AMANI AL-MUALLEM

Thesis submitted in fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Sydney Medical School

The University of Sydney

2018

DECLARATION

This thesis is submitted to the University of Sydney in fulfillment of the requirement for the Degree of Doctor of Philosophy.

To the best of my knowledge and belief, the work presented in this thesis is original except as acknowledged in the text. I hereby declare that I have not submitted this material, either in full or in part for a degree at this or any other institution.

_____   _____

Amani Al-Muallem   **Date:**

Table of Content

LIST OF TABLES

LIST OF FIGURES

ABSTRACT SUMMARY

Background: Research supervision is an increasingly important professional role of faculty members. There is now a growing body of research that explores factors which underpin good supervisory practice. Despite the progress in this area, there is scarcity of existing literature about the readiness of academic faculty who are involved in both undergraduate and postgraduate research supervision. One of the main obstacles in not being able to understand these issues is the lack of appropriate tools to measure research supervision skills. The aim of this thesis is to develop a valid and reliable scale to explore research supervision practices among health science faculty members, identify factors affecting the supervisory process and assess research supervisor's readiness/preparedness towards guiding students' research projects.

Methods: A stepwise mixed methods study was carried out to develop and validate an instrument, the Research Supervision and Academic Readiness Scale (RSARS) that explored research supervision and academic readiness among health sciences faculty. The first stage (stage I) involved expert's opinions, a focus group and a Delphi technique which generated appropriate items that were deemed necessary to be included in the instrument. The scale was piloted to identify the main dimensions/domains which included administrative and personal skills and interpersonal factors while looking for the internal consistency and the strengths of individual items. In stage II, a follow up in-depth qualitative study of the research supervisors' experiences and practices was conducted with 18 participants from two universities to explore factors that influence academic supervision and to further refine the RSARS.

Finally (stage III) was carried out to test the instrument in two different academic institutions representing two different contexts: King Saud Bin Abdul Aziz University for Health Sciences (KSAU-HS) and the University of Sydney (Sydney).

To identify the underlying relationships between the items under each domain, Cronbach's alpha were calculated and Exploratory Factor Analysis (EFA) performed to evaluate items step by step and 15 items were finally retained for the main study.

Results: In stage I, the experts' opinions highlighted the different questionnaire sections and domains. Findings from analysis of the focus group confirmed these domains and helped in refinement and additional items. The Delphi rounds helped in further items refinement and modification. Two rounds were considered adequate and all developed items were approved by 75% of the expert panel in agreement. The developed scale at this stage consisted of a total of thirty-eight items and Cronbach alpha of 0.98 showed item redundancy indicating the need for further review. In stage II (semi-structured interviews), the results were summarized into five main emergent themes, including institutional factors, supervisor/student interaction, professional development opportunities, motivational factors and challenges faced by supervisors. These issues are related to supervisors, students and their contexts. There was consensus among all participants regarding their motivation, challenges, and personal concerns when supervising research students. Rewards, recognition and time management were important factors expressed by the majority of the participants. Students' personal characteristics such as enthusiasm, professional level and progress were of importance to the research supervision process.

Contextual factors included clear institutional rules and regulations of supervision, valuing and recognition of supervisors, which were essential to majority of the supervisors. However, some structural differences were observed between the KSAU-HS and Sydney research supervisors.

The majority of Sydney University participants had reservations about being co-supervisors rather than primary supervisors compared to KSAU-HS. In stage III, the RSARS was further developed and completed by a total of 235 participants as part of a survey including participant characteristics. There were 112/235 (47.7%) from KSAU-HS and 123/235 (52.3%) from the University of Sydney in the sample. The majority of KSAU-HS participants were males (p-value of 0.002); of younger age group (p-value of < 0.001), and had less teaching and supervision experience with a p-value of < 0.05 than their counterparts at Sydney. There was a highly significant difference between the two groups in the areas of initiating new studies or number of published papers with p-values of < 0.001. However, there were no significant differences between the two study areas with regard to the number of research students supervised (p-value < 0.36) or the number of times they were the primary supervisor (p-value of < 0.18). Also, there was variability in the supervisors' personal skills and professionalism scores between the two study sites. Despite those differences, all study participants were in agreement with the need for more institutional support while also encouraging faculty enhancement activities for better supervision outcome.

Conclusions: This study developed and validated a tool to assess the needs and readiness of research supervisors for individual assessments and faculty development interventions. The finding reports a range of validity evidence to support the use of the Research Supervision and Academic Readiness Scale (RSARA). This study highlighted that research supervision is influenced by multiple factors that need to be recognized and implemented for improving research supervisory skills. It is envisaged that this will have important implications for research supervisors' professional development. Future research is needed to further explore these factors from the perspective of supervisees as well as other relevant stakeholders.

ACKNOWLEDGEMENTS

ABSTRACTS PRESENTED FROM THIS THESIS

- ➢ Al-Muallem, A., Elzubeir, M., Roberts, C., Magzoub, M. (2012). Exploring Professional Developmental Needs of Research Supervisors: The Application of a Mixed Method Approach. The 2nd Saudi International Medical Education Conference (SIMEC) as Oral presentation at College of Medicine, Al Imam Muhammed Ibn Saud University, Riyadh.

- ➢ Al-Muallem, A., Elzubeir, M., Roberts, C., Magzoub, M. (2012). Applying a Theoretical Framework to guide a Qualitative Study of Research Supervision. The 2nd Saudi International Medical Education Conference (SIMEC) as Oral presentation at College of Medicine, Al Imam Muhammed Ibn Saud University, Riyadh.

- ➢ Al-Muallem, A. (2013). Research Supervision: A qualitative study. The Association of Medical Education Eastern and Mediterranean Region (AMEEMR) Conference, Quality in Medical Education "Assessment, Social Accountability, and Accreditation" as Oral presentation, College of Medicine, King Saud Bin Abdul Aziz University for Health Sciences, Riyadh.

- ➢ Al-Muallem, A. (2014). Exploring Faculties Perspectives on Research Supervision. The 4th Saudi International Medical Education Conference (SIMEC 2014), as Oral presentation at Al Qassim University, Qassim.

- ➢ Al-Muallem, A. (2016). Factors affecting supervisory skills of research supervisors: A comparative cross-sectional study. The 5th Saudi International Medical Education Conference (SIMEC 2016) as Oral presentation entitled ". Al Faisal University, Riyadh.

PUBLICATION

➢ Al-Muallem, A., Elzubeir, M., Roberts, C., Magzoub, M. (2016). Development and Initial Testing of an Instrument for Evaluating Needs and Inferring Readiness of Research Supervisors: A Mixed Methods Approach. Health Professions Education. 2(2), 138-147.

PROLOGUE

I am a general practitioner and academic who started teaching students soon after finishing my board examination in Family Medicine in 2001. Initially, I was involved with the postgraduate residency training program and then got involved within undergraduate education from 2004. I was always aware of the multiple roles I had to play within my academic institution that is being a clinician and an educator with my students.

I then had the opportunity to participate in research activities in my department and supervise students in carrying out their own research projects. There was a great challenge in developing a research culture within the wider university and within my institution. Additionally, there is an increasing workload demand for tutoring research students who are required to produce mandated research activity both for undergraduate students and postgraduate trainees including residency training programs and clinical fellowships.

It was always a concern to me and to other colleagues across other faculties whether we were doing our best to help our students achieve their research goals. I was always questioning both myself and my colleagues, as to how much we were ready to supervise research students and whether we needed to develop our own knowledge and skills in order to help our students and improve the quality of research supervision practices and outputs.

The main challenge as a research supervisor was in being involved in different clinical, educational and administrative activities, how could I make sure if I am really helping my research students, facilitating their projects and addressing their needs efficiently and effectively?

My colleagues shared my similar concerns and issues about their own practice with regard to research supervision. They indicated their willingness to assist in finding a way to address and share the needs and experience with both current and future supervisors with their students in order to work on providing quality research supervision.

With the opportunity to do my PhD in medical education, I was keen on exploring this topic, "Research Supervision from Faculty Perspectives", as I felt the necessity to address and appreciate academic faculty needs and readiness to undertake the research supervisory role for students.

While searching the current literature, there were no studies conducted on academic supervision within our local context (Saudi Arabia). Much of the literature reported local studies concentrated on clinical and hospital-based supervision rather than academic supervision. It was clear to me at that time that I needed to explore and develop an instrument which addressed issues of research supervision from academic perspectives and which was then named as Research Supervision and Academic Readiness Scale (RSARS) which provided a way of measuring research supervision from academic perspectives. To ensure that my findings were truly international, I validated the instrument in two very differing educational contexts namely, King Saud Bin Abdul Aziz University for Health Sciences (KSAU-HS), Riyadh, Saudi Arabia and the University of Sydney (Sydney), Australia for comparison and generalizability purposes.

It has been quite a journey, and the following chapters discusses the in-depth details of this journey.

CHAPTER ONE: INTRODUCTION

1 INTRODUCTION

1.1 Background and significance of the study

Being a research supervisor is an increasingly important professional role of faculty members. Currently, there is an increasing body of research looking at the factors which both underpin and mitigate against good supervisory practice. What has yet to be fully explored is whether inferences about the readiness of faculty member for research supervision can be generalized to make claims about the quality of research supervision across a whole faculty.

This study was specifically designed to address firstly the question as to whether a measure of readiness of faculty members for academic research supervision could be developed and validated. Secondly, the study has been designed to determine the current gaps in academic supervision readiness within two academic centers representing two different educational contexts. The data obtained with this work is expected to share some insightful recommendations about individual and institutional factors needed to develop a faculty wide capacity in research supervision within medical and health sciences.

Research, in general, is extremely vital in academia as it adds to knowledge, improves practice, and builds students' research skills (Creswell, 2005). In clinical supervision, evidence shows that it has a positive impact on patient outcomes and the lack of it has harmful effects (Kilminster, Cottrell, Grant, & Jolly, 2007). Therefore, it could be assumed that the higher the quality of research supervision in academic medicine, the higher the quality of student research. Harris (2007) suggests that research is one of the five domains of being a successful medical faculty member along with education, administration, communication and professional academic skills (Harris, 2007).

These domains seem to complement each other enriching the academic faculty knowledge and skills in the most effective way. Thus, the outcome is not limited to research quality alone, but it has a greater impact on the future of medical and health science students.

An important role of an effective educator is to be a research supervisor and to cater to the student's needs, enabling them to complete their research projects successfully (Newble & Cannon, 2002). Although, such a task (i.e. meeting the student needs in an effective educational way) may seem very simple, it depends on many factors, like for example, promoting and developing communication along with learning to their maximum attainable extent. This is mainly to develop students into capable future researchers in their chosen field.

Furthermore, the published literature indicates a growing emphasis on the quality of research supervision and research produced from the perspectives of students, the institutions they attend and supervisors themselves. Grant *et al.,* (2003), suggest that although supervision within clinical or educational contexts is considered to be essential and effective, the actual practice is far from reality. Another study, Kilminster et al (2007), also pointed out that the requirement of coherence in the definition and guidelines are needed (Grant, Kilminster, Jolly, & Cottrell, 2003; Kilminster, Cottrell, Grant, & Jolly, 2007).

Internationally, there is an increased demand for research supervision, both in undergraduate and postgraduate programs. Medical degree programs generally provide insight into the fundamentals of biostatistics and epidemiology. Unfortunately, knowledge sharing on topics related to fundamentals of research methods is found to be limited, while the available literature is too scarce to provide further guidance. Most health practitioners are incapable of

differentiating a well-designed study from a poorly designed one, thereby limiting their ability to start, perform, interpret and exhibit their research (Supino, 2007).

Medical students' involvement in research is thought to be an important element of their education. Fostering medical students to conduct research should be given utmost importance, as it is evident that research done during the formal education often results in it being carried on after graduation. (Detsky & Detsky, 2007; Remes, 2000).

