 5.5.2). This finding parallels the observations of Balahadia, Dalugdog, and Cabiente (2022), who also noted disparities in awareness and challenges among individuals from different demographic backgrounds within a

university setting. Such disparities highlight the need for tailored approaches to QMS implementation that account for the diverse experiences and perspectives of subject supervisors across various nationalities (section 6.2.2.1), to exchange knowledge. In the qualitative findings of this study, the foreign subject supervisors shared their understanding and familiarity with QMS extensively during the semi-structured interviews (section 6.2.2.1). They recounted experiences aimed at improving QMS implementation within the MOE (section 6.2.2.1). This knowledge stemmed from their exposure to QMS during their tenure in their home countries or other nations where such systems were implemented earlier than in MOE in Oman, often influenced by their professional engagements (see Section 7.5.4 for an in-depth explanation of all demographic data).

7.5.2   *Age:*

The examination of demographic data within this study (section 5.5.3) unveils nuanced insights into the role of age in shaping awareness levels concerning QMS. Notably, statistically significant differences in awareness levels were observed during the data analysis across different age brackets, particularly within the age range of 41-50 years (section 5.4.2). This finding indicates that age may indeed exert a considerable influence on individuals' perceptions and comprehension of QMS principles. However, the study's findings (section 5.5.3) diverge when considering the impact of age on perceptions of QMS training effectiveness and organisational skills. Contrary to the significant disparities noted in awareness levels, no statistically significant differences were detected in participants' evaluations of QMS training and organisational proficiency across various age groups. This suggests that, while age may influence awareness, it might not play a substantial role in shaping perceptions of QMS training efficacy and organisational skills (section 7.54). Consequently, these results highlight the complexity of demographic variables in QMS implementation and suggest that training programmes should be designed with these differences and varieties in mind to maximise effectiveness and engagement across all age groups.

This result resonates with and contrasts with prior research endeavours. For instance, Macalos-Galbo's (2023) study, situated in a university environment, emphasised the influence of demographic variables such as educational attainment and training participation on awareness levels. This finding aligns with the current study's emphasis

on the significant role of demographic factors. In contrast, Fronda's (2019) investigation into educational institutions in the Central Luzon Region (Philippines) extended the analysis to encompass a broader range of variables, including age, employment status, and tenure, particularly examining their effects on commitment levels. These divergent findings across studies underscore the multifaceted nature of demographic variables' influences on QMS perceptions and suggest the necessity for context-specific considerations. Moreover, Neyestani's (2016) exploration of demographic backgrounds in construction project management highlighted potential correlations between gender, age group, and QMS implementation duration (experience). Thus, similarly to this study (section 5.4.2), as age increased, knowledge of the standard also rose, with the 36–45 age group showing the highest awareness (Murmura and Bravi, 2016).

Integrating these insights with the findings of the current study underscores the complexity of demographic dynamics within QMS contexts and suggests avenues for further exploration. These varied research outcomes illustrate that, while certain demographic factors may significantly influence awareness and perception of QMS principles, others may not exert a substantial impact on training efficacy and organisational skills. Organisations may significantly benefit from recognising age-related differences in awareness and customising training programmes to address diverse prior learning needs effectively. Moreover, the lack of significant differences in perceptions of QMS training and organisational skills across various age groups suggests the potential universality of certain training approaches, indicating avenues for streamlining training efforts across demographic variables. Additionally, the quantitative findings (section 5.5.3) indicate no significant difference in the effectiveness of QMS training and their organisational skills across different age groups, thus it remains important to consider diverse prior learning experiences. Such as developing training modules that are adaptable to all age levels could further enhance understanding and implementation of QMS principles. Furthermore, the study hints at the possibility that certain fundamental aspects of QMS training may be universally effective, thereby simplifying the design of training programmes to cater to a broad audience. Further exploration into the discrepancies related to years of experience will be addressed to ascertain their potential impact on QMS implementation in subsequent sections (section 7.5.4).

7.5.3   Gender:

The examination of gender significance within the realm of QMS implementation reveals intriguing insights both within the context of this study findings and in comparison, to previous studies (i.e. Balahadia, Dalugdog, and Cabiente (2022), Macalos-Galbo (2023), and Fronda (2019)). This study indicates that there are no significant gender differences in QMS awareness, training effectiveness, and organisational skills among subject supervisors' within the Ministry of Education in Oman (section 5.5.4). This could be attributed to several factors. Firstly, QMS programmes are inherently designed to be gender-neutral, focusing on job-related skills rather than gender-specific attributes. Secondly, the principles of QMS emphasise standardised processes and continuous improvement, which are equally applicable to individuals regardless of gender. Therefore, the lack of significant gender differences in QMS skills reflects progress towards creating inclusive workplaces where all employees can thrive, irrespective of gender.

This finding aligns with the broader literature on QMS implementation. For instance, the study by Balahadia, Dalugdog, and Cabiente (2022) also did not identify statistically significant relationships between gender and awareness or challenges in ISO 9001:2015 implementation among teaching and non-teaching personnel within a university setting. Similarly, the studies conducted by Macalos-Galbo (2023) and Fronda (2019) within organisational settings emphasise the absence of significant gender disparities in QMS awareness and training effectiveness. Furthermore, Macalos-Galbo's research underscores the impact of demographic factors such as sex on employees' level of awareness but does not find gender to be a significant determinant. Fronda's study, while exploring various facets of compliance and commitment among employees, also does not highlight gender as a significant factor influencing QMS outcomes. Moreover, Neyestani's (2016) study on demographic background and QMS implementation in construction projects observes a predominant presence of male managers compared to female managers yet does not identify gender as a significant predictor of QMS effectiveness. Instead, the study suggests a potential relationship between gender, age group, and QMS implementation duration, indicating a more nuanced interplay between demographic variables.

In summary, the findings from this study and previous studies underscore the gender-neutral nature of QMS programmes and highlight the importance of creating inclusive

workplaces, where all employees, regardless of gender, have equal opportunities to engage with and contribute to QMS implementation efforts. Moving forward, future research could explore the nuanced interactions between gender and other demographic factors to further enhance stakeholders' understanding of how organisational contexts shape perceptions and practices related to QMS implementation.

7.5.4   *Years of Experience:*

This study highlights a significant connection between age and years of experience (Table 37), which influences professional awareness and training engagement. As individuals spend more years in their roles, they generally acquire a deeper familiarity with organisational standards and processes, gaining influential insight through prolonged exposure.

Age Group (Years)	Years of Experience
21-30	1-5, 6-10
31-40	11-15, 16-20
41-60	21 and above

Table 37 Years of experience across the age group of the sample

The data about years of experience in this study reveals a significant concentration (section 5.5.5) of highly experienced individuals (21-25 years of experience) within the sample, indicating the potential impact of extensive professional experience on the study's outcomes.

The quantitative result (section 5.4.2 and section 5.4.4) suggests that age and years of experience are closely linked (Table 37). As age increases, so do the years of experience, reflecting a typical career progression where older individuals have had more time to accumulate professional experience.

Comparing this with the findings from the literature, Macalos-Galbo (2023) investigated the relationship between respondents' profiles and their awareness of the ISO 9001:2015 QMS within a university setting in the Philippines. This study incorporated variables such as years of experience, highest educational attainment, position/designation, and training participation. Interestingly, the results showed no significant relationship between age and years of experience with QMS awareness. This suggests that contrary to what might be expected, extensive experience does not necessarily enhance awareness levels of QMS

among university employees. However, significant relationships were identified between QMS awareness and factors like sex, educational background, job role, and training attendance. These findings imply that, while years of experience might not be pivotal in shaping QMS awareness, other demographic factors play a critical role. In contrast, Fronda's (2019) study on the implementation of QMS in Schools Division Offices (SDOs) in the Central Luzon Region of the Philippines explored whether demographic factors such as age, sex, educational attainment, years of experience, employment status, and eligibility influenced QMS implementation levels. Fronda's research did find significant differences based on demographic factors, although no significant difference was observed when respondents were categorised by employment status and eligibility. This indicates a broader range of influential factors in educational environments, suggesting that years of experience could potentially impact QMS implementation differently in educational versus corporate settings.

Additionally, Neyestani (2016) focused on the construction industry in Metro Manila, examining the demographic variables of managers and their QMS knowledge levels. This study highlighted a significant gender disparity and identified the predominant age group of managers (30-39 years), showing that extensive experience in this age bracket correlates with moderate to high levels of QMS knowledge. This contrasts with Macalos-Galbo's findings, suggesting that in industries like construction, years of experience might have a more direct impact on QMS knowledge.

In summary, this current study's findings align with the broader literature in highlighting the complex role of demographic variables in QMS awareness and implementation. While Macalos-Galbo (2023) and Fronda (2019) provide insights into the educational sector, emphasising the significant impact of educational attainment and training attendance, Neyestani (2016) offers a different perspective from the construction industry, where years of experience seem to correlate more directly with QMS knowledge. This study contributes to this body of knowledge by demonstrating the relevance of years of experience in shaping QMS awareness within a diverse participant sample.

7.5.5   *Educational Governorates:*

Examining statistically significant differences between educational governorates in awareness, effectiveness of training, and organisational skills illuminates QMS

implementation within educational governorates (Table 30). Findings (section 5.4.5) indicate notable variations among educational governorates, with Al-Wosta exhibiting the highest mean rank. These findings indicate potential disparities in how QMS is marketed and implemented across different governorates (more in how of dissemination of QMS was added on this governorate, using the contest, as mentioned in the qualitative findings (page 185). The observed differences in mean ranks (section 5.4.5) among educational governorates underscore the multifaceted nature of QMS dissemination and adoption processes. In particular, the qualitative findings highlight varying approaches to disseminating quality management practices across different educational governorates, which likely contribute to the disparities observed in QMS awareness and effectiveness of training. These differences underscore the need for tailored strategies and interventions to address the specific needs and challenges faced by subject supervisors in each educational governorate. Moreover, to develop a bespoke QMS for the supervisory directorate in all educational governorates, drawing on the recommendations arising from this study (section 8.5).

Furthermore, this study highlights a higher concentration of foreign subject supervisors in the Al-Wosta educational governorate compared to other regions, as noted in the statistical educational manual (MOE,2021). This demographic detail may have significant implications for QMS implementation efforts in this governorate. In this governorate, a creative approach was employed to disseminate the QMS by incorporating as a competitive element in terms of contest, such as questions and answers on QMS, among employees, which could enhance engagement and commitment to QMS practices. Additionally, the presence of a higher proportion of foreign subject supervisors in Al-Wosta suggests potential diversity in perspectives and experiences, which could influence the effectiveness of QMS initiatives. Their previous experience with QMS implementation in other countries and regions allows them to draw on prior knowledge, mitigating the lack of effective training in their current governorate. Moreover, the interviewee from Al-Wosta mentioned the opportunity to participate in a Ministry of Education training programme focused on QMS and Lean Six Sigma, which aids in understanding the needs, purpose, and application of QMS within their supervisory roles. This effort helps them respond effectively to the reports required by the QMS department at the end of each month or semester.

Understanding and leveraging this diversity could be crucial for enhancing QMS awareness and organisational skills in Al-Wosta and other regions with similar demographic compositions.

As an implication, the findings regarding differences between educational governorates in QMS awareness, effectiveness of training, and organisational skills point to several avenues for future research and practice (section 5.5.6). Firstly, further investigation is warranted to identify the specific factors contributing to the disparities observed among educational governorates. Understanding the underlying drivers of these differences could inform the development of targeted interventions to promote more equitable QMS implementation outcomes across governorates. Additionally, future research could explore the impact of demographic factors, such as the composition of subject supervisors', on QMS implementation within educational governorates. Investigating how factors like nationality, age, and experience influence perceptions and practices related to QMS could provide valuable insights for designing inclusive and effective QMS initiatives. Moreover, given the concentration of foreign subject supervisors in certain educational governorates, future research could examine the unique challenges and opportunities associated with promoting QMS awareness and skills among this demographic group. Tailoring training programmes and support mechanisms to meet the needs of all subject supervisors' by gaining and mixing the foreign subject supervisors' experiences in the supervisory work could be instrumental in enhancing overall QMS implementation effectiveness.

Overall, the findings regarding differences between educational governorates in QMS implementation underscore the importance of considering the educational governorate's contexts and demographic factors in designing and implementing QMS initiatives within educational settings. By addressing the specific needs and challenges of subject supervisors across different governorates, the MOE can promote more inclusive and effective QMS implementation efforts, ultimately contributing to improved quality standards and organisational performance.

7.5.6   *The subject of supervision*

The study employed a rigorous random sampling method (section 4.12.2.1) and utilised the MOE annual educational statistics for the academic year 2020-2021 (MOE, 2021),

which identified a population of 439 applied sciences supervisors', out of a total of 2,410. Quantitative data (section 5.4.5) indicates that a greater proportion of applied science supervisors participated in this study compared to those from other subject areas, yet it reveals that their number is bigger than other subjects as mentioned in the annual educational statistics for the academic year 2020-2021 (MOE, 2021). This observation is consistent with the research conducted by Balahadia, Dalugdog, and Cabiente (2022), who similarly focused on both teaching and non-teaching staff within a university setting. Additionally, demographic data was gathered to ascertain which subject areas had not received QMS training. However, the results unequivocally demonstrated that all subject areas had received training relating to QMS (section 5.4.6).

7.6 Section Five: Relationship (correlation and regression analysis)

Based on the Quantitative and Qualitative Findings from this study, it can be argued that the type of training received is not always uniform in its impact on QMS implementation and effectiveness. Previous research, such as that conducted by Batista, Feijo, and Silva (2013), has identified a positive correlation between QMS practices—like responsibility and teamwork—and job-related attitudes, including organisational commitment. In a similar vein, Bagińska and Sawicki (2018) presented a structured model to enhance quality awareness among employees in the automotive supplier sector, underscoring the importance of QMS awareness in fostering organisational skills. However, this study specifically investigates the correlation between QMS awareness and the development of organisational skills among subject supervisors' (section 5.6, correlation analysis), revealing that a comprehensive understanding of QMS significantly facilitates knowledge acquisition and enhances organisational capabilities (section 3.2.5).

In contrast to Batista, Feijo, and Silva's (2013) broader examination across multiple sectors, this research narrows its focus to subject supervisors', providing a more in-depth exploration of how QMS awareness influences distinct managerial roles within organisations. This specificity allows for more targeted insights into optimising QMS strategies to bolster supervisory effectiveness. Moreover, this study aligns with Bagińska and Sawicki's (2018) assertion of the importance of QMS awareness, extending their findings by highlighting that awareness and effective training are pivotal in shaping organisational skill sets (section 5.6, regression analysis). This integrated approach ensures that supervisors possess not only awareness of QMS principles but also the skills

necessary to effectively implement and uphold quality standards (section 3.2.4.7). Ultimately, while this research builds on prior foundational insights, it offers a unique contribution by focusing on the specific context of subject supervisors' in QMS implementation. By emphasising the essential roles of QMS awareness and tailored training in enhancing supervisors' organisational skills, the findings provide actionable recommendations for organisations striving to strengthen their QMS strategies and achieve sustainable performance improvements.

7.6 Section six: Strategic Refinement: Enhancing QMS Policies and Procedures in the Ministry of Education

This section provides a discussion relating to the research question four:

RQ4: "In what ways can the existing policies and procedures for implementing the QMS in the Ministry of Education be modified/improved?"

7.6.1 Feedback from the Quality Management Department

An analysis of interviewees' perspectives (section 6.2.4.1) on the feedback from the Quality Management Department reveals a diverse array of viewpoints, echoing themes present in other studies Zeng, Tian, and Tam (2007), Boiral (2011), Al-Jaghoub et al. (2019), and Alsalamah (2023). Some interviewees voiced dissatisfaction with the depth and regularity of feedback, highlighting concerns about its superficial nature and irregular distribution over time. Conversely, others noted instances of constructive dialogue and structured feedback processes, particularly in performance evaluation. However, a significant proportion (section 6.2.4.1) of participants reported a lack of feedback altogether, underscoring a gap in communication between departments and the need for enhanced feedback mechanisms.

Comparing these findings with prior research offers valuable insights into commonalities and differences across various sectors. The importance of fostering a culture of ownership and involvement among subject supervisors through open communication and feedback mechanisms emerges as a consistent theme. This aligns with the emphasis in previous studies, such as those by Zeng, Tian, and Tam (2007) and Boiral (2011), on the significance of subject supervisor engagement in QMSs implementation. Additionally, parallels can be drawn with research by Al-Jaghoub et al. (2019) and Alsalamah (2023),

which highlight the positive impact of subject supervisor involvement on satisfaction levels and overall performance, albeit in different contexts such as higher education and healthcare.

In addition to the alignment of data in this study with other studies, the current study offers unique insights into specific challenges within the organisation's feedback mechanism within the MOE, such as the inconsistency and superficiality of feedback (section 6.2.4.1). The data gathered highlights the importance of addressing internal feedback processes to optimise subject supervisor engagement and organisational performance. Moreover, the study underscores the need for more structured feedback processes and enhanced communication channels between departments to bridge existing gaps and ensure a comprehensive approach to feedback management.

A specific significance of this study lies in its contribution to the broader discourse on QMSs and subject supervisor feedback. By examining the nuances of feedback mechanisms within the specific organisational context of the Ministry of Education in Oman, the study provides actionable insights for improving feedback processes and fostering a culture of continuous improvement, which whilst situated in this study, could be considered and applied or adapted in a broader global community. Furthermore, the study adds depth to stakeholders' understanding of the challenges and opportunities inherent in implementing QMSs, particularly concerning subject supervisor engagement and communication. Ultimately, by addressing these challenges and leveraging the insights gained from this study, organisations can enhance subject supervisor satisfaction, organisational performance, and the overall effectiveness of QMSs implementation. The next section will provide a more thorough exploration of strategies aimed at improving the implementation of the QMS.

7.6.2   *Suggestions for enhancing the implementation of the QMS:*

Implementing a robust QMS in any educational system is paramount for ensuring effectiveness, efficiency, and continuous improvement (section 1.1) and, within the Oman MOE (section 2.2), adopting international standards such as ISO 9001:2015 underscores a commitment to quality management and organisational excellence. As this study postulates, it is imperative to listen to the voices of stakeholders, in this study, subject supervisors', directly involved in the educational process. Data from the qualitative

findings (section 6.2.4.2) and relevant previous studies that explored below (i.e. Zeng, Tian, and Tam (2007), Boiral (2011), Alsalamah (2023) and Pradeep and Kalicharan (2019) portray approaches to enhance QMS. For example, training and development, communication, technology, feedback and evaluation, promotion, awareness, flexibility, adaptability, and reinforcement strategies will be discussed in the sections below.

7.6.2.1 Training and Development:

The qualitative findings (section 6.2.4.2) from subject supervisors' who participated in this research emphasise the critical role of practical training and a deep understanding of QMS (QMSs) implementation. Specifically, supervisors highlighted that existing training programmes often lack practical application, focusing instead on theoretical knowledge without adequately preparing employees for real-world implementation challenges. This finding aligns with previous studies by Zeng, Tian, and Tam (2007) and Boiral (2011), which underscore the importance of equipping employees with both the knowledge and the skills necessary for effective QMS implementation. Furthermore, subject supervisors pointed out that the current implementation of QMS does not sufficiently address the nuances of training that are essential for the practical application of QMS principles. For example, interviewee (6) in section (6.2.2.2) remarked on responsibilities, addressing this gap, and the subject supervisors suggested a more focused approach to training that integrates detailed implementation strategies. This introduces a new dimension to existing training paradigms by advocating for comprehensive and tailored training programmes. Such programmes should, not only convey theoretical knowledge, but also include practical activities, real-life case studies, and scenario-based learning to ensure that employees are fully prepared to implement QMS effectively.

By incorporating these insights, organisations can design training strategies that more effectively address the real needs of their employees. This approach will bridge the gap identified in previous research, as it highlights the necessity of practical, implementation focused training. Therefore, future research should prioritise the development of training frameworks that combine theoretical and practical elements, ensuring a holistic approach to QMS training and ultimately leading to more successful QMS implementation across various organisational settings.

7.6.2.2 Communication and Technology:

The qualitative findings (section 6.2.4.2) highlight the crucial role of effective communication, encompassing both face-to-face interactions and technological channels, in facilitating the implementation of QMSs. This observation aligns with existing research that underscores the importance of maintaining open communication channels (Alsalamah, 2023; Pradeep and Kalicharan, 2019). Furthermore, the recommendation from the participants to incorporate mobile phone technology (section 6.2.4.2) and relevant applications suggests innovative approaches to enhancing communication within QMS frameworks. Consequently, organisations must integrate traditional face-to-face communication methods with advanced technological tools to improve communication and collaboration among stakeholders. This dual approach is expected to significantly enhance the efficiency and effectiveness of QMS implementation processes.

7.6.2.3 Feedback and Evaluation:

Feedback mechanisms are crucial in improving QMS effectiveness, as highlighted by the qualitative findings (section 6.2.4.2) and from previous studies (Girmanová et al., 2022; Al-Jaghoub et al., 2019). Encouraging employees to contribute feedback and suggestions regarding ISO 9001:2015 implementation fosters a sense of ownership and involvement, promoting open communication and actively seeking input from employees at all levels of the organisation. This approach taps into valuable insights from employees directly engaged in the implementation process, thereby enhancing system accuracy and employee evaluation. Previous research underscores the importance of employee feedback in identifying areas for improvement and increasing the effectiveness of QMS (Zeng, Tian, and Tam, 2007; Boiral, 2011). Employees who feel valued and heard are more motivated to participate actively in ISO 9001:2015 implementation, leading to higher satisfaction levels and improved overall performance (Al-Jaghoub et al., 2019). Furthermore, fostering a culture of continuous improvement and innovation is essential, as feedback mechanisms contribute significantly to these efforts. In various sectors, feedback mechanisms connecting TQM practices to employee satisfaction have proven beneficial. For instance, in healthcare settings, understanding employee perspectives on QMS aids in decision-making processes, enhancing both satisfaction and quality performance (Alsalamah, 2023). Similarly, in educational institutions, feedback is pivotal in sustaining service quality and meeting stakeholder expectations, despite challenges

such as financial constraints and resistance to change (Pradeep and Kalicharan, 2019). Feedback derived from QMS reports offers numerous benefits for employee development within organisations, identifying training needs, encouraging participation, and aligning individual and organisational objectives (Alsalamah, 2023). Additionally, feedback plays a significant role in cultivating problem-solving skills and enhancing process efficiency, contributing substantially to continuous improvement efforts (Girmanová et al., 2022). Therefore, organisations should establish robust feedback mechanisms that solicit input for system improvement and contribute to employee development and performance evaluation, thereby maximising the benefits of QMS implementation. Creating a culture of ownership and involvement among employees through open communication and feedback mechanisms is vital for enhancing ISO 9001:2015 implementation, employee satisfaction, and overall organisational performance across various sectors.

7.6.2.4 Awareness and Promotion:

The specific suggestions for promotional materials (section 6.2.4.2), including posters, brochures, and infographics, present effective strategies for engaging stakeholders and disseminating information about QMS. These creative and visually appealing materials play a critical role in increasing awareness and understanding of QMS among employees and other relevant parties. Raising awareness of QMS is essential for garnering support and participation from stakeholders. This is highlighted by the qualitative findings of this study and corroborated by previous research (Pradeep and Kalicharan, 2019; Alsalamah, 2023). Investing in such promotional materials, not only facilitates communication, but also fosters a more informed and cohesive organisational environment, thereby enhancing the overall effectiveness of QMS implementation.

7.6.2.5 Flexibility and Adaptability:

This emphasis on adaptability is consistent with previous research, which highlights the critical role of flexibility in the successful implementation of QMS (Rohayati and Sari, 2019; Irsyada et al., 2018). The qualitative data in this study (section 6.2.4.2) suggests that flexible approaches to QMS implementation allow organisations to tailor and adjust the system to their specific requirements. This customisation not only enhances the effectiveness of QMS, but also increases its acceptance among stakeholders, thereby contributing to its overall success. The ability to adapt QMS processes to fit organisational

needs is thus pivotal in fostering a more supportive and engaged environment for quality management.

7.6.2.6 Reinforcement Strategies:

Continuous reinforcement and improvement strategies are essential for sustaining QMS implementation efforts over time, as emphasised by both the qualitative findings and previous studies (Girmanová et al., 2022; Al-Jaghoub et al., 2019). The specific suggestions in this study (section 6.2.4.2) for reinforcement strategies, such as quarterly meetings and exchange visits between supervisors, offer practical methods for maintaining momentum and engagement. Therefore, organisations should implement regular reinforcement activities that encourage ongoing learning, collaboration, and improvement, thereby embedding QMS principles into the organisational culture for long-term success.

In conclusion, by integrating the suggestions derived from both qualitative findings and previous studies, the Ministry of Education in Oman, can enhance the implementation of the QMS and realise its full potential in improving organisational performance and effectiveness. These suggestions provide actionable insights for developing comprehensive strategies that address various aspects of QMS implementation, ultimately fostering a culture of quality and continuous improvement within any educational organisation. Moreover, as this study recommends, leveraging the EDU-DMAIC framework, as elucidated in section (8.3.3), can support the action and implementation process.

7.7 Summary:

This chapter consolidates and discusses the quantitative and qualitative findings from Chapters Five and Six, integrating them with the literature review. It comprises six sections, each dedicated to addressing one of the research questions.   The study underscores the importance of tailored training approaches to address challenges identified by participants and suggests strategies for successful QMS implementation aligned with ISO 9001:2015 objectives. The thorough sampling approach and comprehensive coverage of QMS training across subject supervisors are highlighted, along with the positive correlation between awareness and organisational skills. The study also sheds light on challenges within the organisation's feedback mechanism and provides

actionable insights for improving feedback processes and fostering a culture of continuous improvement. The Ministry of Education in Oman can enhance QMS implementation and improve organisational performance by integrating suggestions from qualitative findings and previous studies.

8 Chapter Eight: Conclusion and Recommendations

This final chapter is a synthesis of the conclusions and recommendations derived from the research questions and the data gathered.

The adoption of market-driven reforms in education systems, such as ISO 9001:2015, has been strongly influenced by globalisation, with scholars like Ball (2012) and Ozga (2000) critically examining how neoliberal ideologies increasingly shape educational governance, prioritising efficiency over pedagogical values. While frameworks like TQM and QMS are often framed as tools for improving accountability and competitiveness, critical management studies, such as those by Morley (2003, 2005) and Anderson (2006), clearly highlight how these models may inadvertently lead to bureaucratisation, significantly diminish academic autonomy, and function as mechanisms of control rather than genuinely fostering educational improvement. In Oman, while educational reforms largely incorporate these global frameworks, the government carefully aims to balance economic modernisation with cultural and religious values, as outlined in Oman Vision 2040 (2023), requiring a critical evaluation of how these frameworks meaningfully align with local educational objectives and values.

Moreover, it is rooted in the exploration of subject supervisors' awareness, effectiveness training of the QMS training programme, and organisational skills of the benefits of implementing ISO 9001:2015 as a QMS within the MOE. This chapter comprehensively reviews the research outcomes and their implications for future practices and studies. Furthermore, this chapter draws together and highlights the study's contributions to knowledge, the challenges and limitations of the study and recommendations for practice. It divided into five sections, which are explained below along with a description of the chapter's organisation.

8.1 Chapter Structure:

Figure 33 is a road map that outlines each section.
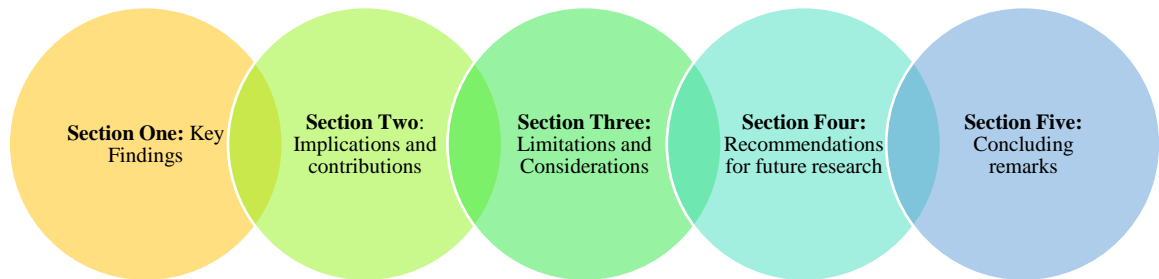
Figure 33 Chapter Eight Structure

The subsequent explanations of Figure 33 offer an outline, presenting a detailed breakdown of the content within each section.

Section One: Key Findings: an overview of the responses to the research questions, including links between the research pillars and demographic data.

The journey of inquiry embarked upon in this study sought to address the fundamental questions:

1. How aware are subject supervisors of the benefits associated with implementing the ISO 9001:2015 QMS?
2. What is the perception of the quality of the training programme on the QMS about the subject supervisors' roles and responsibilities?
3. Does the implementation of ISO 9001:2015 quality management processes impact the organisational skills of subject supervisors?
4. In what ways can the existing policies and procedures for implementing the QMS in the Ministry of Education be modified/improved?

This chapter examines demographic variables and how they interact, thus assessing subject supervisors' awareness of training effectiveness and its impact on their organisational skills. Furthermore, it highlights the complex relationship between implementing ISO 9001:2015, demographic factors, and key research areas.