Supervision at any level is widely recognized as complex and multidimensional. Fostering research capability in students demands high-quality supervision (Shankar, 2007). Although there have been notable developments in research training, supervision and funding in recent years, high attrition and less-than-ideal completion rates have attributed to poor quality supervision (Kiley, 2011).

Despite anecdotal evidence suggesting time constraints or lack of time as a barrier to research participation among faculty, there has been very little inquiry into the factors that may contribute to effective research supervision from the perspectives of either students or faculty, suggesting the need for research in this important area. Furthermore, although there are studies that have investigated the roles and responsibilities of research supervisors (Abiddin, 2009), a review of the literature (see Chapter 2) indicates that there is very little published work regarding research supervisors' needs, readiness and preparedness for academic supervision.

While there is considerable literature provided within most academic organizations on the supervision of postgraduate research (Masters and PhD degrees), little is known about the

supervision of undergraduate research students (Jamieson, 2006). Some studies conducted from students' and supervisors' perspective identify a wide range of challenges and difficulties (Adedokun, Dyehouse, Bessenbacher, & Burgess, 2010).

1.2 Rationale of the thesis

Research is an important educational activity as it adds to our knowledge, improves practice, and builds students' research skills (Creswell, 2005). Currently, research in the area of research supervision is rather sparse (Kilminster, Cottrell, Grant, & Jolly, 2007), and there is a need to inform and clarify research supervision practice (Green, 2005).

Because of the complex nature of research in academic supervision, the methodological problems, diversity of theories and practices related to research supervision warrants robust study that develops tools and investigates the interrelationship between different factors that may influence research supervision. Against this background of perceived complexity, diversity in conceptualization and practice as well as a distinct lack of knowledge in the field of research supervision, the purpose of this thesis is to develop an instrument to measure and explore the readiness/or preparedness of research supervisors to supervise students' research projects effectively.

1.3 Aim and objectives of this thesis

The aim of this thesis was to explore research supervision practices among academic faculty members and identify factors affecting the supervisory process. In addition, this thesis would help assess research supervisor's readiness/or preparedness to undertake research students. This would in turn help in illuminating personal and organizational implications for a change

in planning for effective faculty development and educational programs to enhance professional supervision practices and quality supervision.

Under this broad aim, the specific objectives of this thesis are as follows:

1) To develop and provide initial validation evidence of the Research Supervision and Academic Readiness Scale (RSARS).

2) To explore factors affecting research supervision processes and practices.

3) To determine the academic readiness for research supervision of participants.

In order to achieve these objectives, this thesis was planned to be carried out in three different stages:

Stage I: Using a multi-method approach to develop the Research Supervision and Academic Readiness Scale (RSARS) instrument.

Stage II: Qualitative method using semi-structured interviews to explore factors affecting supervision process and practices from academic faculty perspectives.

Stage III: Quantitative method using a survey to further explore factors and determine academic readiness of research supervisors as measured by the RSARS.

The following Table 1-1, summarizes these three stages and maps them to the research objectives.

Table 1-1: Thesis stages

Study stage	Objective covered	Method used	Study site	Related figures
Stage I	Objective (1)	Multi-method using expert opinion, focus group, Delphi, Pilot	KSAU-HS	Figures 4-1, 4-2
Stage II	Objective (2)	Qualitative (Semi-structured interviews)	KSAU-HS & Sydney	Figures 4-3, 4-4 & 4-5
Stage III	Objective (3)	Quantitative (survey distribution)		

1.4 Structure of the thesis

Chapter 1 is the introductory chapter which discusses and lays out background information and the significance of this study, research aim, and objectives.

Chapter 2 provides an overview of the literature in the context of the research objectives using a systematic approach, to understand and highlight efforts investigating the readiness/ or preparedness of research supervisors.

Chapter 3 describes the theoretical orientation, explains the statement of the research questions and the theoretical framework that guided this thesis.

Chapter 4 describes the research design and methods of the different parts of this thesis including the three research stages, the qualitative and quantitative components and the scale refinement.

Chapter 5 presents the results of the qualitative part of the thesis, and answers the research question; "What are the factors affecting research supervision process and practices from faculty members' perspectives ?".

Chapter 6 presents the quantitative part of the thesis which is divided into two parts:
Section (A) *Questionnaire refinement* including exploratory factor analysis, scale items reduction process, and this answers the research question around the validity and reliability of the Research Supervision and Academic Readiness Scale (RSARS) instrument.

Section (B) *Questionnaire Survey data* of the thesis which presents the descriptive data from the survey and comparison between participants from the two study settings using inferential statistics. This answers the research question as to determining the research supervisor's readiness to undertake supervision of research students at the two different institutes.

Chapters 7 involves the thesis discussion, including summary of the key findings, implications, strengths and limitations of the research, conclusion and recommendations.

CHAPTER TWO: LITERATURE REVIEW

2 LITERATURE REVIEW

In order to understand the key issues underpinning the quality of research supervision practice among faculty members, this chapter discusses what literature states about various definitions of supervision, the historical context of supervision and methodological issues in researching research supervision.

2.1 Supervision definition, conceptions and confusion

2.1.1 Definition of supervision

The term supervision has been used for many years in health sciences including medicine, nursing and mental health to mean structured, systematic, extended encounters intended at reflecting on day-to-day work (Scaife, 2001). There are many definitions and descriptions of one-to-one learning activities such as coaching, supervision, and mentoring (Laurner, 2010).

As suggested by Clark *et al.* 2006, supervision must be regarded as a much more broader term including face-to-face interactions to mentor and coach along with tasks comprising the varied facets of training, evaluation, management and revision (Clark *et al.*, 2006). These interactions can collectively be grouped as illustrations of supervision since they display identical interpersonal adeptness crucial in face-to-face communication (Laurner, 2010).

However there are a number of nuances in distinguishing the differences between mentoring and research supervising. (Mills, Francis, & Bonner, 2005). The emphasis in supervision is less on counseling or teaching and more on overseeing, evaluating performance and directing.

Moreover, there are often overlaps and this does not mean that in some situations supervisors may not also fulfill the role of a mentor when promoting the professional development of their research students or switch into an instructional mode when and where necessary (Ford & Jones, 1987). In the background of scholastic supervision, a formal sense of managerial liability rests on the shoulders of the supervisor over the student during the specific timeframe.

The key differences between academic supervision and mentoring in the literature may be outlined as follows (Table 2-1).

Table 2-1: Differences between mentoring and research supervising. Adapted from: Mills, Francis and Bonner (2005)

Element	Research Supervision	Mentoring
Context	Within the academic/research work setting	Outside the immediate academic work setting
Time	Timeframe dependent on the length of the research endeavor/project, etc.	Long timeframe (often open-ended) with advancement of relationship.
Relationship reporting	Official description on the supervisee's advancement.	Confidential meetings; with negligible update on relationship.
Level of commitment	High level of commitment. Requires formal time commitment with the work setting	High level of commitment; requiring informal meetings off work environment.
Outcomes	Specific and broad outcomes (e.g. thesis production, improved research capabilities, personal achievements, career progression.	Broad outcomes that can encompass clinical practice, career progression, personal achievements

Supervision can also be seen as a form of pedagogy in a larger prospect of higher education. It transforms students from reproducer of knowledge to producer, a transition that is challenging at various levels (Grant, 2000). In addition, supervision is a complex process used in varied settings, with different definitions, functions and methods of implementation. Depending on the functions and forms of delivery, supervision may be defined in various ways (Kilminster

& Jolly, 2000; Severinsson, 2012) and most of these definitions are related to practice-based supervision in teaching, social work, psychology, counselling and clinical healthcare contexts. In the healthcare context, the emphasis is on the promotion of professional enhancement and nurturing patient well-being. However, a definition that is logical across professions and which has most relevance to research supervision is that of Proctor (Kilminster & Jolly, 2000) who sketched out three primary functions of supervision – normative (administrative), formative (educational) and restorative (supportive). Research supervision can therefore be defined as a combination of pedagogical, administrative and facilitative processes.

From a practical point of view, Laurner, 2010 has suggested that supervision involves both development (continuous professional learning related) and performance (clinical governance and standard setting related) (Laurner, 2010).
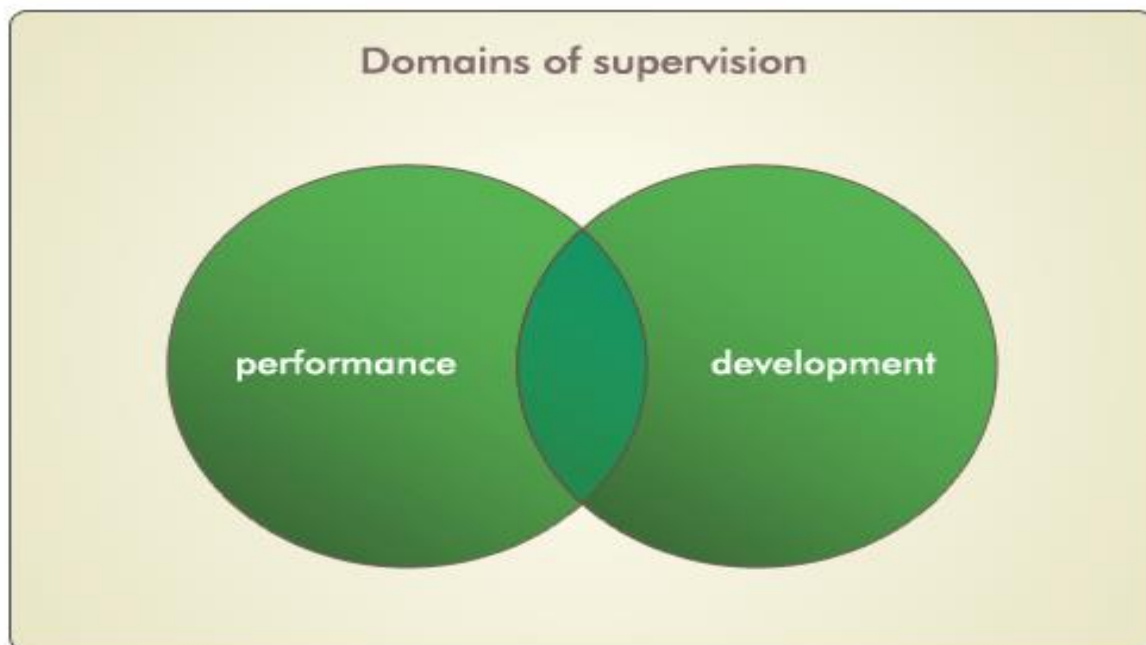
Figure 2-1: Domain of supervision, Adapted from (Laurner, 2010)

The core principle of supervision could either be development or performance or a combination of both pivoting on the association existing between the supervisor and the supervisee. The

degree to which the circles of development and performance overlap each other varies in extent. In the context of my thesis, both domains overlap as both professional development and performance are clearly elements of the supervision process.

2.1.2 Supervisors: educators, researchers or health providers?

Research supervisors are expected to have several roles, and most may endorse the view that the general role of a research supervisor is to guide and assist research students. However, the roles may differ depending on the supervisor's career choice, other roles and responsibilities within the institution (Roberts, 2012), e.g. If the supervisor is an active clinician, they may also undertake duties such as teaching responsibilities or administrative work. Furthermore, they may act as the main or associate supervisor.

Historically, research supervision has been regarded as a form of teaching and the implication is that one needs to be an effective teacher in order to be an effective supervisor (Taylor, 2006). There are numerous reasons to advocate the idea of supervision in the broader sense as conceived in other fields. This idea or concept links physicians getting into supervisory roles in these fields, specifically nursing and mental health careers.

Furthermore, it helps people recognize numerous interactions in medicine which involve supervision, although they might not be known as such. Over a period of time, this could aid in promoting a superior style of supervision within medicine, not only during training, but also through professional career (Laurner, 2010).