Section Two: Implementations and Contributions:

Building upon the insights gleaned from the research findings, this section presents a set of implementations aimed at enhancing awareness levels and fostering the effective application of ISO 9001:2015 principles among subject supervisors.
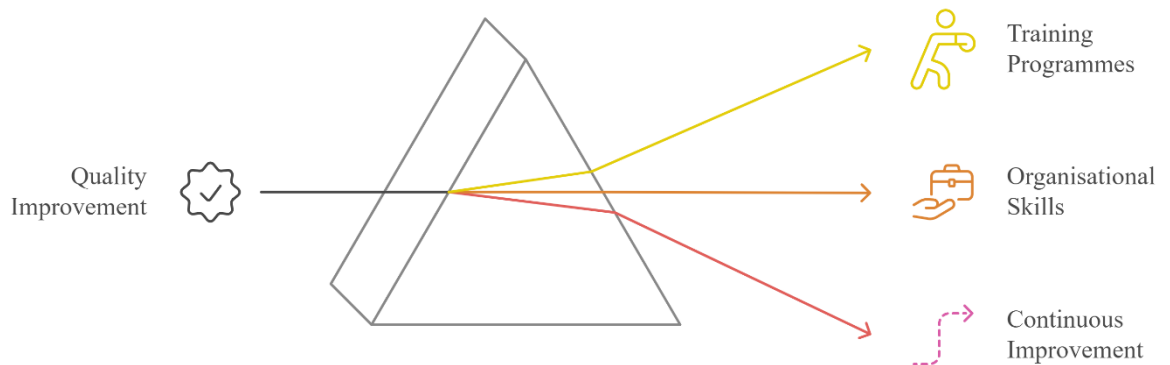
Figure 34 implementation and contributions aspects

Drawing from the research outcomes (Figure 34), recommendations are tailored to address key areas of intervention, including training programmes, organisational skills development, and strategies for promoting a culture of quality and continuous improvement within the Ministry of Education in Oman.

Section Three: Limitations and Considerations

Acknowledging the inherent limitations of any research endeavour is important for its credibility and generalisability. This section critically evaluates the methodological and contextual constraints encountered throughout the study (Figure 35).

Figure 35 Limitations and considerations

By transparently delineating these limitations, as a researcher I seek to provide a balanced perspective on the scope and generalisability of the research findings, thereby informing future research or studies and practice in this domain.

Section Four: Recommendations for future studies:

This section suggests directions for future research based on the knowledge gained from the current study (Figure 36).
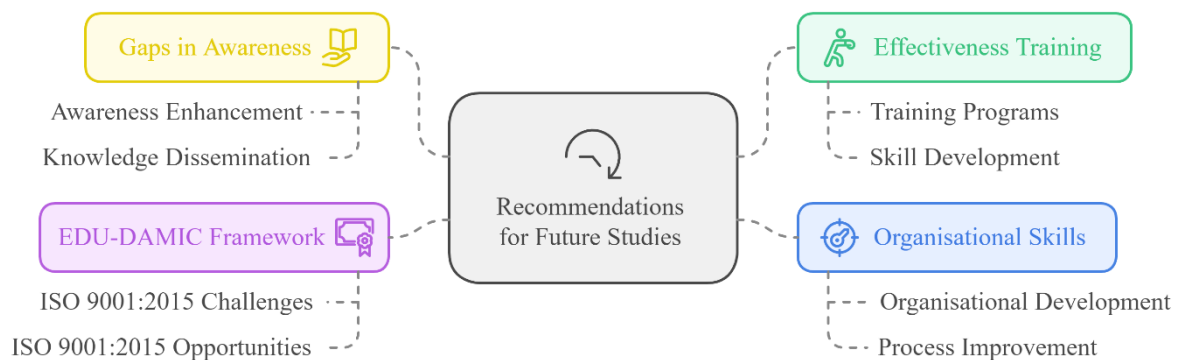
Figure 36 Recommendations for future studies

By identifying gaps in awareness, effectiveness training and organisational skills and opportunities for further exploration, as a researcher, I lay the groundwork for subsequent inquiries into the dynamics of quality management, awareness enhancement, and organisational development within educational contexts. Additionally, the chapter introduces, as a contribution to knowledge, the EDU-DMAIC Framework a novel conceptual framework informed by the research findings which offers a holistic approach to understanding and addressing the challenges and opportunities associated with ISO 9001:2015 implementation in educational settings.

Section Five: Concluding remarks:

In summary, this concluding chapter encapsulates the essence of the research journey, offering a reflective synthesis of the findings, recommendations, limitations, and implications derived from the study. Through a multifaceted exploration of subject supervisors' awareness levels and the impact of ISO 9001:2015 integration, the chapter seeks to inform future practice while advancing our understanding of quality management within educational contexts.

8.2   Section One: Key Findings

The key findings (section 7.5) of the research questions' responses include links between the research pillars and demographic data

8.2.1   *Key findings of the first research question:*

RQ 1: *"How aware are subject supervisors' of the benefits of implementing the ISO 9001:2015 QMS?"*

In pursuing organisational excellence, implementing QMS has become a cornerstone for many enterprises worldwide (section 1.1). Alongside other ISO quality standards, the ISO 9001:2015 provides a benchmark for ensuring consistent quality and continuous improvement among these systems (section 3.2.3.1.2 and section 3.2.4.7).

The key findings from the first research question expand on existing literature by offering new insights into ISO 9001:2015 integration. Specifically, they reveal critical aspects such as awareness of ISO 9001:2015 benefits, the role of employee awareness, the impact on self-reflection and development, and the need for enhanced communication and training, as outlined below.

Studies conducted by Matorera (2018), Rohayati and Sari (2019), Al-Jaghoub et al. (2019), and Balahadia, Dalugdog, and Cabinet (2022) highlight the significant benefits of adopting ISO 9001:2015. These studies collectively show that implementing ISO 9001:2015 can lead to notable improvements in work processes, facilitate effective self-assessment, and drive overall organisational enhancement. Consequently, the consensus from these findings underscores the crucial role of ISO 9001:2015 in boosting employee awareness and enhancing organisational efficiency. By establishing a structured approach to quality management, ISO 9001:2015 refines operational workflows and contributes to a more self-aware and productive workforce.

On the other hand, insights from Zelnik et al. (2012) and Rogala (2016) emphasise the negative repercussions of insufficient employee awareness concerning QMS. Specifically, a lack of awareness can severely undermine the effectiveness of these systems, placing undue burdens on management and staff. Therefore, the importance of employee awareness is accentuated, highlighting that for a QMS to operate successfully

in alignment with ISO 9001:2015 standards, active involvement and understanding from all employees are essential. Without adequate awareness, the potential benefits of the QMS can be compromised, ultimately affecting overall organisational performance. Building on Matorera's (2018) detailed analysis, the discussion highlights how the QMS can significantly influence individual behaviour, knowledge, and skills. It emphasises the importance of self-reflection and personal growth as key factors in enhancing individual and institutional development.

The findings of Matorera's indicate that ISO 9001:2015 plays a pivotal role in enhancing self-awareness and self-assessment among supervisors', thereby supporting ongoing personal and organisational growth. By fostering a culture of self-reflection, ISO 9001:2015 enables continuous development and improvement at individual and organisational levels.

Furthermore, as in other studies, this current study, for example Girmanová et al. (2022), highlights the importance of enhancing internal communication channels and conducting individual employee interviews. The data gathered (section 6.2.1, section 6.2.2) underscores the need for improved communication and training programmes to raise awareness levels among subject supervisors. Effective leadership and communication strategies are therefore critical for achieving successful implementation of ISO 9001:2015. By improving internal communication and providing targeted training, organisations can better align their staff with ISO 9001:2015 standards, leading to more effective quality management and greater organisational coherence.

Through these lenses, this exploration aims to provide a nuanced understanding of the interplay between ISO 9001:2015 adoption, organisational dynamics, and employee engagement. It offers valuable insights for practitioners and scholars alike in pursuing operational excellence and continual improvement.

8.2.2   Key findings of the Second research question:

RQ 2: "*What is the perception of the quality of the training programme on the QMS about the subject supervisors' roles and responsibilities?***"**

The general agreement among participants on the effectiveness of the ISO 9001:2015 QMS in enhancing productivity and performance is well-founded and supported by

previous research (Priede, 2012; Bernardo et al., 2015; Lambert and Ouédraogo, 2008). However, it is essential to recognise that this effectiveness is closely tied to the awareness of those implementing the QMS. The consensus on effectiveness presupposes that participants are aware of the system's principles and applications. Without such awareness, the QMS's effectiveness could be compromised, as the benefits of ISO 9001:2015 can only be fully realised when users understand and correctly apply its guidelines. The studies cited (Priede, 2012; Bernardo et al., 2015; Lambert and Ouédraogo, 2008) reinforce that effective QMS implementation is key to achieving organisational success, underscoring the necessity of awareness for realising the system's full potential. Therefore, the general agreement on effectiveness among participants reflects not only an acknowledgement of the QMS's potential but also an implicit recognition of the importance of awareness in harnessing that potential.

However, there is a notable discrepancy among participants regarding the perceived effectiveness of various training aspects associated with implementing the ISO 9001:2015 QMS. While the system is effective, opinions diverge on the adequacy of training resources, programme length, and overall training effectiveness. This divergence highlights the necessity for tailored training approaches, consistent with Deros et al. (2012) and Psomas (2013) recommendations. Addressing these specific concerns will help ensure that training aligns with ISO 9001:2015 objectives and meets the needs of all stakeholders.

Qualitative findings reveal that implementing the QMS enhances employees' understanding of their roles and improves organisational skills. This observation underscores the importance of role clarity and effective training, as highlighted by previous studies by Dentch (2016) and Psomas (2013). A well-designed training regime is essential for promoting role clarity and enhancing organisational skills, and it is critical for effective coordination and management within the QMS framework. Hence, role clarity and organisational skills development remain integral to the successful application of ISO 9001:2015.

Furthermore, quantitative and qualitative data emphasise the importance of regular evaluation and adjustment of training programmes based on employee feedback to facilitate continuous improvement in ISO 9001:2015 implementation. This perspective aligns with the recommendations by Bernardo et al. (2015) and Rohayati and Sari (2019), which advocate for ongoing evaluation and refinement of training programmes to ensure

their sustained effectiveness. Consequently, regular assessments and modifications are vital for maintaining the relevance and impact of training initiatives.

8.2.3 Key findings of the Third research question:

RQ 3: "*Does the implementation of ISO 9001:2015 quality management processes impact the organisational skills of subject supervisors'?*"

Quantitative analysis reveals a striking consensus among participants regarding the positive influence of ISO 9001:2015 implementation on various organisational competencies. Specifically, participants consistently report improvements in problem-solving, decision-making, teamwork, and communication, attributing these enhancements directly to adopting ISO 9001:2015 standards. These observations align with Neyestani's (2016) study within the construction industry, which similarly identified a clear positive impact of QMS implementation on organisational skills. Thus, the consensus underscores the broad benefits of ISO 9001:2015 in refining key organisational competencies.

Moreover, qualitative insights further illuminate the transformative impact of QMS implementation on organisational skills within educational contexts. Previous studies by Hussein et al. (2017) and Aniskina and Terekhova (2019) support these findings, as participants emphasise the crucial role of time management, teamwork, and effective communication in achieving successful QMS integration. They describe how the structured framework provided by ISO 9001:2015 facilitates better organisation of work, which in turn enhances planning and prioritisation skills. Consequently, the qualitative evidence reinforces that ISO 9001:2015 significantly improves organisational skills by promoting more effective work practices and time management strategies.

8.2.4 Key findings of the Fourth research question:

RQ 4: "*In what ways can the existing policies and procedures for implementing the QMS in the Ministry of Education be modified/improved?*"

The feedback analysis from the Quality Management Department revealed a range of perspectives regarding the quality and frequency of feedback provided. While some participants expressed dissatisfaction, citing issues with the content and regularity of feedback, others noted that the dialogue and structured feedback processes were

beneficial. Consequently, this disparity indicates a potential communication gap within the organisation, particularly in the QMS departments across educational governorates. Previous studies, such as those by Zeng, Tian, and Tam (2007) and Boiral (2011), highlight the importance of engaging subject supervisors' in QMS processes. Indeed, the findings of this study resonate with these studies, demonstrating the critical need to foster ownership and involvement among subject supervisors through effective feedback mechanisms. Nevertheless, the study also reveals specific challenges within the organisation's feedback system, including inconsistency and superficiality. Therefore, these insights contribute valuable depth to the existing literature, emphasising the need for more structured feedback processes and improved communication channels between departments.

Furthermore, subject supervisors' have proposed several suggestions for enhancing the implementation of the QMS. These suggestions cover a range of areas, including training and development, communication and technology, feedback and evaluation, awareness and promotion, as well as flexibility and adaptability. For instance, improvements in training and development could ensure that all participants are well-equipped to engage with the QMS effectively. Likewise, enhanced communication and technology integration could facilitate smoother operations and more efficient information exchange. Focusing on feedback and evaluation might also lead to more responsive and actionable insights. Moreover, promoting greater awareness and flexibility within the system could foster a more adaptable and inclusive approach. Collectively, these suggestions aim to strengthen the overall implementation of the QMS and address existing challenges, thereby leading to a more robust and effective quality management system.

8.2.5 *Key findings of the Demographic data about research pillars (employees' awareness, practical training, organisational skills):*

The quantitative analysis in this study yielded several key findings regarding the impact of demographic variables on participants' perspectives across three sections of a questionnaire: awareness, training effectiveness, and Organisational skills related to QMSs implementation within the Ministry of Education in Oman.

Significant disparities were observed in understanding the QMS, training effectiveness, and organisational skills among subject supervisors based on nationality. Foreign subject supervisors', who drew from their experiences in their home countries or other nations

with prior QMS implementations, demonstrated a deeper understanding of QMS principles. Consequently, this highlights the need for tailored approaches to QMS implementation that consider the diverse experiences of subject supervisors across different nationalities. In contrast, while age did influence awareness levels regarding QMS principles, no significant differences were detected in perceptions of training effectiveness and organisational skills across various age groups. This suggests that age may shape awareness but does not materially affect perceptions of training efficacy and organisational competence. Therefore, age seems to play a role in shaping general awareness but not determining the effectiveness of training or organisational abilities. Gender did not emerge as a significant factor influencing QMS awareness, training effectiveness, or organisational skills among subject supervisors. Indeed, this finding underscores the gender-neutral nature of QMS programmes and reflects progress towards creating inclusive workplaces where all employees can engage with QMS initiatives on an equal footing. Hence, gender appears to have no substantial impact on the engagement with or effectiveness of QMS programmes. Furthermore, participants with 21 to 25 years of experience showed a positive association with training effectiveness, emphasising the importance of regular communication channels in keeping employees informed about QMS implementation progress. Based on experience levels, it was recommended that training programmes be tailored to accommodate varying levels of familiarity and learning preferences among employees. As a result, experience levels significantly influence how effectively training is perceived and utilised. Additionally, educational governorates observed significant differences in QMS awareness, training effectiveness, and organisational skills. These findings underscore the need for tailored strategies to address the specific needs and challenges faced by subject supervisors across different governorates. Therefore, a focus on promoting more equitable QMS implementation outcomes is essential to address these regional disparities.