2.2 Multifaceted role of supervisor

Supervision is a network of obligations that is aimed at educating and transforming research students (Readings, 1996). Some scholars suggest that there is a need for a more impressive title than supervisor to accompany the increased sophistication of the role that is described and analyzed at great length in the growing literature. For instance, Grant *et al*, 2003, findings advocate that even though supervision is vital and efficacious, a high degree of variability exists in reality; thus, demanding the need for a clear-cut definition and guidelines (Kilminster, Cottrell, Grant, & Jolly, 2007).

The literature also suggests that the supervisory role is far more composite and fine-drawn than perceived. Down, Martin and Bricknell (2000), pointed out that research supervisors may have to execute up to 16 different work roles. This escalates the query as to whether one style of supervision would suit all settings and student requisites (Down, Martin, & Bricknell, 2000). Supervision demands a concern that extends beyond being an academic. The supervisor needs to demonstrate commitment and understanding of the student as a whole in regard to the development their intellectual capabilities and fulfilling other roles and responsibilities. This may include balancing between work, family and other non-academic activities (Van Rensburg, Mayers, & Roets, 2016).

Carrington (2004), also explored another vital element of professional development under supervision and the potential it has to enhance the professional development of the supervisor. However, literature on supervision defines the process from the supervisee's professional development point of view (Carrington, 2004).

Scientific research has always been an integral component of modern medicine with research projects being part of medical students' development. Research projects conducted by medical students empower them with knowledge in research methodology as well as enhance their critical analytic skills in publishing literature, often culminating in published output for the institution (Shankar, Chandrasekhar, Mishra, & Subish, 2006). Fostering research capability in students, however, requires high quality supervision and mentoring.

Student involvement in research is largely considered to be a vital element of medical education. Nurturing this research capability in students, however, requires high quality supervision and mentoring. Mentoring has been called the utmost satisfying activity in an academician's career. Enormous amount of knowledge sharing takes place during the mentoring process. Mentoring relationships last long when both the coach and the student grow together (Shankar, 2007).

Research supervision is an activity promoting and developing knowledge sharing, research, and interpersonal skills at the utmost level; hence, advocating students as proficient researchers is the prime objective of research supervision.

2.3 Importance of research training

Research development is becoming an increasingly recognized essential to measure innovation and growth of a nation. Research training plays a pivotal role in enhancing students' long term capability in conducting independent scientific research. Research training is also an important aspect of research development and funding by institutions and governing bodies (Pearson & Brew, 2002). Students often pursue their research work even post allocated research period

(Kemph et al. 1984 cited in Remes, 2000). Student research projects qualify students to master research procedures and enhance analytical skills involved in published literature, and often resulting in the published output of the institution (Shankar, Chandrasekhar, Mishra, & Subish, 2006).

2.4 Research supervision: perspectives of academics

For many members of faculty who are also physicians, the opportunity to be involved in research teaching forms an important reason for selecting an academic medicine career. Enhancing faculty teaching and supervision abilities raises quality and enhances their achievement of learning outcomes and research outcomes for their students. Supervision is crucial for successful completion of research projects, although problems widely exist (Grant & Graham, 1999). Just as students have preconceptions of research and research supervision, so do the supervisors in terms of what they expect from research students. There is, however, some evidence that there is a mismatch between preconceptions and reality and this can be a cause for student difficulties (Bills, 2004).

The most appreciated qualities of a supervisor from the students' point of view were scientific competence, adequate duration of supervision time, inspiration, sociability and interpersonal relationships (Remes, 2000). Other studies suggest that for postgraduate students, a key factor in their success or failure is the relationship with their supervisor (Seagram, Gould, & Pyke, 1998). Supervisors require not merely professional competency in students' research alone but also virtues which empower them for better communication and build relationships with their students (Welsh 1979, cited in (Armstrong & Shanker, 1983).

Furthermore, according to Hockey (1997) postgraduate students are often concerned with departmental support, personalities in supervision and supervisors' knowledge of the research area or of procedural matters (Hockey, 1997). Delamont et al (1997) however, indicates the diversity of experience, suggesting that postgraduate research could span from an encouraging college episode to an intimate unique journey (Delamont, Atkinson, & Parry, 1997). In contrast to males, female postgraduates have reported that they have been most affected by interpersonal factors (Seagram, Gould, & Pyke, 1998).

2.5 Assuring good quality research supervision

Quality research supervision is the responsibility of both the individual and the academic institution. Historically, research supervision has been seen as part of the research function of academic staff and for some time there has been an underpinning logic that academic staff are inherently capable of supervising others if they have done research themselves.

Most universities internationally are quite explicit in their description about quality research supervision and the different roles and responsibilities of both supervisors and supervisees (Cryer, 1998). Most organizations also recognize that the enhancement of skills and knowledge in this aspect are seeds sown for a strong futuristic institutional culture (Grant & Graham, 1999), and some provide induction and training for this important role. In the UK, the Quality Assurance Agency (QAA., 2004) has developed a code of practice for research students and suggests institutions should ensure that the responsibilities of all concerned are clearly communicated through written guidance to ensure students and supervisors are not ambiguous about their roles and responsibilities.

The need for research supervisors training in supervision is widely acknowledged in most universities globally. Western countries are emphasizing on the need for formal, in-house supervisor training programs, continuous in nature. These include a range of programs ranging from half-a-day to a longitudinal series of educational activities lasting up to a year. A study conducted in New Zealand, for example, (Rath, 2008) indicated a range of institutional policies and practices in relation to supervisors' professional development including provision of printed materials, handbooks for students and supervisors, training sessions and mentoring programs, peer support groups and web-based resources.

2.6 Needs assessment and self-assessment

In planning or designing an improvement activity such as enhancing the quality of research supervision, a needs assessment would be a critical first step, involving systematic gathering, review, and study of available data which helps to recognize the knowledge and skillset needed by the staff to carry out their delegated roles (DaRosa, 1995). Some authors have cautioned that without understanding needs, faculty development organizers may try to provide knowledge, skills and attitudes that are already developed (Ratnapalan & Hilliard, 2002).

Needs assessment most often takes the form of questionnaires and interviews (Grant, 2002; Mann, 1998); however, Pololi (2003) supports the recommendations of other authors (Crandall, 1998) regarding the need to combine several needs assessment tools if generalizability is the goal. Adopting a comprehensive approach over a period of four months, Pololi et al (2003) used semi-structured interviews, nominal group techniques and questionnaires to identify factors perceived by academic faculty that would enable them to find professional fulfilment (Pololi, 2003). It is thereby expected of health practitioners to find out their learning needs via

a process of continuous self-assessment and contemplation (Colthart et al., 2008). Ward et al (2002) has defined self-assessment as "ability to accurately assess ones strengths and weaknesses" which is a vital move toward developing a lifelong learner (Ward, 2002). However, as several authors have identified, the ability to accurately self-assess knowledge, skills and competencies is limited (Colthart et al., 2008; Davis et al., 2006).

Educators strongly emphasize the importance of needs assessments to ensure that learning outcomes are related to the needs of participants that are realistically achievable (DaRosa, 1995).

In summary, this chapter reviewed the literature in relation to available definitions and concepts in relation to supervision and research supervision, the different roles and responsibilities of an academic faculty. It also discussed other important aspects related to research supervision such as needs assessment which helps in illuminating and planning faculty development activities, research training and identify ways to improve the quality of research supervision practices.

CHAPTER THREE: THEORETICAL PERSPECTIVE

3 THEORETICAL PERSPECTIVE

3.1 Conceptual and Theoretical Orientation

This chapter will discuss the conceptual framework and theoretical orientation of this thesis. Romberg affirms that more is needed to inform and guide the research in hand than just a review of previous studies. He elaborates:

> "*An explicit description of the theoretical orientation, as well as a conceptual framework for the study, is required*" (Romberg, 1992).

Thus, the aim of this chapter is to discuss the use of theories within the literature related to research supervision. It is important to bear in mind that there are many theoretical frameworks reported in the literature in relation to supervision, in general, but very limited in the domain of research supervision.

Most of the available theoretical frameworks are mainly in clinical supervision, psychotherapy and education (Hawkins & Shohet, 2000; Proctor, 2008; Scaife, 1993; Scaife, 2001; Stoltenberg & Delworth, 1987). Therefore, in this chapter, it is important to make an argument for using the chosen theoretical framework. This entails a critical analysis of the suggested theoretical frameworks and the importance to reflect on their characteristics in order to support the argument for choosing the most appropriate one.

I explored several theoretical frameworks and then I narrowed down to the most relevant four, discussed them in depth, and chose the one that is in line with the main aim of this research (i.e. to explore the research supervision practices among faculty members and identify factors affecting supervisory process) This is essential because a theoretical framework considers

relevant theory underpinning the knowledge base of the phenomenon to be researched and provides a loosely-structured scaffolding to guide the researcher. It can be thought of as a roadmap, for example, Stoltenberg, 2005, suggests *'having a destination in mind is a nice start, but having a roadmap that provides guidance on how to get there is equally valuable'* (Stoltenberg, 2005). Nevertheless, it is crucial to pare in mind that discussing the chosen theories could be a thesis on its merits. Therefore it is important to be focused in the context of this work. The theories discussion and reflection will be very limited to the specific task of choosing the most appropriate one as a theory for this project.

Some authors use the terms conceptual and theoretical interchangeably when describing research frameworks. Before addressing the difference between them, it is worth defining the terms: conceptual and theoretical frameworks. Conceptual frameworks signify different ways of approaching a problem or study, or ways of representing the functioning of composite things, whereas theories are structured principles and statements confirmed through well-designed studies (Bordage, 2009).

In addition to the theoretical and conceptual framework, other terms appear in the literature. The term theoretical perspective is described here as the theoretical lens or philosophical stance that is behind the research methodology adopted and which influenced how the study was conducted, (Guba, 1994; Illing, 2010). According to Dobson, "the researcher's theoretical lens is also suggested to be playing an important role in the choice of methods because the underlying belief system of the researcher (ontological and epistemological assumptions) largely defines the choice of method (methodology) (Dobson, 2002).

The theoretical and philosophical commitment usually guides the researcher thoughts when designing the research methodology. Even asking simple questions can be driven by theoretical and philosophical assumptions about the nature of knowledge (i.e. epistemology) and how the world works. Thus, a good qualitative research explicitly describes what are the theoretical and philosophical assumptions that would drive the research methodology in term of data collection and analysis (Walker, 2014).

3.2 The theoretical perspective of this study

Despite an increasing amount of literature focusing on the significance of clinical and academic supervision, the articulation of theories and use of theoretical perspectives is sparse. Research supervision is a multifaceted activity and needs to be supported by different theoretical perspectives including environmental, emotional, personal intellectual and socio-cultural aspects. The aim of this section is to explore the theoretical perspectives that could be deemed relative or more applicable to study the process of research supervision.

It is interesting to note that supervisors may well apply theories underpinning good supervision to promote the development and achievement of their supervisees if they apply theoretical perspectives or are guiding principles in their work. In the area of clinical nursing supervision, for example, it was found that Australian nurse supervisors commonly used reflection theory, human development theory and psychodynamic theories (Begat, Berggren, Ellefsen, & Severinsson, 2003). One of the challenges of this project was to find a rigorous published theoretical framework that addresses research supervision and its dynamics between supervisors and supervisees. Specific and focused theoretical framework that fully explain the

multi-dimensional aspects of research supervision is lacking in the literature. Therefore, I opted to look for the most relevant framework that could be applied to this project.

The following sections will discuss the existing most relevant theories applicable to this thesis including reflective practice, experiential learning theory, communities of practice and social cognitive theory.

3.2.1 Reflective Practice

Philosophically, the reflective theory can be seen as built from three main epistemological theories (i.e. positivism, interpretivism, critical theory) (Kaufman, 2010). Firstly, the positivist epistemology assumes that knowledge is a scholarly pursuit to predict an outcome independent from its socio-cultural norms, motives, reasons, and positions of relevant background knowledge (Phillips, 2018). The professional reflection, however, bridges the gap of knowledge by allowing theory and practice to inform each other (Kaufman, 2010). This can be rated as a positivist practice intended towards enhancing the experience of research supervision. Secondly, reflection, in a way, brings also the interpretive epistemology. This is where reality is interpreted by the individual current and past experiences and where theory can guide the understanding of the learning process (Bourget, 2017).

Research supervision as an exercise is informed by the individual way of thinking, his/her knowledge and the way of interpreting the academic improvement. The third epistemological stand is the "critical" school of thought. This can be seen as the reflective assessment and critique of the process of research supervision by being knowledgeable in research supervision (Bohman, 2016). Based on the above philosophical understanding, reflective practice theory

is a mean for learning effectively in the domain of research supervision. This would imply that there is an ideal context where we want to match or benchmark yourself by it. This implication asserts that Reflective Practice Theory is an objectivist school of thought. With that assertion, we need to understand how the theory can be adapted to the context of this study.

An essential component of the learning process; the value of reflecting on what the learners are doing, has been highlighted by several researchers. According to Schon (1983), there are two types of reflection: reflection in action (when doing something) and reflection on action (after the action is done) (Schon, 1983). Reflection-in-action entails three activities of restructuring the problem from different views, ascertain where the problem lies from previous experience, and knowing the aspects and consequences of the problem. On the other hand, reflection on action happens after the completion of any activity or task. This is a process of reflecting back by analyzing of what a person did, whether she succeeded in performing the task and whether the outcome was achieved or could be different. Both are iterative processes where perceptions and knowledge from each experience could be applied in the future or what can be described as knowing by practicing, or in other words, "Knowing in action" (p21) (Kaufman, 2010).

For example, "reflecting in action" could occur when the supervisor start to be more critical about his practice, s/he would ask the questions either during the research supervision session or while commenting on a written material "is this session going well?" or "is my feedback going to help the student improve writing". On the other hand, when "reflecting on the action", a supervisor might think about him/herself as a service provider to the student and to other stakeholders (for example, institution). It is mainly a reflection of what has been achieved, where does their bias lie, would it be within themselves? with their institutions? or with the

student? Another example is a situation where the supervisor could ask the students to reflect on their supervision experience after it is over.

Others suggest the reflective practice is "a set of abilities and skills, to indicate the taking of a critical stance, an orientation to problem-solving or state of mind" (Moon, 1999) in order to accomplish an outcome. Moreover, Moon perceives reflection as a catalyst that transitions surface learning to in-depth learning. Numerous factors both positive and negative persistently affect the reflection process. These factors may include situation, maturity, proper guidance and continuous supervision, and the culture of the organization and the most imperative is time (Kaufman, 2010). For instance, in research supervision, a real-life situation such as a sudden illness of either the supervisor or the student might affect the progress of the research. Subsequently, the supervisor and the student could reflect on that situation and their understanding of the problem to reach a satisfactory outcome.

As explained in the beginning of this chapter the aim of this research is to explore research supervision practices among academic faculty members and identify factors affecting supervisory practices (see section 1.3 Aims and Objectives of this Thesis). In order to do that in two different contexts (Saudi and Australian), it is essential not to exclude the context. The reflective process according to Schon and Moon, is an intrinsic process that would impact the quality of the outcome (i.e. the research supervision.) Therefore, it was important to find a different theory that would include both intrinsic and extrinsic factors such as the context (for example. environmental, institutional support, resources).

3.2.2 Experiential Learning Theory

The philosophy underpinning the Experiential Learning Theory (ELT) is constructivism; this entails that ELT is trying to construct or create different versions of reality (Yardley, Teunissen, & Dornan, 2012). ELT Kolb's theory argues that active learning has four central abilities: concrete experience, reflective observation, conceptualization and active experimentation (Kolb, 1975) in a learning cycle. These four domains are constructing the experience of research supervision in a way that makes it unique to the individual. This means that ELT is not keen on the concept of generalizing one why of supervision, every institute can construct its own way of research supervision. Thus, it can be established that ELT is a subjectivist school of thought. With that assertion, we need to understand how the theory can be adapted to the context of this study.

ELT theorizes two models: holistic learning process and multilinear model of adult development. These models provide information about how learners learn, develop and grow. The theory is called "Experiential" to emphasize the vital role experience plays in the process of learning (Kolb, Boyatzis, & Mainemelis, 2001). The theory is known as "experiential" due to its intellectual origins from the works of theories including Lewin for social psychology, Piaget's cognitive-developmental theory and Dewey's philosophical pragmatism (Kolb, 1984).
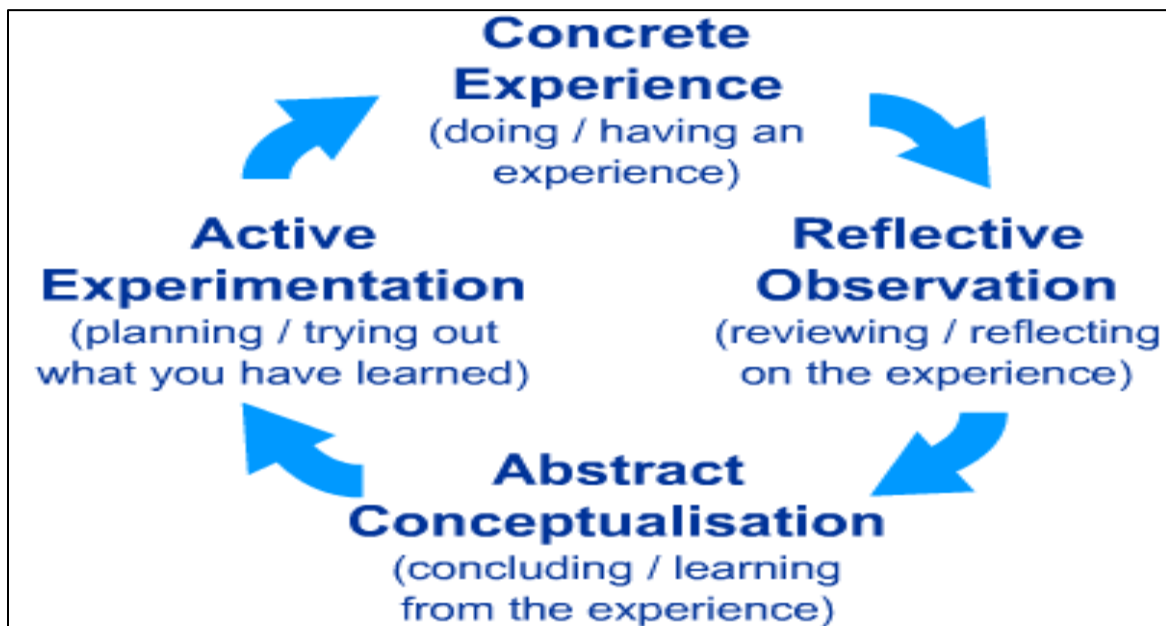
Figure 3-1: The four stages of Experiential Learning Theory Adapted from Kolb's Cycle (1974).

For example, within the context of research supervision experience, the roles and responsibilities of the supervisor are dependent on the context of learning. In the *affective oriented environment,* the supervisor performs as a role model and an effective advisor. He conveys knowledge and information as per need and objectives of the supervisee. Also, he monitors changes in learning by facilitating periodical discussion and critique with their supervisee.

In the *symbolic oriented environment,* the supervisor is acknowledged for his vast knowledge, time management, and mastery (Kolb, 1984), in order to achieve a way to solve a problem or to help to achieve a goal. In the *perceptual oriented environment*, supervisor plays a role of facilitator by emphasizing the smooth process instead of the solution. He also directs and outlines the association between communications where supervisee individually evaluates responses to questions and defines difficult concepts. Already predetermined criteria for evaluation are being used in the perceptual environment to assess the performance of the

learner. In the *behaviorally oriented environment*, the supervisor is expected to act as a mentor and emphasizes on reflection of background experiences while doing the counseling. The learner is required to manage own time and be focus on action. Moreover, a learner accomplishes tasks through professional standards.

One of the advantages of the ELT over the Reflective Practice Theory is that the ELT is specifically working, as explained earlier in this section, on intrinsic factors insofar as the name implies the rule of experience and how it plays a major rule in the learning process. This could be seen as one of its important characteristics of ELT theory. On the other hand, in the context of this project, it is important to explore or measure extrinsic factors as well and to assess how those (extrinsic and intrinsic) factors interact with each other to impact the research supervision teaching and learning cycle.

In the context of this project, it was essential to be able to study the multidimensional aspect of research supervision process assuming that there is an ideal research supervision experience. This is an objectivist way of thinking, which is important because the main aim is to tease out the differences in experiences in different contexts in order to benchmark it by an ideal situation. Therefore, ELT as a subjectivist theory may not be the best to serve as the selected theory in the domain of this work.

3.2.3 Communities of practice

The underpinning philosophy of the Communities of practice (COP) is Pragmatism which entails that both positivism and interpretivism can work together to serve the researcher and help to answer questions. One of the most prominent examples of pragmatism is a mixed

methodology (Denscombe, 2008). Communities of practice can use both qualitative and quantitative research as an epistemic authority to describe how research supervision takes place. With that assertion, we need to understand how the theory can be adapted to the context of this study.

Both undergraduate and postgraduate supervisions are viewed as part of the adaptation process into a community of practice while endorsing the social learning theory of Lave and Wenger (1991). Initially, Vygotsky described learning as happening through activities that are mediated both by others and by cultural factors (Vygotsky, 1978). Thereafter Lave and Wenger used the term 'communities of practice' to explain the activities of a group of people working together to explore common goals (Mann, 2011).

Lave and Wenger proposed that communities of practice exist everywhere and that we are part of numerous such communities, be it at our occupation, educational institute, home or in our social circles. Wenger added later:

"Communities of practice are built by persons sharing a common domain and who want to involve in group learning in their endeavor: a tribe learning survival skills, an art band looking for new forms of expression, a group of engineers operating on similar issues, surgeons discovering novel methodologies, amateur managers coping with each other's help". To be precise, communities of practice are groups of members with a common goal for something they practice and who learn how to better it with regular interaction. (Wenger, 2010).

The three crucial components that distinguish the community of practice from other communities and community groups as mentioned by Wenger (2010) are:

- *The domain*: A community of practice is very different from any social club or friend on the social network with some common interests. It is a process where members of the community shared the domain of common goals, commitment with the goals and interest that differentiate them from people from another social group (Wenger, 2010).

- *The community*: To achieve their goals in the community, members of the community set common goals, activities, and dialogues, support each member, and disseminate relevant information for the wellbeing of everyone by developing close relationships (Wenger, 2010).

- *The practice*: Practitioners are considered as members of a community or fraternity of practice because they develop a shared wealth of database including prior and personal experiences, means of dealing with recurring issues in their shared practices. This requires a quality of time to sustain interaction (Wenger, 2010).

Communities of practice are therefore where professional identities are formed and shared (Wenger, 1999). Research supervisors will belong to several communities of practice. For example, they will be members of a broader community of academics where common practices and values are shared across disciplines as well as members in a specific disciplinary community. Some may enter these communities at different levels as e.g. novices or experts. To illustrate the community of practice process in which novices become expert, Lave and Wenger (1991) use the term 'legitimate peripheral participation'. They indicate that through growing participation, novices are able to gain access to resources for understanding. Their capacity for learning on the job is part of the process of enculturation. Since learning involves making an individual is capable of undertaking new tasks, activities, and mastering new skills, communities of practice are vital. Newcomers will need access to other members of the

community. As Lave and Wenger (1991) elaborate: "Activities, tasks, functions, and understandings do not exist in isolation… Learning thus implies becoming a different person with respect to the possibilities enabled by these systems of relations… To ignore this aspect of learning is to overlook the fact that learning involves the construction of identities.