Finally, the supervisors in the applied sciences emerged as the most represented group, as noted in Chapter 5, because they inherently make up a larger number than other subjects. Therefore, it is natural that their participation rate is dominant. Nevertheless, all subject areas had received QMS training, which underscores the comprehensive coverage of QMS training across all subject supervisors. Thus, while some regions show higher engagement, the QMS training has been broadly disseminated across different subjects.

8.2.6   Key Findings of the Relationship between Research Pillars:

The study investigated the correlation between awareness of the QMS, the effectiveness of QMS training, and the development of organisational skills among subject supervisors.

The analysis revealed a strong and significant direct correlation between awareness of the Quality Management System (QMS) and the development of organisational skills among subject supervisors. Indeed, this finding underscores the crucial role that understanding the QMS plays in shaping the acquisition and enhancement of organisational skills. Consequently, a heightened awareness of QMS principles is essential for improving organisational capabilities. Moreover, the effectiveness of the training programme was identified as a pivotal factor in fostering the development of organisational skills. This observation highlights that, in addition to awareness, practical training is vital for shaping the organisational skill set of subject supervisors. Therefore, while awareness of the QMS is fundamental, the quality and implementation of the training programme also significantly contribute to developing these skills.

Finally, the analysis showed positive correlations between both awareness of the QMS and training effectiveness with organisational skills. Nevertheless, the findings indicated a stronger association between awareness and organisational skills compared to the association between training effectiveness and organisational skills. Thus, while practical training is important, the impact of QMS awareness on organisational skills appears to be more pronounced.

Implementing ISO 9001:2015 within the MOE in Oman represents a substantial commitment to strengthening QMS across higher education institutions. This internationally recognised standard has been shown to significantly enhance operational efficiency, foster a culture of continuous improvement, and increase stakeholder satisfaction within educational contexts (ALHasani, 2020; Kamusoko, 2020). It facilitates the systematic identification and mitigation of risks while promoting alignment with both national educational priorities and international benchmarks (Al Marhoobi and Balcioglu, 2018). In Oman, the Approach–Deployment–Results–Improvement (ADRI) quality cycle—extensively employed by the OAAAQA complements the ISO 9001:2015 framework. Originally developed in Australia and New Zealand, the ADRI model offers a structured methodology that supports regular self-assessment and external review of institutional performance (Paquibut, 2017). It thus provides a robust mechanism for

continuously evaluating educational practices, enabling institutions to systematically assess strategies, monitor outcomes, and implement targeted improvements (Manatos, Sarrico and Rosa, 2015; Carroll and Razvi, 2006).

By integrating ISO 9001:2015 with the ADRI framework, higher education institutions in Oman can not only ensure alignment with international quality assurance standards but also effectively address the unique challenges presented by local educational and administrative contexts (Ozbek, 2020; Al-Najar, 2016). This integration ultimately enhances institutional responsiveness and fosters a strategic approach to achieving sustainable improvement within the higher education sector.

8.3 Section Two: Implications and contributions to the knowledge.

8.3.1 The Implications:

The findings underscore the significance of enhancing subject supervisors' awareness and understanding of quality management processes, which has several practical implications.

Firstly, organisations can leverage ISO 9001:2015 implementation to foster continuous improvement, self-assessment, and organisational effectiveness, thus suggesting how this standard can be applied for practical enhancement. Furthermore, effective communication, leadership support, and targeted training programmes are emphasised in promoting awareness and alignment with organisational goals, thereby stressing the need for these elements in practices. The findings from this study reveal practical implications for educational institutions seeking to enhance organisational efficiency and effectiveness through the QMS adoption. Particularly, this study emphasises the requirement to focus on practical improvements and performance. Several key components must be considered to clarify the practical implications of ISO 9001:2015 implementation in educational institutions (section 3.2.4.7) and (section 3.2.4.8). Firstly, the standard encourages continuous improvement and self-assessment, which are foundational to its effectiveness. The Plan-Do-Check-Act (PDCA) cycle (Clause 2) is a practical tool for organisations to evaluate and improve their practices regularly. As highlighted by González and Huerta-Barrientos (2017) and Parso et al. (2021), educational institutions adopting this cycle can create a structured system for ongoing quality enhancement, thereby aligning daily operations with broader organisational objectives (section 3.2.4.8).

Furthermore, implementing ISO 9001:2015 significantly enhances organisational effectiveness by systematically identifying and addressing areas for improvement. This approach is particularly beneficial for educational institutions, as demonstrated by Dagdag, Bete, and Galiza (2022), whose findings show that quality management structures help align institutional processes with performance goals, ultimately driving improvement in educational outcomes. Additionally, effective communication, leadership support, and targeted training are critical to the success of ISO 9001:2015 in educational contexts. Clause 5 emphasises the importance of leadership accountability and involvement, while Clause 7 focuses on support systems, including training and resource allocation. These elements ensure that staff understand and are committed to organisational goals, reinforcing alignment and cohesion within the institution. By fostering awareness through these measures, institutions can better integrate quality management into their culture and operations (section 3.2.4.9).

 Finally, this study's emphasis on practical improvements and performance aligns with findings from Ambarwati, Rusmiati, and Aisyah (2023), which underscore that structured QMS adoption leads to measurable gains in both educational outcomes and operational efficiency. Therefore, adopting a results-oriented approach to QMS helps institutions meet regulatory requirements and drives continuous enhancement of institutional practices and educational quality.

The observed disparities in QMS engagement based on demographic factors such as Sex (Macalos-Galbo, 2023; Fronda, 2019), Educational Attainment (Macalos-Galbo, 2023), Position/Designation (Macalos-Galbo, 2023), Attendance of Relevant Training Sessions (Macalos-Galbo, 2023), Age (Macalos-Galbo, 2023; Fronda, 2019; Neyestani, 2016), Years of Experience (Macalos-Galbo, 2023; Fronda, 2019), Employment Status (Fronda, 2019), Eligibility (Fronda, 2019), and Work Experience (Murmura and Bravi, 2016) emphasise the need for a customised approach to QMS implementation (section 3.2.5.1.5). By understanding these differences, organisations can develop more effective training programmes and communication strategies that consider diverse learning preferences and backgrounds among subject supervisors. Consequently, this study recommends tailoring QMS initiatives to align with the specific needs of various demographic groups to optimise engagement and learning outcomes. Further, the comprehensive coverage of QMS training for subject supervisors reflects the effectiveness of current training initiatives. However, there is a practical need for

continuous updates to these programmes to ensure they remain relevant and accessible to all employees, promoting ongoing improvement. This approach addresses immediate training needs and reinforces a culture of continuous development in QMS skills, supporting long-term organisational goals. Additionally, the strong link observed between QMS awareness and organisational skills highlights the practical significance of QMS knowledge in enhancing supervisors' performance. This insight underscores the importance of embedding QMS awareness into daily operations, as understanding QMS principles helps supervisors align their actions with organisational goals, thereby improving overall performance. Lastly, the effectiveness of training programmes in developing organisational skills reinforces their critical role in fostering practical competencies among supervisors'. Policymakers and practitioners can apply these findings to design targeted interventions, which focus on both skill-building and performance enhancement, resulting in measurable improvements across the organisation.

8.3.2 *Contributions to the knowledge:*

The contributions to knowledge in this study can be categorised into two primary areas. Firstly, the study makes a significant impact by linking Quality Management Systems (QMS) to various demographic factors, including age, gender, educational governorates, years of experience, subjects of supervision and nationality. These variables, which have not previously been explored about QMS, provide new insights into how demographic diversity influences QMS awareness, training effectiveness, and organisational skills among subject supervisors. This linkage is discussed in detail within sections 3.2.5.1.5, 5.5 part 4, and 7.5.

Secondly, this study offers a notable contribution to the field of QMS within educational contexts—a domain that remains underrepresented in existing research. While substantial QMS literature has focused on sectors such as manufacturing and healthcare, there is a paucity of studies addressing its application within educational institutions, particularly regarding supervisory roles in subject-specific contexts. By investigating the impact of QMS on educational settings, this research fills an essential gap, extending our understanding of how demographic factors can influence QMS effectiveness in fostering subject supervisors' awareness, training outcomes, and organisational capabilities (detailed in sections 3.2.5.1.5 and 3.2.5.4).

This contribution is especially significant because it introduces a fresh perspective on QMS in education. It provides a foundation for policymakers, administrators, and practitioners aiming to implement or enhance QMS frameworks in educational environments. As such, this research paves the way for future studies to examine the intersection of QMS and education further, encouraging the development of tailored approaches for more effective implementation across diverse educational contexts. This work not only advances knowledge but also emphasises the potential benefits of QMS in supporting structured, quality-driven practices in educational institutions.

The primary contribution to academia for the development, acceleration, and empowerment of quality management system applications is the introduction of the EDU-DMAIC model. This model is comprehensively detailed in section 8.3.3 and serves as a framework for improving QMS implementation within educational settings. These contributions not only enhance the theoretical understanding of QMS impacts but also provide practical insights for improving training programmes and organisational effectiveness based on demographic factors.

8.3.3   EDU-DMAIC Framework:

As Best and Neuhauser (2005), Sánchez (2020), and Singh (2023) mentioned, Deming's focus on the dynamic and evolving nature of quality, highlighted in his 1950 lectures, Juran's emphasis on "fitness for use" from 1964, and Crosby's advocacy for "zero defects" from 1979, each offer distinct perspectives that enrich the understanding of quality management (section 3.2.3). These principles apply to manufacturing and can be effectively implemented in service sectors such as education. However, combining with structured approaches like the EDU-DMAIC process (Define, Measure, Analyse, Improve, Control), these insights provide a comprehensive framework for continuous improvement.

By applying Deming's (1900–1993) approach, education can continuously enhance teaching methods and student engagement, while Juran's (1904–2008) focus on planning and control can ensure that courses are designed to meet the specific needs of students and parents. Crosby's (1926–2001) zero-defects methodology can help reduce errors in administrative processes and improve the overall quality of the learning environment. Together with EDU-DMAIC, these quality management philosophies offer a structured

pathway to resolving issues in education and driving sustained improvement (section 3.2.3).

A novel conceptual framework informed by the research findings offers a holistic approach to understanding and addressing the challenges and opportunities associated with ISO 9001:2015 implementation in educational settings. Being accepted to present the Edu-DMAIC framework and to emphasise its potential benefits at the 3rd Middle East Education Thought Leadership Forum in the UK provided an opportunistic platform for the discussion of it (see Appendix (G).

8.3.3.1 EDU-DMAIC: Tailored DMAIC Framework for Educational Quality Management:

An adaptation of the DMAIC methodology (section 3.2.4.3) to the educational field, subsequently termed EDU-DMAIC, is proposed in this study. This adaptation aims to facilitate the implementation of the DMAIC strategy in education by using tools familiar to educators, allowing for a seamless application of the DMAIC phases (section. 3.2.4.3.2). The study focuses on enhancing the organisational skills of subject supervisors', identifying areas for improvement in their abilities, and exploring the significance of integrating a Six Sigma approach (section. 3.2.4.4 and section 3.2.4.5) within the EDU-DMAIC framework as a quality management tool in the education sector. The EDU-DMAIC framework offers significant benefits by improving educational processes, with its application, duration, and tools essential for effective implementation (Figure 37).
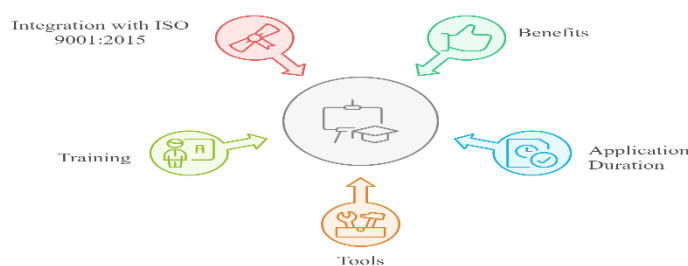
Figure 37 Why to Implement EDU-DMAIC?

 Next, the discussion will explore these benefits, application tools, and the integration of training with ISO 9001:2015.

8.3.3.2 EDU-DMAIC benefits:

A novel concept for future research is the implementation of the EDU-DMAIC framework. This framework proposes applying the DMAIC methodology using educators' tools, thus streamlining the traditional DMAIC phases—defining the problem, measuring, analysing, improving, and controlling. This adaptation of DMAIC to EDU-DMAIC lies in its integration of familiar tools such as pilot studies, interviews, and questionnaires to simplify data collection and its combination with ISO 9001:2015 standards to achieve high and rapid productivity.

8.3.3.2.1 Application Duration:

The EDU-DMAIC framework is designed to shorten the application time of each process, as detailed in the DMAIC literature. The optimal duration for implementing DMAIC in educational settings is varied to improve teaching and learning outcomes significantly (Lopez and Rodriguez, 2018; Qureshi et al., 2013).

By leveraging tools that educators are already accustomed to, such as interviews and questionnaires, the framework reduces implementation time significantly, making it more efficient and user-friendly.

8.3.3.2.2 Application Tools:

The innovative use of familiar research tools is a significant advancement. Educators and subject supervisors frequently use tools like questionnaires and interviews, which means there is no need for additional training on DMAIC-specific tools. Their existing proficiency in these methods reduces the need for costly training by Six Sigma experts and facilitates smoother adoption.

8.3.3.2.3 Training:

The framework's reliance on familiar tools eliminates the need for further training for educators and supervisors', resulting in substantial savings in time and effort. This approach also spares the Ministry the financial burden of training personnel in Six Sigma methodologies, making the implementation more cost-effective.

8.3.3.2.4 Integration with ISO 9001:2015

A distinctive feature of the EDU-DMAIC framework is its integration with ISO 9001:2015 standards. This integration ensures that the framework not only adheres to international quality management principles but also enhances productivity and efficiency. The combination of DMAIC and ISO standards creates a robust framework that can deliver high-quality results swiftly. Additionally, Bewoor and Pawar (2010) put

forward a comprehensive framework at the managerial level, advocating for the integration of measurement, analysis, and improvement phases within a company's QMS/ISO 9001. They emphasised the importance of mapping out the significant connections between these approaches at both macro and micro levels to facilitate their potential integration.

In summary, the EDU-DMAIC framework distinguishes itself by merging DMAIC principles with well-known research tools to the educators and ISO 9001:2015 requirements, thereby minimising effort, time, and training needs. This integration of ISO standards with Six Sigma principles, as highlighted in several studies, promises to deliver more effective, efficient, and high-quality results, marking a significant step forward in educational research and practice.

8.3.3.3   The Procedure for Implementation (Phases and Tools):

Figure 38 EDU-DMAIC Phases

The EDU-DMAIC framework (Figure 38), an adaptation of the traditional DMAIC process commonly utilised in business and manufacturing for quality improvement, stands for Define, Measure, Analyse, Improve, and Control. Applied to educational settings, this framework provides a structured approach to implementing and evaluating new teaching strategies, thereby ensuring continuous improvement and effective educational outcomes, as detailed in (section 8.3.3.2).

Within the educational context, the EDU-DMAIC framework is specifically tailored to systematically enhance teaching methods and student performance in dynamic matter and quick mode. Given the constrained nature of academic semesters in schools and universities, it is imperative to accurately locate and define issues within a limited timeframe, ensuring efficiency and effectiveness in improvement initiatives.

The EDU-DMAIC framework constitutes a systematic, data-informed methodology for driving educational improvement, grounded in the sequential phases of Define, Measure, Analyse, Improve, and Control. Originating from established quality management practices, the framework has been adapted to suit the complexities of educational environments, offering a robust mechanism for addressing organisational and capacity-building challenges. Through its structured approach, EDU-DMAIC facilitates the precise identification of problems, the analysis of underlying causes, the implementation of evidence-based interventions, and the establishment of sustainable enhancements. Within the scope of this thesis, the EDU-DMAIC framework is utilised to address identified deficiencies in QMS training among subject supervisors, serving as a practical application of one of the key findings. This example illustrates how the framework can be operationalised in response to empirical evidence, with the aim of enhancing supervisory effectiveness and fostering greater institutional compliance with quality assurance standards.

8.3.3.4 8.3.3.4 An EXAMPLE: EDU-DMAIC Framework for Addressing the Lack of Training on QMS Programmes among Subject Supervisors

The EDU-DMAIC framework offers a structured and evidence-based methodology for implementing improvements within educational management systems. This framework is particularly useful for addressing organisational and capacity-related challenges identified through empirical research. One key finding of this thesis is the lack of training on QMS programmes among subject supervisors, which has hindered effective implementation and engagement with QMS procedures. By applying the principles of Define, Measure, Analyse, Improve, and Control, educational institutions can systematically tackle this issue to enhance supervisory performance and institutional compliance.

8.3.3.4.1 EDU-Define

In the Define phase, the problem is clearly articulated: subject supervisors lack adequate training in QMS protocols, leading to inconsistent practices, reduced confidence in using QMS tools, and inefficiencies in monitoring and reporting processes. The objective is to develop and implement a targeted training programme to build QMS competency among supervisors, aiming for measurable improvements in knowledge, performance, and standard compliance within one academic semester.

8.3.3.4.2   EDU-Measure

The Measure phase focuses on establishing the current level of QMS understanding and engagement among subject supervisors. Baseline data is collected through pre-training surveys, focus group interviews, and performance audits of QMS-related tasks. This helps quantify the knowledge gap and assess the variability in current supervisory practices.

8.3.3.4.3   EDU-Analyse

In the Analyse phase, data is examined to identify the root causes of the training deficit. Using qualitative analysis tools such as NVivo 12 Pro, interview data is coded to identify themes such as lack of institutional training initiatives, unclear communication of QMS expectations, or limited access to relevant professional development resources. Quantitative data, such as error rates in QMS reports, further substantiates the problem.

8.3.3.4.4   EDU-Improve

The Improve phase involves designing and delivering an intervention based on the findings. This includes a structured QMS training programme tailored to supervisors' roles and responsibilities. Use of blended learning formats (e.g. workshops, e-learning modules, and case-based learning). Development of clear operational guides and job aids aligned with institutional QMS standards. A Fishbone Diagram (Ishikawa Chart) is used to ensure that the training addresses key causal factors, such as lack of awareness, insufficient resources, and inadequate policy clarity.

8.3.3.4.5   EDU-Control

In the Control phase, mechanisms are established to sustain the improvements. These include:

Follow-up assessments to evaluate retention and application of QMS knowledge. Regular refresher training and integration of QMS competence in performance appraisals. A monitoring plan to track improvements in QMS compliance and supervisor confidence over time. This ensures continuous professional development and reinforces a culture of quality across supervisory roles.

By implementing the EDU-DMAIC framework in this context, educational leaders can systematically address critical gaps in QMS training. As evidenced in this thesis, such structured interventions are essential for building institutional capacity and aligning quality management practices with strategic educational goals.

8.4 Section Three: Limitations and Considerations:

8.4.1 Generalisability:

The researcher's decision to focus on the subject supervisors in the MOE in Oman reflects the researcher's effort to delve deeply into a specific organisational context. By concentrating on this sample, the study was able to explore the intricacies of QMS implementation within an educational framework. This targeted approach captured unique insights and nuances that might have been overlooked in more generalised studies. Moreover, the inclusion of subject supervisors in the sample was strategic and beneficial. Subject supervisors' play a pivotal role in overseeing various aspects of educational processes, making them key stakeholders in QMS implementation within educational settings. By centring their research around this group, the study was able to gain firsthand perspectives from individuals directly involved in the implementation process, thereby enriching the depth and relevance of their findings. While it is acknowledged that the findings may not universally apply beyond the MOE, the significance of these insights should not be understated. The study's meticulous examination of QMS implementation within this specific context has provided invaluable knowledge about the factors influencing awareness and organisational skills within educational institutions. These findings serve as a foundation for further research and practical applications within similar governmental organisations worldwide.

In essence, while the study's findings may be context-specific, they represent a significant contribution to the understanding of QMS implementation within educational sectors.

8.4.2 Literature Review:

Indeed, although the variation in the number of relevant studies was not as anticipated, it has nonetheless fulfilled its purpose. The challenges in finding studies specifically addressing QMS about organisational skills required the researcher to investigate individual skills, such as teamwork, time management, decision-making, and prioritisation, as indicators of broader organisational competencies. Additionally, the limited availability of studies on the implementation of QMS within educational settings, concerning its effect on subject supervisors, underscored the necessity of this broader exploration (section 3.2.5).

8.4.3   Data Collection:

The expected responses were 33 participants from each governorate, but as shown in table 30 in the quantitative findings chapter, the responses ranged in the lowest number of 25 from Al-Dakhilia governorate and the highest response in North of Sharqia governorate with 49 participants (section 5.5 part 4).

8.4.3.1   Correspondence system:

Where the questionnaire was officially sent through the approved system for sending official documents to the MOE, which supervisors often see on the official day designated for the completion of office and administrative tasks, the rest of the weekdays are field workdays in which supervisors move between schools to monitor the progress of the educational process. The questionnaire was sent at the beginning of November 2021, and no responses were received until the end of December 2021 and after follow-up conversations with my academic supervisors in the UK and the Technical Office for Studies and Educational Development (TOSD) in the MOE.   Due to the response rate being initially sluggish, a further approach, using social media by the researcher, was used to speed up the questionnaire's publication and application.

8.4.3.2   Reliance on social media:

WhatsApp was used as a social media tool after the approval of the Studies and Development Office in the MOE to distribute the study tool (Appendix B). The challenge in using WhatsApp was being able to contact appropriate people to assist in the process from the researcher's education network, to reach the intended research sample distributed across the overall educational governorates. To address the obstacle of delayed questionnaire distribution, several strategies could be implemented. Firstly, utilising multiple social media platforms would likely enhance outreach efficiency. Additionally, developing a pre-established contact list would streamline communication by ensuring that relevant individuals are promptly accessible. Moreover, involving local coordinators in each educational governorate would facilitate distribution across regions, thereby minimising delays and ensuring timely access to the target sample.

8.4.3.3   Time difference, days, and holidays:

The researcher had to follow up on the matter of distributing the questionnaire, considering that the time difference between the Sultanate of Oman and the United Kingdom was 4⁺ hours. This resulted in the challenge, during the two and a half months of the questionnaire's application, of getting up and starting to work at 4 am, UK time, to follow up on the distribution and application of the questionnaire, with executives/ administrative staff during their official working time in Oman. Moreover, was the difference in holidays at the end of the week between the two countries, vacation periods, and the presence of some religious holidays (Isra and Mi'raj), and official ones that occurred during the implementation period.

8.4.3.4   Logistical and Administrative Challenges:

Since the Sultanate extends geographically and covers a total area of 309,500 km² (11 governorates), it was necessary to reach people at work who would help in applying the questionnaire (a simple random research sample covering all governorates) hence adopting the strategy of using WhatsApp. The role of senior staff, for example managers of supervision departments, heads of departments, and even subject supervisors was crucial in the task of implementing the questionnaire. As reported above, reaching the research sample in each governorate was not without its challenges, as a first team (**executives/ administrative**) was formed to facilitate the process of reaching the required sample in each governorate. Also, even during the response period, the numbers differed from one governorate to another, due to variance in management by the first team in the governorate, working conditions, time difference, and vacation times as the end of the first-semester vacation (first week of February 2022).

8.5   Section Four: Recommendations for future research:

Several recommendations are proposed to augment subject supervisors' understanding of the advantages linked with the implementation of ISO 9001:2015. These suggestions aim to provide actionable steps towards enhancing awareness, effectiveness training, and organisational skills and fostering effective integration of ISO 9001:2015 within the organisational framework.

8.5.1 Tailored training programmes:

Future research could explore the effectiveness of alternative training approaches, such as experiential learning or blended learning models, to address the varying needs and preferences of subject supervisors. Additionally, longitudinal studies could assess the long-term impact of QMS training programmes on organisational performance and employee satisfaction. Comparative studies across different organisational contexts could also provide valuable insights into the transferability of training strategies and their effectiveness in different settings. Besides, compare the effectiveness of different training approaches in enhancing organisational skills to identify best practices for QMS implementation.

8.5.2 Enhanced Communication Channels:

Establishing effective communication channels to disseminate information about QMSs and the integration of ISO 9001:2015 is crucial; consequently, such initiatives would, not only foster engagement and knowledge sharing among subject supervisors' but also build on existing research by highlighting the significance of collaborative learning environments. Furthermore, this research is vital in enhancing the quality of provision, as it equips educators with the necessary tools and understanding to implement quality management practices effectively, ultimately leading to improved educational outcomes.

8.5.3 Leadership Support and Advocacy:

Strong leadership support and advocacy for quality management initiatives are recommended for the promotion of a culture of continuous improvement and a quality-driven mindset throughout the organisation.

8.5.4 Collaborative Approach:

Developing a more collaborative approach is recommended that involves subject supervisors in the planning, implementation, and evaluation stages of quality management initiatives, enhancing their understanding and commitment to ISO 9001:2015 integration.

8.5.5 *Continuous Monitoring and Evaluation:*

Implementation of a system for continuous monitoring and evaluation of subject supervisors' awareness levels and understanding of quality management processes, informing targeted interventions and improvements is therefore recommended.

8.5.6 *Longitudinal studies:*

Longitudinal studies could assess the sustained impact of QMS implementation on organisational skills over time, providing insights into the long-term effectiveness of ISO 9001:2015 initiatives. Additionally, comparative studies across different sectors within MOE could further elucidate the generalisability of findings and identify sector-specific challenges and opportunities, to validate the findings and explore variations in demographic influences on QMS implementation. Besides, longitudinal research could assess the sustained impact of enhanced feedback mechanisms and QMS implementation strategies on organisational performance over time. Likewise, longitudinal studies could be conducted to track changes in QMS awareness, training effectiveness, and organisational skills over time, considering demographic variables/factors.

8.6 Insights from ISO 9001:2015 in Education:

Concluding this extensive academic journey, this chapter provides an in-depth examination of the research conducted on the influence of ISO 9001:2015 as a QMS within the Ministry of Education in Oman. Specifically, it focuses on its impact on subject supervisors' awareness, effective training, and organisational skills. Consequently, this chapter serves as a culmination of the quantitative and qualitative findings. Section 8.6 can be categorised into two parts: Reflections on the researcher's journey (Section 8.6.1.1) and Reflections on the entire thesis (Section 8.6.1.2) (see Figure 39).
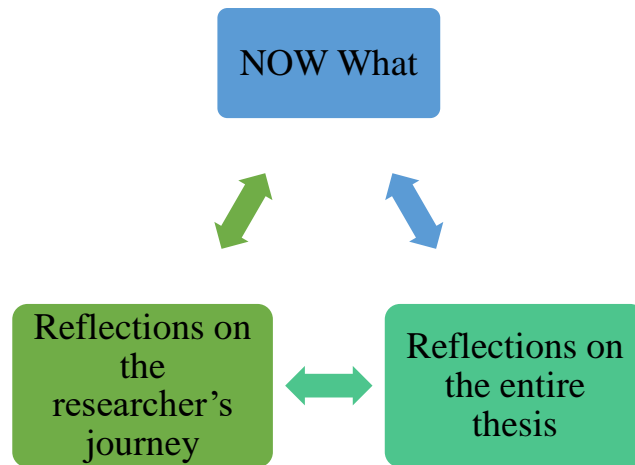
Figure 39 Now what

8.6.1.1   Reflections on the Researcher's Journey

Launching my academic journey as a researcher, I possessed a foundational understanding of thesis writing, including the structure of its chapters and their components. My technical proficiency extended to using statistical software like SPSS and mastering Microsoft programmes. Additionally, I developed strong communication skills, which are crucial for engaging in deep conversations during interviews to extract comprehensible responses for subsequent analysis. My initial knowledge base also encompassed QMSs and the context of Omani education.

8.6.1.1.1   Academic Development

However, this journey has significantly enhanced my skills in various dimensions. Academically, engaging with research paradigms and methodologies felt like navigating new waters. Although I was theoretically versed in these concepts, practically applying them within the scope of social science paradigms and methodologies was a learning process throughout my academic endeavours.

8.6.1.1.2   Personal Growth

Throughout this journey, I encountered obstacles that tested my resilience. The COVID-19 pandemic posed significant logistical challenges, particularly in travelling between the UK and Oman. Furthermore, the length of the research demanded adaptability, especially when changes in my supervisory team occurred. During these transitions, I had to independently deepen my understanding of data analysis. Participating in webinars on data analysis helped refine my skills, turning what could have been a solitary struggle into an opportunity for growth. These experiences collectively strengthened my capacity to navigate complex research processes and refine my analytical capabilities.

8.6.1.2   Reflections on the Entire Thesis

8.6.1.2.1   Key Findings

The review comprehensively summarises the key findings from both quantitative and qualitative analyses, thereby highlighting the significance of ISO 9001:2015 implementation in enhancing subject supervisors' understanding of quality management processes. It underscores the importance of effective training programmes tailored to their specific roles and responsibilities. Furthermore, it emphasises the necessity for enhanced communication channels and robust leadership support to foster a culture of continuous improvement.