From this perspective, mastery of research supervision resides with the supervisor and organizes in a way community of practice being organized. Lave and Wenger (1991) urge that newcomers will need to engage in dialogue with other members of the community. Hence, new research supervisors will not only need access to the activities of other supervisors in order to get to know what the standard capabilities are and how to master and enact them but also engage in dialogue on these matters. In this regard, Lave and Wenger (1991, p.109) distinguish it as a conversation about practices from w*ithin* and *outside* the community of practice (Lave & Wenger, 1991).

Of further importance, not only the communication/dialogue between members of the community of practice but also communication on the interpersonal level between the student and the supervisor and Dysthe et al (2006) argues that supervision commonly referred as a communicative practice requires to be based on linguistic and communication theory (p.302). Further to explain the theory, they mentioned the theory of Bakhtin's dialogue which emphasizes on the use of multiple perspectives and opinion in the construction and knowledge transformation (Linell, 1998) and state: "…supervision practices include on one hand specific dialogues between the candidate and the supervisor or between group participants and on the other hand dialogic activities involving, for instance, institutional routines, the use of linguistic

resources and repertoires, and ways of thinking, talking and acting" (Dysthe, Samara, & Westrheim, 2006).

As explained earlier in this section, Community of Practice is more suitable for an individual with shared interests. It would require generous resources of mixed populations and experienced individuals. For example, it assumes the server/teachers are expert in teaching by research supervision. This may not be always the case in the chosen context. Mostly, in health science research education, research supervision is expected to be or may need one to one exercise. Albeit, the pragmatic approach of this theory is very useful, it might not be the best theory for this project for the above-mentioned reasons.

3.2.4 Social Cognitive Theory (SCT)

Social Cognitive theory, formally social learning theory, acknowledges the social (interactive) aspect of learning and unites two approaches to understand learning. These are the behaviorist approach, which emphasizes the influence of the environment on our actions, and the cognitive approach, which emphasizes the importance of cognition in mediating our learning and functioning (Kaufman, 2010).

Social cognitive theory suggests that people learn from each other, via observation, imitation, and modeling. These factors coupled with environmental infrastructure will either influence or hinder the supervisor's achievement (Bandura, 2001). Figure 3-2 illustrates the interaction of the three main elements and how these may apply to research supervision (Bandura, 1999).
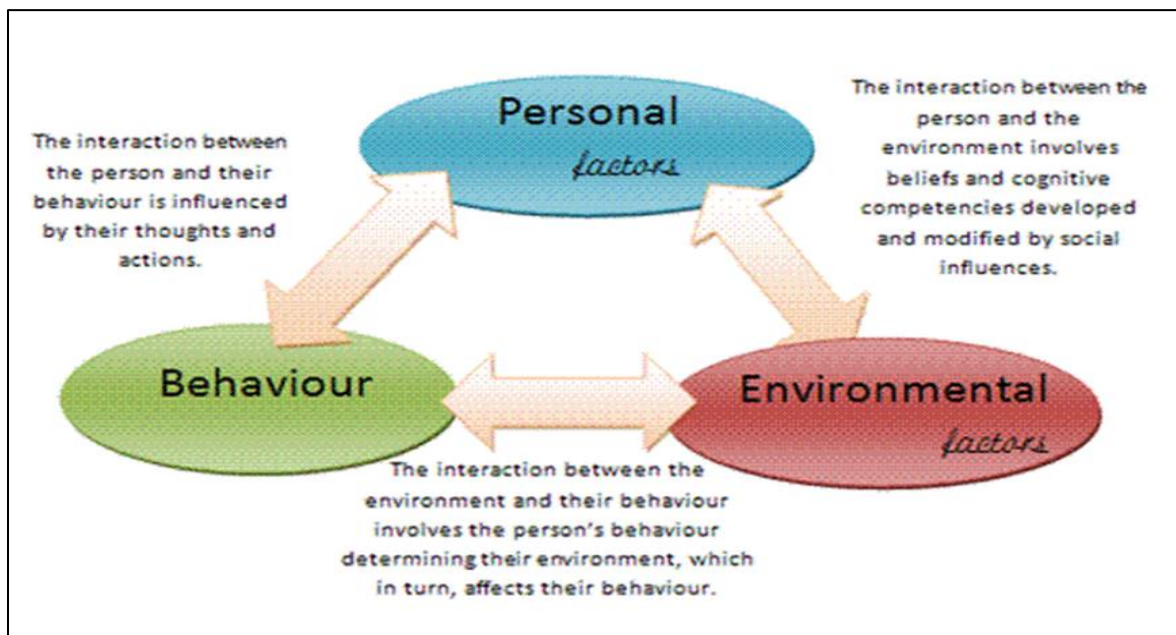
Figure 3-2: Interaction of the main elements of Social Cognitive Theory.

The theory includes both cognitive and behavioral aspects because it covers attention, memory, motivation, and self-efficacy (Bandura, 1977). Bandura's learning theory has been changed or renamed to social cognitive theory as he found that we learn by observing each other and that our personality develops through interaction between environment, behavior and psychological processes.

For example, Personal factors like Perceived self-efficacy. It is a prominent aspect of the socio-cognitive theory. Research supervisors with greater perceived self-efficacy are likely to be more confident in their abilities to perform the various roles and responsibilities and therefore have fewer professional development needs compared to peers who have lower perceived self-efficacy (Pajares & Urdan, 2006). Self-efficacy is therefore concerned with the perceived capability and is associated with motivation and achievement. Witnessing others undertaking tasks successfully will be an important source of self-efficacy and belief in one's own

capabilities to master comparable activities. For example, in designing questionnaires measuring self-efficacy items should be framed in terms of 'can do' rather than 'will do' statements since the latter is a statement of intentions while 'can do' is a statement of capability (Pajares & Urdan, 2006).

Research supervisors may, therefore, believe themselves efficacious or capable across a wide range of supervisory domains or may consider themselves capable in only certain domains. The areas in which efficacy is expressed (e.g. behavioral, cognitive, affective) may vary in terms of types of individuals the behavior is directed toward the context. Bandura (2006) reminds those constructing scales to measure self-efficacy that perceived self-efficacy should be"… distinguished from other constructs such as self-esteem, locus of control and outcome expectancies"(p.309) He perceives these as totally different phenomena and explains that self-esteem is a result of self-worth however locus of control is not capabilities as perceived by others but are beliefs about outcome in any trouble situation irrespective of who is controlling one's actions or are outside from one's control (Bandura, 2006).

Interventions to increase self-efficacy will include faculty development in the areas of organization, motivation, and achievement. Although the belief on self-efficacy is multi-layered, social cognitive theory classifies it many conditions where it may co-exist in different circumstances (Bandura, 1997).

Other personal factors that are vital ingredients in the process of research supervision include individual's prior research experiences, perceptions towards supervision, values, positive attitudes, knowledge in the subject area and interpersonal skills. On the other hand,

environmental components comprise effects that benefit or limit actions and the attainment of goals. All of these factors: environment, people, and behavior constantly influence each other (Bandura, 2001) and represents a triad which has specific relevance to the identification of the interlinked factors influencing acquisition and execution of research supervision competencies. Figure 3-2 illustrated the interaction of the three main elements and how these may apply to research supervision (Bandura, 1999).

Each component contributes to the practice of supervision and requires consideration within the personal understanding of supervisory functions and professional development of supervisors. Behaviors require knowledge, which in turn are influenced by values perspective (both personal and institutional or contextual). According to Summerall et al,(2000) knowledge or cognition is the base upon which supervisory competency is built. This includes knowledge of the discipline areas, research process, supervision models, ethics and institutional rules specific to supervision. Certain core personal values and attitudes (affective) will also influence performance. For example, whether supervisors value empowerment of supervisees and the achievement of a balance between support and challenge in supervision might be considered a significant prerequisite by some supervisors (Summerall, Lopez, & Oehlert, 2000).

Furthermore, Bandura believes that modeling of behavior can have more influence than direct experience. The four variables that are involved in modeling are attention, retention, reproduction, and motivation. For example, in the context of research supervision, supervisors' motivation and reproduction will affect their interaction with students. Also, supervision can be seen as an individual consultation process based on the supervisor's direct observation of

the students' practice and progress. Furthermore, attention and motivation are crucial for this process to be transformative and they will be dependent on experience and the developmental level of the research supervisor. Outcome expectations refer to individuals' belief of the consequences that are expected to arise in some particular actions by the individual. It is important to shape decisions for activities need to pursue or not. For example, research supervisors may expect that if the institution provides them with training, support and guidance regarding their roles and responsibilities, the outcome would be higher levels of personal motivation and success for supervisees.

One of the most important qualities of this theory is that its underpinning philosophy is objectivist in the sense that it assumes a golden standard of practice. This is very important in the context of this research because of the nature of the research aim which is to cast a light on the educational process that endured by the research supervision process in health education in general.

The keyword in social learning theory is "social" which refers to the context within which supervision occurs. In this current research, the social element is represented by the institutional, social and cultural factors that might influence the research supervision process. Therefore, these factors will be considered when designing my inquiry to assess the research supervisors' needs. The theory also helps me to identify important variables (supervisors' characteristics, attitudes, values, self-reflection, and motivational factors together with environmental socio-cultural factors) and their potential relationships in order to understand the multi-faceted nature of research supervision.

In summary, the main aim of this chapter was to find the most suitable theoretical framework that would guide the conceptualizing and analysis of the data in this project. The chapter discussed four theoretical approaches (i.e. reflective practice, experiential learning theory, communities of practice and the social learning theory). The reflective practice and the experiential learning theories shares assessing the learning/teaching process through intrinsic factors. However, they are different in their underlying philosophy. The Reflective theory is objectivist which assumes a golden standard of supervision while ELT is a subjectivist theory, a one that does do not commit to a single golden standard practice of supervision. Although reflective practices theory is closer to the aim of this project than the ELT, however, they both lack the extrinsic factors which rendered them unsuitable for or project. The third theory which is the community of practice is a pragmatic theory that focus on a group of individuals who shares the same interest. Such understanding of the COP is considered a limitation to the context of this project because of the fact that research supervision entails a one to one interaction. The fourth and the most suitable was the positivist approach of Social Cognitive theory. It was deemed the most suitable because it combines the interinsic and extrinsic factors with a through reflection on the interaction between them.

CHAPTER FOUR:

RESEARCH METHODS AND DESIGN

4 RESEARCH METHODS AND DESIGN

4.1 Introduction

This chapter will begin with describing the justification of using mixed methods, the context in which this study was conducted, how participants were selected and the process of obtaining the ethical approval from the Institutional Review Board (IRB). The chapter will also describe the different stages needed for developing and validating the Research Supervision and Academic Readiness Scale (RSARS) instrument.

The main objective of this study was to develop and validate the Research Supervision and Academic Readiness Scale (RSARS) in order to explore factors affecting research supervision practices from faculty perspectives, and to determine academic readiness of research supervisors. This study used multiple research approaches that included Experts opinion, focus group, Delphi technique and semi-structured interviews in order to develop the Research Supervision and Academic Readiness Scale (RSARS) that was used in the quantitative part. Stages used are summarised in the following table (4-1):

Table 4-1: Summary of the different stages of the study

Stages	Description	Setting	Related tables and figures
Stage I	Initial development of the scale: ➢ Phase I: Searching literature ➢ Phase II: Expert Opinion ➢ Phase III: Focus group ➢ Phase IV: Delphi Rounds (2) ➢ Phase V: Pilot	KSAU-HS	See figure for steps See figure for analysis
Stage II	Qualitative Data collection (semi-structured interviews)	KSAU-HS & Sydney	See figure (thematic analysis)
Stage III	Quantitative Data collection: ➢ Scale distribution ➢ Scale Validation	KSAU-HS & Sydney	See Scale (appendix)

4.2 Mixed methodology approach

Mixed methods research is formally defined as the type of research where the researcher integrates quantitative as well as qualitative research methodologies or viewpoints into a single study (Johnson & Onwuegbuzie, 2004). It presents insights that is not possible when conducting quantitative data or qualitative data alone. It acts as an equalizer by permitting to compensate for built-in method weaknesses, benefit from method strengths and balance the unavoidable biases. The core principle of mixed methods research as debated by Johnson and Turner (2003) is through gathering numerous types of data, with various techniques and methods to ensure that it mirrors corresponding strengths and non-conflicting weaknesses. (Greene, 2007; Johnson & Turner, 2003).