8.6.1.2.2   Implications for Practice

The findings carry several implications for educational institutions. Most notably, the research emphasises the need for a collaborative approach involving subject supervisors in all stages of quality management initiatives. Effective training programmes and strong leadership are crucial for fostering a culture of continuous improvement and ensuring the successful implementation of ISO 9001:2015. Moreover, the integration of these elements can lead to a more cohesive and efficient organisational environment.

8.6.1.2.3   Future Research

Future research should explore similar QMS implementations across various contexts and with more diverse samples to assess generalisability and identify unique challenges or benefits. Additionally, examining the long-term impacts of QMS on educational settings and comparing the effectiveness of different training programmes could provide valuable insights into sustainable ISO 9001:2015 implementation. Employing longitudinal methods could be especially beneficial for monitoring how QMS initiatives evolve over time, enabling researchers and practitioners to refine these models based on empirical data. Consistent monitoring and evaluation would thus contribute to a robust understanding of QMS efficacy and inform continuous improvement in education.

8.6.1.2.4   Proposed Framework: EDU-DMAIC

In addition to these reflections, the chapter proposes a new framework of work known as EDU-DMAIC, designed to define, measure, analyse, improve, and control the QMS in educational sectors. The EDU-DMAIC framework distinguishes itself by merging the DMAIC methodology (section 3.2.4.3) with well-known research tools familiar to educators and ISO 9001:2015 requirements. This integration minimises effort, time, and training needs, providing a clear, precise, and concise methodology for identifying and

resolving process deficiencies. Ultimately, this framework aims to enhance the overall quality of education delivery, offering a practical tool for educational institutions striving for continuous improvement.

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Appendices:

8.7 Appendix (A)

CANADIAN GLOBAL TRAINING ACADEMY

Certificate

THIS IS TO CERTIFY THAT

Sumaya Salim Mohammed Al-Nuaimi

HAS COMPLETED THE TRAINING DIPLOMA COURSE IN

TOTAL QUALITY MANAGEMENT

PLACE OF TRAINING :UAE   ISSUING DATE : 23 / 4 / 2016

TRAINING MANAGER
MOHAMMAD ABDULFATTAH

8.8 Appendix (B)

<div align="center">

Questionnaire

</div>

- **Thank you for agreeing to complete the following questionnaire.**

1. Please fill in the questionnaire and choose the word category. Please note that the data provided will be used only for research purposes and will be kept confidential.

2. You are free to withdraw from the questionnaire at any point if you wish to.

3. If you have any questions prior to, during or after the questionnaire please ask via email: Sumaya.al-nuaimi@researcher.staffs.ac.uk.

<div align="center">

Particulars of Respondents (Demographic data)

</div>

Please answer the following by tick mark (√) nearby represented one:

A. **Age:**
1. 21-30
2. 31-40
3. 41-50
4. 51-60

B. **Gender:** □F □M

C. **Nationality:** □ Omani □ Non-Omani (Foreigner)

D. **Year of Experiences:**
   1. 1-5
   2. 6-10
   3. 11-15
   4. 16-20
   5. 21 or more

E. **Educational Governorates:** ....

F. **Subject of Supervision:** ....

	Please choose the word/category that most closely describes your overall opinion of each item.					

Section one: The awareness of subject supervisors of the importance of the ISO 9001:2015 QMS and its implementation

No.	Statement	Totally agree	Agree	Neither agree nor disagree	Disagree	Totally disagree
1	Implementing the ISO 9001/2015 quality management system continuously enhances the supervisor's work					
2	ISO 9001/2015 quality management system contributes to the self-assessment of subject supervisors'					
3	ISO 9001/2015 quality management system improves the work of the whole organisation					
4	ISO 9001/2015 quality management system encourages supervisors to create and innovate.					
5	The subject supervisors are aware of the processes of quality management connected to their supervisor roles					
6	The annual plan of subject supervisors' is linked to the implementation of the ISO 9001/2015 quality management system and is designed to meet its standards					
7	My department uses the supervisors' feedback on the ISO 9001/2015 quality management system to improve its implementation					
8	Implementing ISO 9001/2015 quality management system improves the performance of subject supervisors'					
9	ISO 9001/2015 quality management system empowers					

	subject supervisors to perform their job roles					
10	ISO 9001/2015 quality management system contributes to continuously improving the supervisor's work					
Section Two: The effectiveness of training offered for the ISO 9001:2015 QMS, specifically designed to cater to the roles and responsibilities of subject supervisors within the MOE.**:**						
1	ISO 9001/2015 quality management system contributes to the improvement of the performance of subject supervisors in their roles and responsibilities					
2	Experts have trained you on the ISO 9001/2015 quality management system					
3	ISO 9001/2015 quality management system provides the opportunity to enhance the productivity of subject supervisors'					
4	The Quality Management department holds periodic assessments to improve the processes of the ISO 9001/2015 quality management system.					
5	The training on ISO 9001/2015 quality management system is clear					
6	The training on ISO 9001/2015 quality management system covers all stages which are planning, implementation, and assessment					
7	There is a how-to guide for supervisors' work on ISO 9001/2015 quality management system					
8	The comments of subject supervisors on the ISO 9001/2015 quality management system are considered by the specialists in the quality management department					
9	The length of the training programmes was enough to provide subject supervisors with the knowledge to implement the quality management system in their jobs.					
10	The subject supervisors are trained to use technology to document the					

	processes of the quality management system.					
Section three: The impact of implementing the ISO 9001:2015 QMS on the organisational skills of subject supervisors':						
1	Improves time management skills of subject supervisors.					
2	Provides chances for the supervisors to cooperate.					
3	Contributes to identifying the supervisors' priorities in their duties.					
4	Helps subject supervisors in the situation analysis.					
5	Helps subject supervisors to schedule their job responsibilities according to the requirements of the quality management system.					
6	Develops the subject supervisors' problem-solving skills.					
7	Contributes to the improvement of dialogue and discussion skills among subject supervisors'					
8	Equips the subject supervisors with teamwork skills					
9	Enhances the planning skills of subject supervisors'					
10	Enables the subject supervisors to think creatively in developing their professional performance					

Please leave your email if you are willing for the researcher to contact you on the research topic, for   further discussion…… …….

8.9   Appendix (C)

Interview

1. Is the Ministry of Education keen on spreading the culture of quality and practically applying its principles at the level of all units in the institution? Explain how this is done.

2. What role or practices do you participate in to implement the quality control system in the Ministry of Education?

3. What is the role of the training programmes you received in changing your convictions/attitudes about the quality control system?

4. Did the field application of the training programmes contribute to developing the organisational skills of subject supervisors? Explain that.

5. How are the results of the quality control evaluation dealt with in developing procedures for implementing the entire system's operations?

6. What learning opportunities and training programmes to improve the organisational skills of employees should the Ministry of Education provide from your point of view?

7. What are your suggestions for improving the policies and procedures for implementing the quality control system in the Ministry of Education?

8.10   Appendix (D)

<u>Consent Form /</u>

<u>Participant Information Sheet (interview)</u>

(Subject Supervisors')

Title of Research Project:

Impact of Quality Management System ISO9001:2015 on Subject Supervisors' Organisational Skills in the Ministry of Education in Oman

Researcher:

Sumaya Salim Mohammed Al-Nuaimi

University /faculty:

Staffordshire University (Institute of Education)

Invitation:

I invite you to consent to become part of this research study. As a researcher, I am obligated to explain to you why I am implementing this research and what it involves if you agree to participate. Kindly, read the following enclosed sheets carefully, then consider whether you would like to take part.

What is this study about?

The title of the present research is:

"Impact of Quality Management System ISO9001:2015 on Subject Supervisors'
Organisational Skills in the Ministry of Education in Oman"

Aim:

To explore, from the lens of subject supervisors', the implementation of the ISO 9001:2015 QMS in the Ministry of Education in Oman and, as appropriate, make recommendations for improvement.

Objectives:

1.   Understand the awareness of subject supervisors about the benefits of implementing ISO 9001:2015.

2.   Determine the perception of subject supervisors regarding the quality of the training programme on the QMS about their roles and responsibilities.

3.   Evaluate the impact of implementing ISO 9001:2015 quality management processes on the organisational skills of subject supervisors.

4.   Identify and propose modifications or improvements to the existing policies and procedures for implementing the QMS in the Ministry of Education.

Research Questions:

In relation to the aim and the research objectives, the research questions are:

1. How aware are subject supervisors of the benefits associated with implementing the ISO 9001:2015 QMS?

2. What are subject supervisors' perceptions about the QMS training programme, in relation to their roles and responsibilities?

3. Does the implementation of ISO 9001:2015 QMS impact the organisational skills of subject supervisors?

4. In what ways can the existing policies and procedures for implementing the QMS in the Ministry of Education be modified/improved?

Why have I decided to do this?

I enrolled in a professional training programme in quality management, which enlightened me as to how business and educational fields can merge easily through the

application of models such as DMAIC. I recognised that the dynamic procedures inherent in such models could be used to solve issues simply and systematically.

Therefore, your opinions are important to me. I would like to know about your own experience of quality management implementation in the supervisory field and how its contexts could improve the current process as well as your organisational skills.

What does it involve for you?

Involvement in the project is voluntary and, as a participant, you are free to withdraw your consent at any time and to withdraw any unprocessed data previously presented.

First, an electronic questionnaire will be distributed among those participating in the research sample through the training centre in each educational governate selected to participate in the research via a formal correspondence. Once it reaches you, as a supervisor, you will complete it, which will take you 15–20 minutes approximately. The responses you provide in the questionnaire will remain anonymous. At the end of the questionnaire, you will be asked if I can contact you again in the future, which is decided by the questionnaire results.

Then, some of you will be contacted to attend an interview in a comfortable room at the training centre of your educational governate. I will introduce myself and hand you a consent form. Once you have read this information sheet, you will sign the consent form to certify that you consent to the interview being recorded and a transcript is produced. I will analyse the transcript of the interview.

Access to the interview transcript will be limited to me and my Ph.D. supervisors as part of the research process. Moreover, any summary interview content and direct quotations from the interview that are made available through academic publications or other academic outlets will be anonymised so that you cannot be identified. Care will also be

taken to ensure that other information in the interview that could identify you is not revealed.

Ultimately, the actual recording will be destroyed within 12 months of the successful completion of the project, within GDPR guidelines.

Are there any risks?

Participation in this study is completely optional. If you decide not to participate, there will not be any negative consequences. Please be aware that if you do decide to participate, you may stop participating at any time and you may decide not to answer any specific question. Also, no personal risks or disadvantages are involved in taking part in the research; neither the questionnaire nor the interview will involve discomfort or harm.

Moreover, there are no risks and/or discomfort that can reasonably be expected as a result of participating in this study. Before you participate, you will sign the consent form to show that you have freely decided to be involved in the study as a participant. Finally, this research has undergone full ethical scrutiny, and all procedures have been approved by the School of Life Sciences and Education at Staffordshire University, UK.

What are the benefits of participating in the study?

It will be a benefit to be able to share the project results with the quality management administration office at MOE, to influence change. Another benefit is that participants will be provided with a copy of the study results upon request.

Will I be identified in the report?

You will not be identified by name when information is collected and analysed or in any findings that come from the study. Participation in this study is completely voluntary. You may choose not to participate at all or to withdraw your participation and data from the study at any time. Your participation will be kept confidential to the largest extent. In

addition, the information collected from the interviews and the questionnaire will be kept private and confidential and will not be shared with the main quality management office or the training centre or anybody else. I will report the results of the study in my Ph.D. thesis, in academic journal articles, and conference presentations, while maintaining confidentiality relating to the names of the participants in this study. The data collection, analysis, and write-up will be coded in such a way as to secure the anonymity of the participants. Follow-up interview recordings, transcripts, and hard copies will have a code number and will be saved in my password-protected computer and a locked place until after the interviews have been transcribed when only I will have access to them.

General Data Protection Regulation 2018 (GDPR)

Your data will be processed under the General Data Protection Regulation 2018 (GDPR). The data controller for this project will be Staffordshire University. You can provide your consent to use your data in this study by completing the consent form provided to you. You have the right to access information held about you. Your right of access can be exercised under the GDPR. I have been through Staffordshire University's ethical approval process, and I will be dealing with all the requirements. You also have other rights including rights of correction, erasure, objection, and data portability. If you wish to complain to the Information Commissioner's Office, please visit www.ico.org.uk.

FURTHER INFORMATION

This investigation will be undertaken as part of completing a Ph.D. at Staffordshire University. If you have any questions regarding this study, please contact me via email – sumaya.al-nuaimi@research.staffs.ac.uk – and I will be happy to discuss any questions you may have. Alternatively, if you have any concerns about the study, you can contact my supervisor, Dr. Lynn Machin, at L.B.Machin@staffs.ac.uk.

Thank you so much for reading this information sheet. I hope you will find it an interesting experience.

Your signature as interviewee: …………………………………………………

8.11 Appendix (E)

استبيان

- **شكرا لموافقتك على استكمال الاستبانة**

4. يرجى ملء الاستبانة واختيار الكلمة / الفئة المناسبة. يرجى ملاحظة أن البيانات المقدمة ستستخدم فقط لأغراض البحث وستبقى سرية.

5. أنت حر في الانسحاب من الاستبانة في أي وقت إذا كنت ترغب في ذلك.

6. إذا كانت لديك أي أسئلة قبل الاستبانة أو أثناءه أو بعده، فيرجى طرحها عبر البريد الإلكتروني:

<table>
<tr>
<td colspan="7">الرجاء اختيار الكلمة / الفئة التي تصف بشكل وثيق لرأيك العام لكل عنصر</td>
</tr>
<tr>
<td colspan="7">محور المعرفة والفهم: يقصد به فهم ووعي مشرفي المواد بأهمية تطبيق نظام ضبط الجودة ISO 9001/2015:</td>
</tr>
<tr>
<td>غير موافق بشدة</td>
<td>غير موافق</td>
<td>محايد</td>
<td>موافق</td>
<td>موافق بشدة</td>
<td>البند</td>
<td>م</td>
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<td></td>
<td>يؤدي تطبيق نظام ضبط الجودة ISO 9001: 2015 إلى التحسين المستمر في العمل الإشرافي.</td>
<td>1</td>
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<tr>
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<td></td>
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<td></td>
<td>يساهم نظام ضبط الجودة ISO 9001: 2015 في التقييم الذاتي لمشرفي المواد.</td>
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<td>يطور تطبيق نظام الجودة ISO 9001: 2015 عمل المؤسسة بأكملها</td>
<td>3</td>
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<tr>
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<td></td>
<td></td>
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<td></td>
<td>تشجع عمليات ضبط الجودة ISO على مشرفي المواد 2015 :9001 الإبداع والابتكار.</td>
<td>4</td>
</tr>
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<td>يوجد وعي لدى مشرفي المواد بأهمية ISO 9001: 2015 بعمليات ضبط جودة لمهامهم الإشرافية.</td>
<td>5</td>
</tr>
<tr>
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<td></td>
<td></td>
<td>ترتبط الخطط السنوية لمشرفي المواد بتنفيذ لنظام ISO 9001: 2015 ضبط الجودة ومصممة لتتناسب مع معاييرها.</td>
<td>6</td>
</tr>
<tr>
<td></td>
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<td>يستفيد القسم الذي أعمل فيه من ملاحظات المشرفين حول نظام ISO 9001: 2015 لتطوير تطبيق عمليات ضبط الجودة.</td>
<td>7</td>
</tr>
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<td>يؤدي تطبيق عمليات نظام ضبط الجودة ISO9001 إلى تطوير 20015 : أداء عمل مشرفي المواد.</td>
<td>8</td>
</tr>
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<td>يعمل تطبيق نظام ضبط الجودة ISO 9001: 2015 على تمكين مشرفي المواد من القيام بمهام عملهم الوظيفية</td>
<td>9</td>
</tr>
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<td>تساهم عمليات ضبط الجودة ISO 9001: 2015 على إحداث تحسين مستمر في العمل الإشرافي.</td>
<td>10</td>
</tr>
<tr>
<td colspan="7">محور التدريب: ويقصد بها فرص التعلم والتدريب التي تلقاها مشرفو المواد على عمليات نظام ضبط الجودة ISO 9001/2015 بناءً على مسؤولياتهم وواجباتهم:</td>
</tr>
<tr>
<td>موافق بشدة</td>
<td>غير موافق</td>
<td>محايد</td>
<td>موافق</td>
<td>موافق بشدة</td>
<td>البند</td>
<td>م</td>
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<td></td>
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<td>ساهم التدريب على نظام ضبط الجودة ISO 9001: 2015 على قيام مشرفي المواد بمسؤولياتهم وواجباتهم الوظيفية بشكل أفضل</td>
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<td>يتم تدريب مشرفي المواد على نظام ضبط الجودة ISO 9001: 2015 على أيدي مختصين في النظام.</td>
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<td>يتيح التدريب على نظام ضبط الجودة ISO على رفع 2015 :9001 إنتاجية مشرفي المواد.</td>
<td>3</td>
</tr>
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<td></td>
<td>تجري مديرية ضبط الجودة تقييمًا دوريا لتحسين عمليات ضبط الجودة ISO 9001: 2015.</td>
<td>4</td>
</tr>
</table>

					البند	م
					يتسم التدريب على نظام ضبط الجودة ISOبالوضوح 9001: 2015	5
					يتناول التدريب على نظام ضبط الجودة ISO 9001: 2015مراحل وخطوات التطبيق بدءا بالتخطيط، فالتنفيذ، فالتقييم.	6
					يوجد دليل استرشادي لتطبيق نظام ضبط الجودة ISO 9001: 2015 في مجال عمل مشرفي المواد	7
					يتم الأخذ بملاحظات مشرفي المواد حول نظام ضبط الجودة ISO 9001: 2015 من قبل المختصين في قسم ضبط الجودة.	8
					تتسم فترة التدريب بأنها كافية لإلمام مشرفي المواد وتمكينهم من تطبيق عمليات ضبط الجودة في مجال عملهم.	9
					يتم تدريب مشرفي المواد على استخدام التكنولوجيا في توثيق عمليات نظام ضبط الجودة.	10

محور التطبيق: ويقصد به أثر تطبيق عمليات ضبط الجودة ISO 9001: 2015 على المهارات التنظيمية لمشرفي المواد:

موافق بشدة	غير موافق	محايد	موافق	موافق بشدة	البند	م
					يحسن من مهارة إدارة الوقت لدى مشرفي المواد	1
					يتيح فرص التعاون لدى مشرفي المواد بعضهم البعض.	2
					يساهم في تحديد أولويات مهام وأعمال المشرفين.	3
					يساعد على مهارة تحليل المواقف لدى مشرفي المواد.	4
					يساعد مشرفي المواد على جدولة مهامهم الوظيفية تبعا لمتطلبات نظام ضبط الجودة.	5
					يعمل على تنمية مهارات مشرفي المواد في حل المشكلات.	6
					يساهم في تطوير مهارة إدارة الحوار والمناقشة بين مشرفي المواد	7
					يكسب مشرفي المواد مهارة العمل في فرق. (العمل الجماعي)	8
					يحسن من المهارات التخطيطية لدى مشرفي المواد	9
					تُمكّن مشرفي المواد من التفكير بشكل ابداعي في تطوير أدائهم المهني.	10

8.12 Appendix (F)

docs.google.com/forms/d/1Mn6uYWxqGtzKqipZtBDXltckUA1WlBQFAFRCyBM4lls/edit

DMAIC

الأسئلة

يؤدي تطبيق نظام ضبط الجودة 2015 :9001 ISO إلى التحسين المستمر في العمل الإشرافي. *

○ أوافق بشدة

○ أوافق

○ صحيح لحد ما

○ لا أوافق

○ لا أوافق بشدة

يساهم نظام ضبط الجودة 2015 :9001 ISO في التقييم الذاتي لمشرفي المواد. *

○ أوافق بشدة

8.13 Appendix (G)

<div dir="rtl">

اسئلة المقابلة:

أ. أنظمة ضبط الجودة (QMS)

1. هل وزارة التربية والتعليم تحرص على نشر ثقافة الجودة وتطبيق مبادئها بشكل عملي على مستوى جميع الوحدات بالمؤسسة؟

وضح كيف يتم ذلك

2. ما الدور أو الممارسات التي تشارك بها لتطبيق منظومة ضبط الجودة في وزارة التربية والتعليم؟

ب. المهارات التنظيمية:

a. تغيير في الاتجاهات:

1.ما دور البرامج التدريبية التي تلقيتها في تغيير قناعاتك\ اتجاهاتك حول نظام ضبط الجودة؟

b. المعرفة والمهارة:

1. هل ساهم التطبيق الميداني للبرامج التدريبية على تطوير المهارات التنظيمية لدى مشرفي المواد؟ وضح ذلك.

</div>

ج. <u>سياسات التقويم:</u>

أ. ما مقترحاتك لتحسين السياسات والإجراءات الخاصة بتنفيذ نظام ضبط الجودة في وزارة التربية والتعليم؟

ب. كيف يتم التعامل مع نتائج تقييم ضبط الجودة في تطوير إجراءات تطبيق عمليات النظام بأكمله؟

د. <u>السياسات المتعلقة بتعلم الموظفين وتطويرهم.</u>

1. ما فرص التعلم وبرامج التدريب لصقل مهارات الموظفين التنظيمية التي يجب أن تقدمها وزارة التربية والتعليم من وجهة نظرك؟

8.14   Appendix (H)

8.15 Appendix (I)

10/9/2023

Subject: Confirmation of participation in 3rd Middle East Education Thought Leadership Forum in UK

Dear Sumaya Al-Nuaim,

I am writing on behalf of Gulf Conferences Ltd the official organizer of the 3rd Middle East Education Thought Leadership Forum 22-23 November Millennium Hotel Gloucester Road London, to confirm that you been selected as a speaker at the event, to present the paper:

"Analysing Subject Supervisors' Skills in the Quality Management System Using Six Sigma EDU-DMAIC Strategy (MoE Oman)"

Congratulations!

As you are a full-time student, we can offer to waive the registration fee of £750 and anticipate that your university will provide addition support with respect to your travel and accommodation.

We look forward to welcoming you in London for your participation in the conference.

It is our expectation that delegates will attend the two days of the conference, benefit from the entire experience. In addition to your own contribution, we may request that you participate in an expert panel or moderate a session. If that is the case, a separate request will be sent.

Please ensure that you submit the following requirements:

1. A head shot photograph.
2. A short biography (max 250 words)
3. A digital copy of your presentation slides (by November 12th, 2023)

Please visit the website www.gulfconferences.co.uk for further details about the conference.

Should you require any additional information or documentation, please do not hesitate to contact (dr.msani@gulfconferences.co.uk).

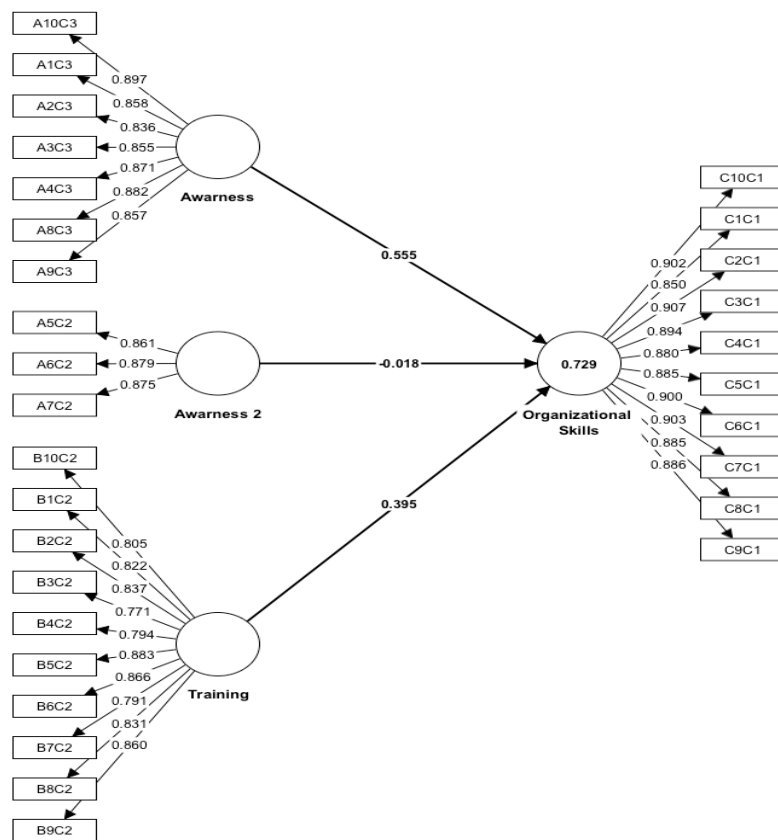Warm regards,

Yours sincerely,

Abdelkhalig Mohamed
CEO, Gulf Conferences

Gulf Conferences Alexandria Road| London| W130NR| Tel: + 44 203 5977034 www.gulfeducation.co.uk Registration Number 8460531. Registered in England

8.16 Appendix (J)

8.17 Appendix (K)

RESEARCH ETHICS

Proportionate Review Form

The Proportionate Review process may be used where the proposed research raises only minimal ethical risk. This research must: focus on minimally sensitive topics; entail minimal intrusion or disruption to others; and involve participants who would not be considered vulnerable in the context of the research.

PART A: TO BE COMPLETED BY RESEARCHER

Name of Researcher:	SUMAYA SALIM MOHAMMED AL-NUAIMI
School	LIFE SCIENCES AND EDUCATION

Student/Course Details (If Applicable)		
Student ID Number:		18024618
Name of Supervisor(s)/Module Tutor:		MACHIN Lynn HINDMARCH Duncan
PhD/MPhil project:	☒	
Taught Postgraduate Project/Assignment:	☐	Award Title:
Undergraduate Project/Assignment:	☐	Module Title:	SUGGESTED NEW TITLE "Crafting Excellence: Impact of Quality Management System ISO9001:2015 on Subject Supervisors' Organisational Skills in the Ministry of Education in Oman (Case Study)

Project Title:	Does the use of DMAIC analysis of six-sigma method improve organizational skills in Quality Management of subject supervisors in the Ministry of Education in Oman?
Project Outline:	The Ministry of Education (MOE) established the project of the Quality Management (Q.M.) System ISO 9001/2008 which was launched in an international tender that was awarded to the Principle Management Consulting Company. The implementation of the project, which lasts eighteen months, started from May 2012 to November 2013. During this period, the departments of Planning, Quality Control and Affairs Administrative and their counterparts in the educational governorates of external auditing obtained the international accreditation certificate ISO 9001/2008 as a first stage. The project is based on ensuring that the services provided by the two directorates (General Directorate for Planning and Quality Control And the General Directorate of Administrative Affairs) comply with the requirements of the standard, in a way that achieves the satisfaction of the beneficiary represented in government schools and special needs education schools. In 2016 the second stage was launched, which focus on the qualification of all structural divisions of the Ministry of Education to implement a quality management system following the requirements of ISO 9001 by its latest release 2015, and the project includes three basic stages: the preparation, the evaluation and diagnostic stage, and the documentation stage and each stage have goals and outputs that can be evaluated through related indicators. The implementation of ISO 9001:2015 reached the Human Resources

University Research Ethics Committee (February 2018)

How aware are subject supervisors of the benefits associated with implementing the ISO 9001:2015 QMS? What are Subject supervisors' perceptions about the QMS training programme, in relation to their roles and responsibilities? Does the implementation of ISO 9001:2015 QMS impact the organisational skills of subject supervisors? In what ways can the existing policies and procedures for implementing the QMS in the Ministry of Education be modified/Improved?	Development departments in the directorate in all educational governorates and most of the employee in this directorates are subject supervisors. Moreover, several workshops applied in all educational governates to ensure from the ISO 9001:2015 implementation and its process were probably embedded. Besides, the subject supervisors are the linkage between the educational field (school principals, teachers and students) and the administrative office, they are a turning point in applying ISO 9001:2015, but they feel are imposed to apply Q.M. tools due to their heavy responsibilities. For that, and as a researcher aiming to enable them to implement Q.M. tools to support the implementation of it in the MOE. And, to ease the implementation process, I aim to enable them to implement Q.M. tools by applying DMAIC analysis in Six Sigma (6 σ) to improve organization skills of subject supervisors in MOE in Oman. The concept of Six Sigma (6 σ) originated in the 1980s as Motorola, which got excited about the concept of zero defects. The application of Six Sigma (6 σ) starts with the identification of a problem, and the defining of a project to counteract or alleviate that problem. The methodology of six sigma is offered by using DMAIC analysis, which refers to Define, Measure, Analyze, Improve and Control. Practically, 6σ methodology minimize the gap by DMAIC analysis (LeMahieu, Nordstrum and Cudney, 2017), Moreover, that's will enhance the Omani educational field with evidence-informed research relating to Q.M. models; specifically, those relating to DMAIC analysis. Finally, my research questions: 1- Does the DMAIC in a research-informed way improve the organisational skills of Subjects' Supervisors in MOE in Oman? 2- How can the organizational skills of subjects' supervisors abilities be developed using DMAIC of Six Sigma?
Give a brief description of participants and procedure (methods, tests etc.)	1-Participants: subjects' supervisors in MOE 2-Sample size: 200 subjects' supervisors 3-Demography: 4 out of 11 educational regions will be chosen to implement the research tools. They are the highest number of subject supervisors which represent a sufficient proportion research portion of the population. 4-Research tools: 1) questionnaire 2) interview 5-Procedure: Firstly, In the define phase from DMAIC, need to determine which actual features in subject supervisors' organizational skills need to be evaluated. Secondly, In the beginning, the training department in i.e. Al-Buraimi, my educational governorate, will inform the central training department in the capital, i.e. Muscat about my study. Following that step and after their replying, they will be provided with the original copy of the questionnaire which will be sent through the corresponding system to be distributed electronically, to the chosen educational regions. After that, all responses will be collected automatically (Define step from DMAIC analysis). This phase, measure from DMAIC, proposes the subject supervisors Indicator of organizational skills, to measure the effectiveness of each attribute by converting the results of Likert's 5-point rating-scale questionnaire. So, a statistic program will be used, mainly the SPSS, to find out the results. In the analysis phase, an Ishikawa Chart i.e. fish-bone diagram will be used to analyse whether the possible factors causing the lack understanding of implementation for organizational skills with subject supervisors in QM.