The debate on qualitative as opposed to quantitative has coexisted since the brisk development of mixed methods, combining qualitative and quantitative methodologies in ways which apparently bridge the gap in addressing questions related to research (Harwell, 2011). The origins of mixed methods go back to Campbell and Fiske's multi- trait, multi-method matrix (Campbell & Fiske, 1959). Although this method is still in its infancy, the groundwork of its philosophy and methodology as well as its practice standards have come a long way and has developed since the early 1990s (Tashakkori & Creswell, 2007).

Johnson et al (2007) state mixed methods research to be an approach to knowledge (theoretical and practical) that strives to regard various concepts or perspectives. It is a strategy, which integrates quantitative and qualitative methods to help better understand the world and is

widely utilized in social and behavioral or human sciences (Johnson, Onwuegbuzie, & Turner, 2007).

Campbell and Fisk (1959) are sometimes viewed as the first to formalize the application of utilizing numerous research methods with their introduction of the triangulation concept, referring to multiple methods as part of a verification process (Campbell & Fiske, 1959). Denzin (1978) was the first to denote triangulation as "the combination of methodologies in the study of the same phenomenon" and outlined four types of triangulation (Denzin, 1978). More recently and of relevance to this study however, Collins *et al*, (2006), identified four principles for carrying out mixed-methods research. These comprise of instrument fidelity e.g. designing new instruments, evaluating the appropriateness and/or functionality of current instruments (Collins, 2006). There is strong agreement in the literature stating the involvement of mixed research in quantitative as well as qualitative research and the reasons for doing so is to provide better understanding and greater confidence in conclusions (Johnson, Onwuegbuzie, & Turner, 2007).

4.3 Context/Setting

In order to provide external validity, the scale was tested in two different universities/ academic centers that differ geographically and culturally. King Saud Bin Abdul Aziz University for Health Sciences (KSAU-HS), Riyadh, Saudi Arabia and University of Sydney (Sydney), Australia. KSAU-HS is a new university, which was founded in 2004 and at the time of writing had been established for 10 years. On the other hand, Sydney was founded in 1850, and is the oldest university in Australia. The following section will provide some contextual details about each of these universities.

4.3.1 General information on King Abdul Aziz Medical City & King Saud bin Abdul Aziz University for Health Sciences

The National Guard Health Affairs (NGHA) is an organization providing a medical healthcare system with a primary role of providing primary, secondary and tertiary healthcare to the National Guard employees and their dependents, also known as King Abdul Aziz Medical City (KAMC) which commenced its operations in May 1983. Since then, it has continued to expand, while providing services for a rapidly growing patient population in all of its catchment areas. Today, King Fahad National Guard Hospital has evolved to be part of the King Abdul Aziz Medical City with many other prominent medical centers. Since its inauguration in February 2001, within a short span, KAMC has been recognized as a distinguished healthcare provider. In addition, most of the medical services, such as pediatrics, medicine, emergency medicine and others have been approved to be responsible for postgraduate training programs in their specific fields, namely: residency and fellowship training programs.

Furthermore, over the past five years a Nursing College, Medical College, Postgraduate College and more recently a College of Allied Health Sciences has been established, thereby creating the nucleus for King Saud Bin Abdul Aziz University for Health Sciences (KSAU-HS). There are currently 21 residency training and 28 fellowship programs.

The College of Medicine at King Saud Bin Abdul Aziz University for Health Sciences (KSAU-HS) implemented a four-year graduate entry program in 2004. Recognizing the importance of student research, a recent requirement of the undergraduate curriculum is the submission of a completed research project before graduation. At the postgraduate level, a number of residency programs require submitting research projects by the end of the training period such as in Family Medicine and Obstetrics and Gynecology. Majority of academic faculty have joint

appointment with the university and usually research supervisors are assigned according to their research experience and interest.

Since its establishment in 2007, the Master's program in Medical Education requires students to undertake a research project as part of the fulfillment of the degree and there is also an expectation that there will be an increase in doctoral submissions as students take the next step from Masters' projects. As research is essential to guide improvements in health systems and to develop new initiatives (Shankar, 2007), the developing trend in enrollments for doctorates in professional and practitioner-oriented fields in the UK, US and Europe (Evans, 2001) might therefore also be expected in the Kingdom of Saudi Arabia. There will consequently be greater emphasis on the quality of research supervision and research produced.

4.3.2 General information of Sydney Medical School

Sydney Medical School fosters world-leading research in cancer, obesity, sleep medicine, pain management, and public health. There are more than 1,600 active researchers, with more than 3,000 publications in 2014. There were more than 1,100 higher degree research students in 2014. In terms of teaching, there were over 1,200 students enrolled in the specialist graduate medical program. More than 1,500 students were enrolled in other postgraduate courses.

Similar to many Western universities, the University of Sydney has a published policy on supervision of higher degrees by research which is accessible on line (http://sydney.edu.au/policies/showdoc.aspx?recnum=PDOC2013/316). The document contains guidance on eligibility, roles and responsibilities and development of supervisors as well as links to other relevant policies and procedures and codes of conduct. On the other hand,

KSAU-HS is in the process of publishing guide lines for both students and supervisors on rules and regulations.

4.4 Participants and recruitment

Permission was sought through the respective faculty deans and relevant staff to allow access to a list of potential participants from the KSAU-HS and Sydney Medical School research supervisor data base. Eligible research supervisors were identified through existing university records/registry and through communication with coordinators of research supervisors of undergraduate/honors and postgraduate programs in order to facilitate the process. Academics who had current or previous supervision with undergraduate and or postgraduate research projects were eligible as per university rules.

To get more perspectives about academic supervision roles and responsibilities, in-depth interviews were conducted with a purposive sample of 18 faculty members who had a year or more experience with research supervision. A list of pre-prepared open-ended questions were used to facilitate the interview. Questions included research supervision experience, views regarding important skills and expertise needed; roles and responsibilities of supervisors, challenges to research supervision, training support needed etc. Those meetings were held at the convenience of participants. The necessary number of interview meetings with participants was determined when the researcher decided saturation had been achieved (i.e. nothing new forthcoming). Meetings were recorded and transcribed verbatim. A thematic approach was utilized in analyzing the data.

For the quantitative survey, the Research Supervision and Academic Readiness Scale (RSARS) was sent to all eligible participants through email with an introductory letter and a participant consent form explaining the purpose of the study and the task required to complete the

questionnaire. The RSARS instrument has four main categories: Demographics, Research Training and Experience, Research Supervision Experience and Self-Reported Research Supervisory Readiness Scale. To ensure the maximum number of questionnaires completion by participants, they were notified about the study in advance and provided information about distribution and collection in a suitable manner (Figure).

```
          ┌─────────────────────────────────────┐
          │  Faculty Deans & Program coordinators │
          │  (KSAU-HS & Sydney Medical School)    │
          └─────────────────────────────────────┘
                           │
                           ▼
          ┌─────────────────────────────────────┐
          │  List of Eligible Research supervisors│
          │  (current/previous)                   │
          │  Under AND/OR Postgraduate            │
          └─────────────────────────────────────┘
              │                           │
              ▼                           ▼
      ┌───────────────┐  ◄──────►  ┌───────────────┐
      │ Undergraduate │            │ Postgraduate  │
      └───────────────┘            └───────────────┘
                           │
                           ▼
          ┌─────────────────────────────────────┐
          │  E-mail with introductory letter     │
          │  +                                    │
          │  Consent                              │
          └─────────────────────────────────────┘
                           │
                           ▼
          ┌─────────────────────────────────────┐
          │  Questionnaire Survey                 │
          │  RSARS                                │
          └─────────────────────────────────────┘
            │         │            │          │
            ▼         ▼            ▼          ▼
```

| Demographics Participants | Research Training & Experience | Research supervision experience | Readiness scale (Self-reported) |

4.5 Ethical issues and considerations

Ethical approval to conduct this study was sought from both universities; University of Sydney Human Research Ethics Committee (HREC) and King Abdullah International Medical Research Center (KAIMRC) at King Saud Bin Abdul Aziz University for Health Sciences. Permission was sought through faculty dean and relevant staff to allow access to a list of potential participants from the KSAU-HS and Sydney Medical School research supervisor database for both qualitative and quantitative.

All participants were fully informed about the aim of the study and were assured of the confidentiality of data and the freedom to withdraw from the project at any time without affecting their relationship with the university. Written informed consent was obtained for participation at the time of the interview (appendix). Participants were reminded before commencing the interview that they could decline to answer any question or to withdraw from the study at any time, without having to give an explanation for doing so. With the participant's consent, the interviews were audio-taped, transcribed and de-identified.

The interviews were transcribed twice to ensure completeness and accuracy of data. To ensure the confidentiality of participants, all audio files and transcripts, were stored securely on password-protected computers at the King Saud Bin Abdul Aziz University for Health Sciences, which could only be accessed by the researcher. All data was de-identified prior to analysis and reporting in order to protect the participants' privacy. The study results could be reported in academic journals and scientific meetings. Participants were provided with the researcher's contact details to facilitate their communication with the researcher in the event there were any questions or concerns regarding the study.

4.6 Background and preparation for the instrument development

Without careful conceptualization and definition of the important constructs of any instrument, the instrument is likely to have poor construct validity.

The researcher considered the following questions/issues during the early phase of development, for example:

- What kind of instrument is required to measure research supervision process?

- What sections and items are important and how might they be related?

- Will the instrument measure specific aspects of supervisory needs or will it consider supervisory needs more broadly?

Some of the constructs in research supervision that needed to be measured were derived from a theoretical framework. However, since there was a limited body of literature specifically on research supervision, the researcher engaged in the following process (stage I) so as to gain explicit understanding of possible determinants or factors for effective research supervision.

4.7 Stage one (initial instrument development)

The objective of this stage was to develop an initial version of the instrument which included the multiple phases of the initial questionnaire development, which was published in Health Profession Education (Al-Muallem, Elzubeir, Roberts, & Magzoub, 2016). This stage of the study was carried out at KSAU-HS and it included the following five phases which are discussed in detail as below:

- **Phase I**: Literature review and preliminary study formulation which included developing and defining study purpose, goals, objectives, research questions, searching literature which helped in developing Background and conceptualization.

- **Phase II**: Expert opinion to explore domains and sub-domains.

- **Phase III**: Focus group discussion to further develop items.

- **Phase IV**: Delphi I & II rounds which helped reaching consensus on developed items.

- **Phase V**: Questionnaire piloting and reliability testing.

4.7.1 Phase I (Literature review and preliminary formulation)

At the beginning of the study, a thorough search was conducted using PubMed, Medline, ERIC, Google scholar, Blackwell, Science direct databases. The key words that were searched include: research, supervisory needs, preparedness, undergraduate and postgraduate supervision, supervision readiness". Due to the anticipated lack of resources in this area, no date limit was stipulated. However, the literature accessed did not provide examples of questionnaires utilized to assess research supervisory needs. It was therefore considered necessary to develop and validate an instrument. The preliminary literature search was regarding the different competencies, roles and responsibilities of research supervisors were conducted. The literature search was later extended to include consideration of the different research skills required by supervisors, generic steps part of the research activity and the research supervisors' overall needs. This helped in formulating a preliminary draft (outline) of the questionnaire.