University Research Ethics Committee (February 2018)

	In the improve phase from DMAIC, Related factors will be clear after the previous step, the researcher will provide tips for improvement in the organizational skills of subject supervisors. A quantitative interview will be applied for a selective number out of total, 30 out of 200, from different educational governorate, 4-5 participants will be involved from each educational governate, maximum time to apply the interview will be 20 minutes for each. Permission needs to be applied to set the interviews. First, at the end of the questionnaire, the examined sample will be asked if they like to contribute in further contact with the researcher, by phone, video calls, or face to face interview. Second, the main training department should be informed, to ease implementing the interview if it will be face to face. In the control phase from DMAIC, Quality management department in the Ministry of Education, i.e. central department in the capital in Oman will be provided with results, however, they must return to the Measure and Analysis phases, after a while, to verify the effectiveness of these improvements.		
Expected Start Date:	06/09/2020	**Expected End Date:**	01/ 07/2023

Relevant professional body ethical guidelines should be consulted when completing this form.

Please seek guidance from the School Ethics Coordinator if you are uncertain about any ethical issues arising from this application.

There is an obligation on the researcher and supervisor (where applicable) to bring to the attention of the School Ethics Coordinator any issues with ethical implications not identified by this form.

Researcher Declaration

I consider that this project has no significant ethical implications requiring full ethical review	☒

I confirm that:		
1.	The research will NOT involve members of vulnerable groups. Vulnerable groups include but are not limited to: children and young people (under 18 years of age), those with a learning disability or cognitive impairment, patients, people in custody, people engaged in illegal activities (e.g. drug taking), or individuals in a dependent or unequal relationship.	☒
2.	The research will NOT involve sensitive topics. Sensitive topics include, but are not limited to: participants' sexual behaviour, their illegal or political behaviour, their experience of violence, their abuse or exploitation, their mental health, their gender or ethnic status. The research must not involve groups where permission of a gatekeeper is normally required for initial access to members, for example, ethnic or cultural groups, native peoples or indigenous communities.	☒
3.	The research will NOT deliberately mislead participants in any way.	☒
4.	The research will NOT involve access to records of personal or confidential information, including genetic or other biological information, concerning identifiable individuals.	☒
5.	The research will NOT induce psychological stress, anxiety or humiliation, cause more than minimal pain, or involve intrusive interventions. This includes, but is not limited to: the administration of drugs or other substances, vigorous physical exercise, or techniques such as hypnotherapy which may cause participants to reveal information which could cause concern, in the course of their	☒

University Research Ethics Committee (February 2018)

	everyday life.		
6.	The research **WILL** be conducted with participants' full and informed consent at the time the study is carried out:		YES ☒
	• The main procedure will be explained to participants in advance, so that they are informed about what to expect.	☒	
	• Participants will be told their involvement in the research is voluntary.	☒	N/A ☐
	• Written consent will be obtained from participants. *(This is not required for self-completion questionnaires as submission of the completed questionnaire implies consent to participate).*	☒	
	• Participants will be informed about how they may withdraw from the research at any time and for any reason.	☒	
	• For questionnaires and interviews: Participants will be given the option of omitting questions they do not want to answer.	☒	
	• Participants will be told that their data will be treated with full confidentiality and that, if published, every effort will be made to ensure it will not be identifiable as theirs.	☒	
	• Participants will be given the opportunity to be debriefed i.e. to find out more about the study and its results.	☒	
7.	A risk assessment has been completed for this research project		YES ☐ N/A ☒

If you are unable to confirm any of the above statements, please complete a **Full Ethical Review Form.** If the research will include participants that are patients, please complete the Independent Peer Review process.

8. Information and Data
Please provide answers to the following questions regarding the handling and storage of information and data:
a) How will research data be stored (manually or electronically)?   1- Electronically: will be password protected.
b) How is protection given to the participants (e.g. by being made anonymous through coding and with a participant identifier code being kept separately and securely)?   The questionnaire will be given a code for each participant
c) What assurance will be given to the participant about the confidentiality of this data and the security of its storage?   Uses of research purposes only
d) Is assurance given to the participant that they cannot be identified from any publication or dissemination of the results of the project?   YES, should clarify each data collection type (e.g. In the questionnaire, will be mentioned at the beginning in each header)

University Research Ethics Committee (February 2018)

e) Who will have access to this data, and for what purposes? Researcher (me), my supervisors
f) How will the data be stored, for how long, and how will it be discarded? Data will be destroyed within 12 months of the successful completion of the project with GDPR guideline.

Supporting Documentation

All key documents e.g. consent form, information sheet, questionnaire/interview schedule are appended to this application.	☒

Signature of Researcher:	Sumaya Salim Mohammed Al-Nuaimi	Date:	22/05/2020

NB: If the research departs from the protocol which provides the basis for this proportionate review, then further review will be required and the applicant and supervisor(s) should consider whether or not the proportionate review remains appropriate. If it is no longer appropriate a full ethical review form MUST be submitted for consideration by the School Ethics Coordinator .

Next Step:

STUDENTS: Please submit this form (and supporting documentation) for consideration by your Supervisor/ Module Tutor.

STAFF: Please submit this form to your Head of Department or a Senior Researcher in your School. Once they have reviewed the form, this should be forwarded to the Research Administrators in RIIS (ethics@staffs.ac.uk) who will arrange for it to be considered by an independent member of the School's College of Reviewers .

PART B: TO BE COMPLETED BY SUPERVISOR/MODULE TUTOR (If student) OR Head of Department/ Senior Researcher (if staff)

I consider that this project has no significant ethical implications requiring full ethical review by the Faculty Research Ethics Committee.	☒
I have checked and approved the key documents required for this proposal (e.g. consent form, information sheet, questionnaire, interview schedule).	☒

Signature of Supervisor/ Head of Department/ Senior Researcher:	Lynn Machin *Lyn Machin*	Date:	22 May 2020

Next Step: Please forward this form to the Research Administrators in RIIS (ethics@staffs.ac.uk) who will arrange for it to be considered by an independent member of the School's College of Ethical Reviewers , having no direct connection with the researcher or his/her programme of study.

University Research Ethics Committee (February 2018)

PART C: TO BE COMPLETED BY A MEMBER OF THE SCHOOL'S COLLEGE OF ETHICAL REVIEWERS

This research proposal has been considered using agreed University Procedures and is now approved.	☐
Or	
This research proposal has not been approved due to the reasons given below.	☐
Recommendation (delete as appropriate): Approve/ Amendments required/ Reject	

Name of Reviewer:		Date:	
Signature:			

Signed (School Ethical Coordinator)		Date:	

University Research Ethics Committee (February 2018)

8.18 Appendix (L)

University of Staffordshire

School of Health, Education, Policing and Sciences

ETHICAL APPROVAL FEEDBACK

Researcher name:	Sumaya Salim Mohammed Al-Nuaimi
Title of Study:	Does the use of DMAIC analysis of six-sigma method improve organizational skills in Quality Management of subject supervisors in the Ministry of Education in Oman?
Status of approval:	Amendment approved

Thank you for your correspondence requesting approval of an amendment to the title and research questions.

Your amended application is approved. We wish you well with your research.

Action now needed:

Your amendment has now been approved by the Ethics Panel.

You should note that any divergence from the approved procedures and research method will invalidate any insurance and liability cover from the University. You should, therefore, notify the Panel in writing of any significant divergence from this approved proposal. This approval is only valid for as long as you are registered as a student at the University.

You should arrange to meet with your supervisor for support during the process of completing your study and writing your dissertation.

When your study is complete, please send the ethics committee an end of study report. A template can be found on the ethics BlackBoard site

Signed:

Date: 18.11.2024

Sarah Rose

Dr. Sarah Rose
Ethics Co-ordinator - HEPS

8.19 Appendix (M)

Theme Number 1	Mechanisms for disseminating the quality control system to the subject supervisors in the Ministry of Education	Frequency
codes	1. Correspondence	**5**
	2. Forms	**5**
	3. social media	**2**
	4. Training the senior supervisor or the head department	**1**
	5. Official gatherings or meetings	**3**
	6. Contests	**1**
	7. Posters	**3**
	8. Training workshops	**3**
Theme Number 2	Feedback from the Quality Control Department	
codes	1. Fluctuation in its arrival over the years	**2**
	2. Reaching the supervision department, which is an indicator of your performance	**2**
	3. Superficial feedback	**2**
	4. Dialogue between supervisors' and the quality management department about the results	**2**
	5. There is no discussion about feedback with the supervision department	**2**
	6. No Feedback	**5**
Theme Number 3	The role of training programmes in changing convictions and attitudes	
codes	1. Planning	**5**
	2. Focus	**3**
	3. Organizing	**2**
	4. Precision	**2**
	5. Prioritising	**3**
	6. Stimulate and remember	**2**
	7. Diversification in supervisory work methods	**3**
	8. There is no training to change convictions	**2**
	9. Learning Communities	**1**

Theme Number 4	Your role as a supervisor in the implementation of the QMS	
codes	1. Preparing the monthly plan according to the quality management forms	**2**
	2. Knowing and understanding my responsibilities	**1**
	3. Analytical	**1**
	4. Executive	**5**
	5. Transfer of training	**2**
Theme Number 5	Training opportunities to sharpen the skills of employees	
codes	1. The effect of transferring training and coaching personality	**1**
	2. Regular meetings	**2**
	3. Targeting a larger scale of employees for training	**2**
	4. Practical training for supervisors'	**1**
	5. Live or virtual meetings with the implementers	**1**
	6. We did not receive training	**6**
	7. Not enough	**1**
Theme Number 6	The contribution of the field applied to the development of Organisational skills	
codes	1. Time management	**2**
	2. Planning	**1**
	3. Teamwork	**1**
	4. Self-understanding	**1**
	5. Prioritising	**1**
	6. Achieving goals	**1**
	7. Simple change	**1**
	8. Resource organisation	**2**
	9. There is no change	**1**
	10. reinforcement and support	**1**
Theme Number 7	Suggestions for improving the implementation of the quality control system	
codes	1. Training in Organisational skills that benefit supervisory work	**3**
	2. Training with practical application	**4**
	3. Employee self-assessment	**3**
	4. Organisation between directorates	**2**
	5. Flexibility	**1**
	6. Types of media publication, and continuous awareness	**2**

	7. Developmental programmes that benefit the educational process	**2**
	8. Exchange of visits at the educational governorate level	**1**
	9. Training of new and transfer supervisors'	**2**
	10. Provide feedback	**5**
	11. Training experts	**2**
	12. Understanding the system through training	**5**
	13. Direct, quick, and continuous interviews or meetings	**6**
	14. Reporting style of quality management department	**2**
	15. Electronic	**6**
Total		**144**

8.20 Appendix (N)

Codes →	Sub-themes →	Themes
1. Correspondence	Mechanisms for disseminating the quality management system to the subject supervisors in the Ministry of Education	Publicity Of ISO 9001:2015 in MOE
2. Forms		
3. social media		
4. Training the senior supervisor or the head department		
5. Official gatherings or meetings		
6. Contests		
7. Posters		
1. Planning	The role of training programmes in changing convictions and attitudes	Training
2. Focus		
3. Organising		
4. Precision		
5. Prioritising		
6. Stimulate and remember		
7. Diversification in supervisory work methods		
8. There is no training to change convictions		
9. Learning Communities		
1. Preparing the monthly plan according to the quality management forms	Your role as a supervisor in the implementation of the QMS	
2. Knowing and understanding my responsibilities		
3. Analytical		

4. Executive		
5. Delivering the impact of training on QMS to colleagues		
1. The effect of transferring training and coaching personality	Training opportunities to sharpen the skills of employees	
2. Regular meetings		
3. Increasing the number of attendees		
4. Practical training for supervisors'		
5. Live or virtual meetings with the implementers		
6. We did not receive training		
7. Not enough		
1. Time management	The contribution of the field applied to the development of organisational skills	Organisational Skills
2. Planning		
3. Teamwork		
4. Self-understanding		
5. Prioritising		
6. Achieving goals		
7. Simple change		
8. Resource organisation		
9. There is no change		
10. reinforcement and support		
1. Fluctuation in its arrival over the years	Feedback from the Quality Control Department	Improvement
2. Reaching the supervision department,		

which is an indicator of your performance		
3. Superficial feedback		
4. Dialogue between supervisors' and the quality management department about the results		
5. There is no discussion of feedback with the supervision department		
6. No Feedback		
1. Training in organisational skills that benefit supervisory work	Suggestions for improving the implementation of the quality control system	
2. Training with practical application		
3. Employee self-assessment		
4. Organisation between directorates		
5. Flexibility		
6. Types of media publication, and continuous awareness		
7. Developmental programmes that benefit the educational process		
8. Exchange of visits at the educational governorate level		
9. Training of new and transfer supervisors'		
10. Provide feedback		

11. Training experts	317	
12. Understanding the system through training		
13. Direct, quick and continuous interviews or meetings		
14. Reporting style of quality management department		
15. Electronic		

8.21   Appendix (O)

Name	Files	References ▽	Created On
آليات نشر ثقافة ضبط الجودة		0	0	20/08/2022 18:52
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استمارات		5	5	20/08/2022 19:29
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لقاءات أو اجتماعات		3	3	20/08/2022 18:52
ملصقات		3	3	20/08/2022 18:52
وسائل التواصل الاجتماعي		2	2	20/08/2022 18:52
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مسابقات		1	1	22/08/2022 16:31
دور البرامج التدريبية في تغيير القناعات و الاتجاهات		0	0	20/08/2022 18:53
التخطيط		5	5	20/08/2022 19:32
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التركيز		3	3	21/08/2022 15:41
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التنظيم		2	2	21/08/2022 16:59
الدقة		1	2	21/08/2022 15:28
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