4.7.2 Phase II Seeking Expert Opinions

A preliminary questionnaire outlining background information skills required of supervisors of undergraduate and postgraduate educational research was drafted. However, this initial drafted questionnaire needed further input from experts in the field of medical education and research in general. As a result, planned meetings were arranged with four research experts (three males and one female) who had expertise in research supervision, two medical educators and two other researchers. They were invited to identify the key roles of research supervisors as well as relevant domains that could form sections or subsections of the questionnaire. During these meetings, some notes were taken in which two main domains were identified namely: Research Experience and Research Supervisory Needs.

A checklist of 18 items on supervisory needs was generated under the domains of administrative and scientific needs on a Likert scale format. Main items proposed included: supervisors' needs, time to do it, having the basics of research skills and supervisor personal abilities.

4.7.3 Phase III (Focus Group Meeting)

A focus group can be defined as a group session which is semi-structured, with a group leader or facilitator moderating it and carried out in an informal setting for gathering information on a specific topic (Morse, 1991). Typically, a group of eight to twelve people gather to explore a topic that is not well known to the researcher (Bender & Ewbank, 1994a). However, smaller groups (4 to 8) are also appropriate as they may allow for greater contribution from each individual participant. Because discussion is enhanced in a group setting, perceptions and opinions can be enriched as well as differences in perspectives can provide new insights into

the topic. It is recommended that a set of questions be prepared in advance which would guide and direct the discussion (Bender & Ewbank, 1994a).

Following the analysis of the expert opinion outcomes (phase I), the preliminary draft questionnaire was modified, and a focus group session was planned with the agenda of "Exploring Research Supervision Experiences and Needs". A set of three main trigger questions/topic guides/ issues were identified to facilitate the group discussion and to assist future questionnaire development. The meeting was held in the College of Medicine, King Saud Bin Abdul Aziz University for Health Sciences (KASU-HS). A group of five medical educators and faculty members who were involved actively in research supervision of undergraduate and/or postgraduate students were invited to participate. Creating a non-threatening, supportive climate, the facilitator prepared three questions/ topic guides in advance to use as a discussion guide, table 4-2.

Table 4-2: Questions guiding the focus group discussion

Questions guiding the focus group meeting
➢ What are the competencies of a good research supervisor?
➢ What in your view are the problems facing research supervision in relation to research supervisors, students and system generally?
➢ What suggestions, solutions or recommendations would you make for a better research supervision practice?

The focus group meeting was audio taped and because of the number of members in the group, lasted 90 minutes to allow maximum contribution from the participants. The focus group participants reached consensus by saturation, comprehensively listing the competencies, problems faced and recommendations, validating the content of the questionnaire and suggested some additional items. This was supplemented with notes taken by the facilitator.

The audiotape was transcribed and analyzed (using thematic analysis) independently by the principal and co- investigator (AM & ME). Transcriptions were compared with hand-written notes. Themes were identified, suggestions for questionnaire improvement studied and modifications made accordingly. Independently, a second transcriber (ME) confirmed the emerging themes. Transcription and analysis of focus group interviews require judgment and skill (Bender & Ewbank, 1994b).

This resulted in confirmation of the three main domains of the questionnaire and their subsections (i.e. administrative and scientific needs) and the identification of a new subsection of interpersonal skills and requirement. A total of 31 items were identified from the focus group discussion and then combined into relevant sections (18+ 1 additional in the administrative section and 12 items under the interpersonal skills). Appendix

4.7.4 Phase IV (Modified Delphi technique)

As there was a need for consensus on the items generated through the first three phases, it was deemed necessary to use Delphi technique (Hsu & Sandford, 2007). This technique is an accepted and widely used method for gathering data from respondents within their domain of expertise. The technique is designed as a group communication process, which aims to achieve a convergence of opinion on a specific real-world issue. It is also utilized in numerous areas of study: program planning, needs assessment, policy making, and resource management to evolve a range of options, discover or reveal underlying presumptions, as well as correlate perceptions on a subject covering a broad range of disciplines. The Delphi technique is a method of creating consensus on a specific subject or topic among a group of individual without necessarily bringing them together face-to-face (De Villiers, De Villiers, & Kent, 2005).

For the purpose of this study, a modified Delphi technique was carried out over a series of two rounds and conducted with a panel of 37 participants; 25 local and 12 international medical education experts in different backgrounds from USA, Europe, Australia and the Middle East. According to Villiers *et al*, (2005), defining what constitutes an expert is critical for the validity of the Delphi.

In this study," *expert"* was defined as a local or external individual who had relevant research supervision knowledge and experience and whose opinion is respected by their peers. In this study, the majority of the selected experts were respected researchers and/or individuals who were involved in either or both under- and postgraduate research and medical education. The researcher initially communicated with local participants over the phone or by sending e-mails to take their agreement for participation. External participants were e-mailed via the chairman of the Department of Medical Education at King Saud Bin Abdul Aziz University for Health Sciences (KSAU-HS), Riyadh. The first round commenced whereby the questionnaires were sent to all respondents to their individual e-mails together with a covering letter explaining the task required (i.e. critiquing the contents of the questionnaire and adding items). Following refinement in round I, the questionnaire was sent back to the same 37 participants. In the second round, focus was on rating the items of the RSARS instrument.

The questionnaire was sent across to panel members electronically, who in turn independently responded to items individually and returned their responses to the researcher electronically or in person. A deadline of one week was given for returning of responses and a reminder was sent to those who had not responded. Reminder follow-ups were made over the phone and again by e-mails. The questionnaire contained a list of research supervisory needs and

requirements, with the respondents being requested to rate each item on a scale of 1-5, where 1 = Not important and 5 = Essential requirement for effective supervision. Additional items were requested, and suggestions were invited. Items were checked for duplications or repetitions and reorganized under relevant sections. Due to the small number of Delphi participants and the ordinal nature of the data, median ratings were calculated.

Following receipt and analysis of comments in round 1, items were added or removed from the original list based on whether maximum consensus had been attained among respondents. The second round then commenced, and the same participants were asked to rate the importance of items. Items were removed or added based on whether 75% or more consensus had been achieved among respondents regarding whether the item was a very important/essential aspect of effective research supervision. Any further comments or suggestions by the participants were also sought and taken into consideration. In both rounds, extreme views or outliers were very carefully considered to determine if they offered any new perspective.

Outcome of the Delphi rounds

Round I: A total of 37 questionnaires were sent, of which 30 were returned, (81% response rate). Ten out of twelve international experts responded; of which eight completed the questionnaire with some additional items and two only critiqued and commented on it.

Of the local group, 20 out of 25 responded, 18 returned completed questionnaires and 2 out of 20 gave only comments without answering or rating the items.

This resulted in 25 additional items, which were checked for duplications or repetitions, and reorganized under relevant sections (9 items in the administrative, 12 in the scientific and 4 in the interpersonal). This resulted in a total of 52 items in the questionnaire.

Round II: following refinement in round I, the questionnaire was sent back to the same 37 participants, seven of international experts responded, two only commented and one apologized. Sixteen of the local experts responded (62% response rate), but four responded after analysis was completed. There were few comments which were taken into consideration and their item ratings were entered in SPSS version 16. Frequencies and percentages were calculated and a cut-off level (75%) of the items rated very important and essential was included which reduced the items to a total of 38. Two rounds were considered adequate because all 38 items received agreement of 75% and above by the panel of experts.

4.7.5 Phase V – Questionnaire piloting

To pilot the questionnaire, a convenient sample of 60 eligible research supervisors including faculty members and hospital consultants were identified from the College of Medicine and Hospital (internal) records. As per college policy eligible supervisors are individuals at consultants and assistant professor ranks and above. All participants were communicated with, and sent questionnaires via e-mail or personal delivery by the researcher. Participants were asked to finish all sections of the questionnaire and rate their needs on a scale of a 1-5 where 1=Not needed and 5=Highly needed. A space for comments and additional items was provided.

Fifty-four of 60 participants returned the questionnaire (a response rate of 87%). Fifty-two completed questionnaires and 2 only commented on it. Other comments and additional items

were also provided. Four items rated as highly needed were all from the administrative section. Twenty-four items rated as moderately needed were from the scientific section and were more highly rated than items in the interpersonal section. The remaining ten items rated 3.0-3.5 in the interpersonal section, were considered of some or little need. A result of 0.70 is generally considered to demonstrate a satisfactory internal consistency. Eighty-one percent of the pilot sample age ranged between 35 and 50 years. Males accounted for two thirds of the sample and more than 88% were Saudis. Out of the total sample, 94% were consultants and 77% had academic titles.

The median of their academic involvement was 7.5 years ranging from 1 to 30 years and majority were involved in both undergraduate and postgraduate education (84.6%). The Cronbach's alpha was 0.98 which indicated redundancy. Figure 4-1 below illustrates the five phases of stage one for the initial instrument development.
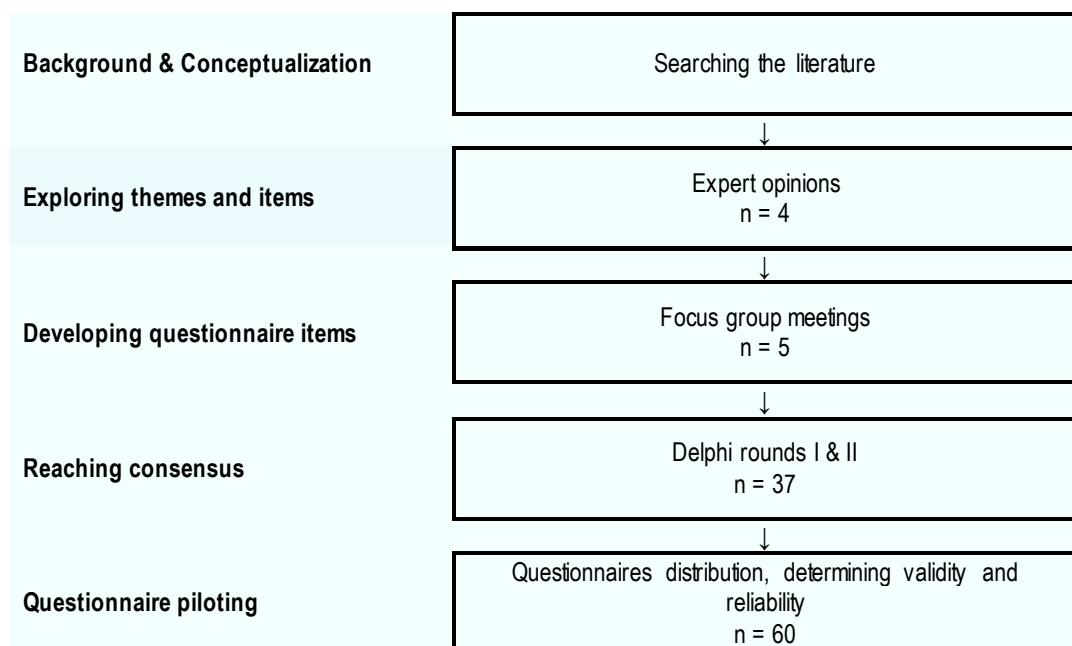
Figure 4-1: Phases of stage one of Instrument Development

Summary of data analysis and results of initial development of the instrument (stage one)

Analysis of data included qualitative transcription of interview, handwritten notes and focus group meetings. Themes were extracted and organized according to the questionnaire's structure and content. Quantitative information derived from Delphi outcomes and the pilot study was entered in SPSS version 16 for descriptive statistics and Cronbach's Alpha was deliberated to find the internal consistency of the questionnaire. A result of 0.70 is generally considered to demonstrate a satisfactory internal consistency. Due to the small number of Delphi participants and the ordinal nature of the data, median ratings were calculated.

Seeking expert opinion contributed to the identification of three main domains of the preliminary questionnaire identified (Demographics, Research Experience, and Research Supervisory Needs). The focus group confirmed the domains identified from the expert opinions which helped in the refinement and added items. In the first Delphi round, two items were removed as 95% of experts agreed they were not essential skills. In the next round, 38 items including the modified items were approved by 75% of experts and were retained. The instrument demonstrated high internal consistency (Cronbach's $\alpha = 0.98$) and content validity as shown by high agreement among Delphi experts. Results of the pilot study revealed the perceived administrative, scientific and interpersonal skill needs of the faculty which were not previously determined in our context. Figure 4-2 below illustrates summary representation of the analysis and the results of the developed instrument.
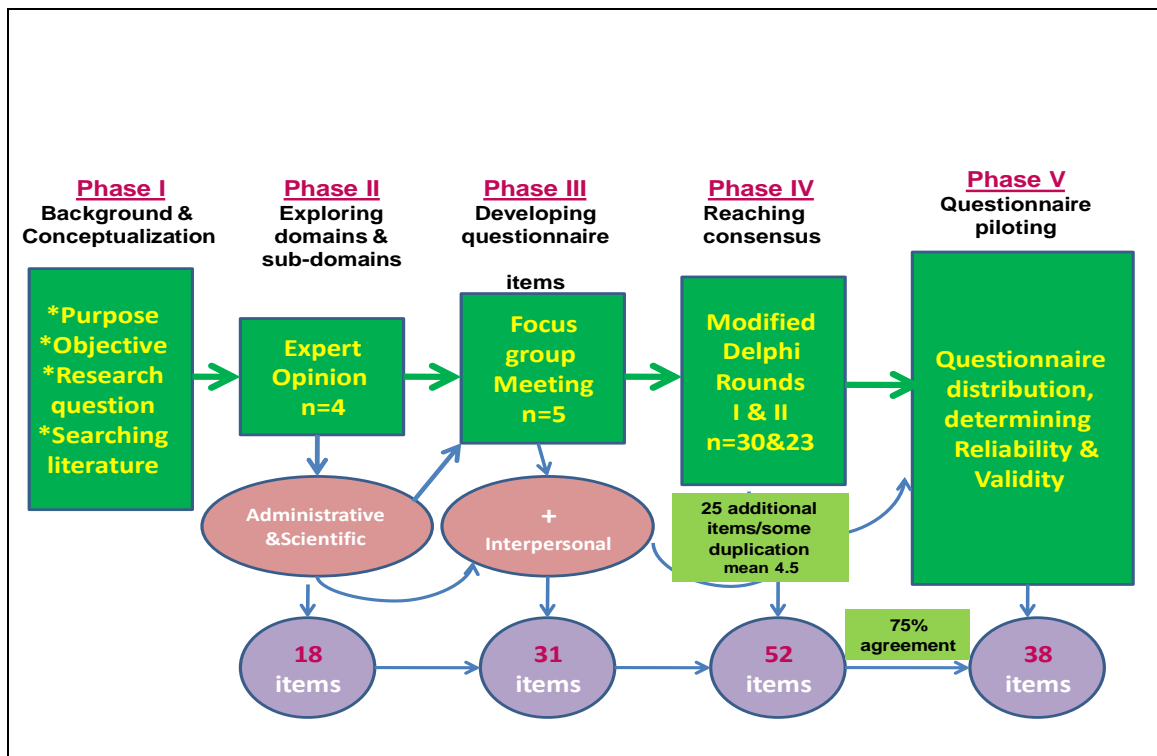
Figure 4-2: Summary of analysis and results of the developed instrument

4.8 Stage two (qualitative component)

The main objective of this stage was to evaluate factors affecting research supervision process and practices from faculty perspectives. This part of the research was conducted in both the universities (KSAU-HS and Sydney). During this stage of the study, the qualitative component in the form of semi structured interviews was carried out with eighteen participants.

4.8.1 Qualitative (semi-structured interviews)

Qualitative research techniques are centered around exploring and understanding experiences, viewpoints, and opinions of participants by discovering the meaning, usefulness, or reality that these participants live with (Hiatt, 1986). It also comprises of a collection of interpretive, material enactments or practices that make the world apparent. These practices transition the

world into a set of representations, comprising of field notes, interviews, discussions, pictures, recordings, and self-memos. At this juncture, qualitative research includes an interpretive, realistic approach to the world. This infers that qualitative researchers analyze things in their natural environment, trying to make sense of or elucidate phenomena in ways of the people's understanding of them. (Denzin & Lincoln, 2005).

Qualitative approach can be valuable in generating important insights about supervision. Face-to-face semi-structured interviews are well suited for this study because one of its principal strengths is the flexibility that allows for in-depth exploration in order to develop a rich understanding of the subjective experiences of participants (Burnard, 2005). The qualitative semi-structured in-depth interviews were conducted at both universities, King Saud Bin Abdul Aziz University for Health Sciences and University of Sydney.

The aim of these interviews was to explore the research supervisor's experiences and practices at different supervisory levels in order to further develop the current RSRAS survey tool. The main objective of the qualitative approach was to obtain in-depth understanding of the academics' faculty perspectives on issues related to research supervision. In addition, it was important to complement further development of the research supervision survey (RSARS) instrument and illuminate the possible findings and recommendations that could be applicable to the context.

4.8.2 Sampling and recruitment of participants

Research supervisors were purposefully identified and sampled from faculty records after permission from both universities (Sydney and KASU-HS) using indexed information in terms

of experience, departmental location, length and level of supervision, and load of supervision. The study sample was heterogeneous (they were of variable practices with undergraduate, post graduate students or both), in order to ensure including wide variety of experiences. They were invited to participate in the study through their official e-mails. In addition, snowballing technique was used to target skilled academic staff with both research expertise and research supervision experiences. Participants who accepted invitations were contacted by the researcher and interviews were arranged at a time and place convenient for each participant.

Interviewees included academics who had previously or currently supervised undergraduate and/or postgraduate research students. Permission was sought through the Faculty Dean and relevant staff from both universities KSAU-HS and Sydney, including the sub dean of Sydney Medical program, honors coordinators and postgraduate program coordinators to allow access to a list of potential participants from the KSAU-HS and Sydney Medical School research supervision database. Interviews were conducted until data saturation was reached and no new themes were emerging from the data (Sandelowski, 1995).

4.8.3 Conducting the semi-structures interviews

Semi-structured interviews with the study participants were conducted using broad topic/questions guiding the discussion with responsive follow-up and probing questions used to aid clarification. These questions were generated following a literature search and discussions with experts in medical education and supervisors in order to improve validity and obtain a variety of different perspectives. Questions included research supervision experience, views regarding important skills and expertise needed; roles and responsibilities of supervisors, challenges to research supervision, and the training support needed. Figure 4-3 shows the pre-prepared questions used as a guide to semi-structured interviews.

Questions guiding interviews

"Research Supervision perspectives/experience"

- Tell me broadly about your experience in research supervision?

- What does it mean to you to be a research supervisor?

- What skills & expertise do you think are important for supervising?

- What keeps you going as a research supervisor, what motivates you?

- What do you enjoy about research supervision?

- What kind of training or support or professional development have you had for supervising?

- What do you do to maintain or improve your supervision practice?

- Can you give an example of a memorable/challenging supervision experience?

- How do you deal with the student at risk of not progressing?

- Are there any particular issues in dealing with international students?

- How do you keep track of the progress of your students?

- What is your view on the amount of research training students should have undertaken prior to undertaking a research degree?

- Is there anything else you would like to add that we haven't covered?

Figure 4-3: List of pre-prepared questions used to facilitate the interview

The topic guide served as an organizer of content but did not dictate data collection since it incorporated considerable flexibility in order to allow the participants to introduce new issues unanticipated by the researcher.

At the beginning, background questions were used to establish rapport and to make the interview as comfortable as possible, such as "how long you have been supervising?", "What

kind of projects have you been involved in? This helped in ice breaking and creating a welcoming and friendly environment, Figure 4-4.

<div style="border:1px solid #000; background:#e8f4f8; padding:1em;">

Interviewee's background information questions

- How long have you been supervising?
- At what level(s) have you supervised?
- What kinds of projects/research have you supervised?
- How many students have you supervised approximately?
- How many of your students have completed their research?
- What is your current research student load?
- How many publications do you have?

</div>
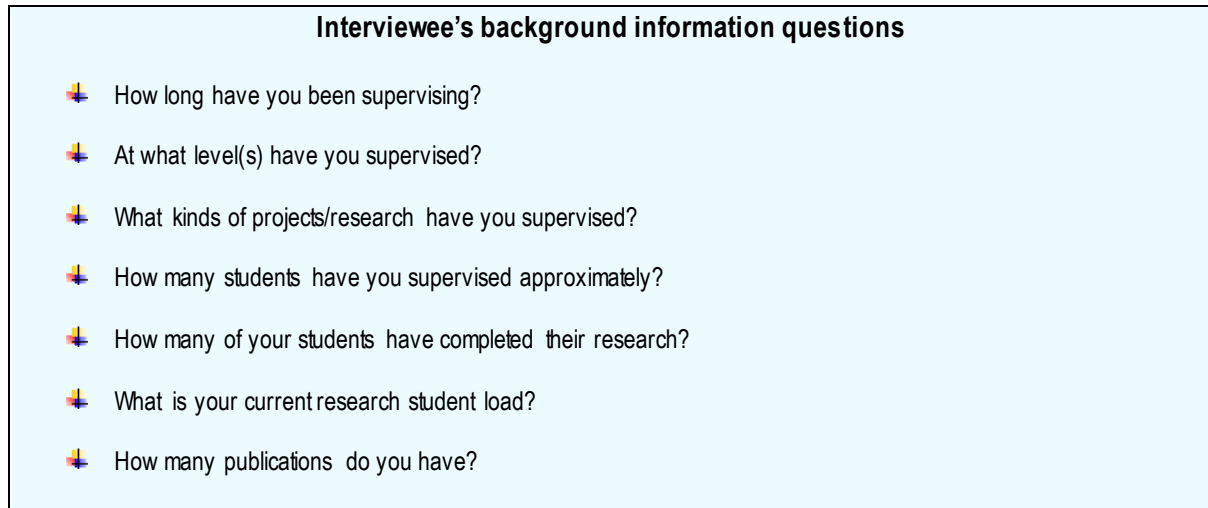
Figure 4-4: Interviewee's background information

Prior to conducting interviews with the selected participants, questions on the topic guides were piloted using two independent researchers. This was done in order to check for appropriateness and clarity of the questions. New emerging topics were discussed with project supervisors to determine feasibility and appropriateness. Thereafter, the topic guides were modified accordingly to accommodate the new ideas that will be explored in the future interviews.

Interviews were conducted in English, which was appropriate to all participants. At the end of the interview, participants were thanked, and any additional comments or inputs were welcomed. With the participant's consent, the interviews were audio-taped, transcribed verbatim and de-identified. The interviews were double transcribed to ensure completeness of data. The interviews time ranged between 30-45 minutes.

4.8.4 Qualitative data analysis

Using the thematic analysis processes described by Braun and Clark (2006) that includes: familiarization, initial code generation, scrutinizing for themes, evaluating and refining themes, naming the themes and producing the final report. Data was explored using thematic analysis and this was based on an inductive approach using the raw data to develop analytical themes from the experiences and views put forward by the participants during the interviews. An inductive approach allowed the opportunity to open up the research to any possible factors that might emerge from the interviews as the supervision process involves multiple dimensions (personal, professional, and organizational). Thematic analysis is a technique for identifying, evaluating, and documenting pattern within the data. A theme is a pattern apprehending something vital about the data related to the research question, and portrays some aspects of patterned response or sense within the data set (Boyatzis, 1998). Thematic analysis has the advantage of being structured yet flexible, and provides an enriched yet composite account of data (Braun, 2006).

The analysis process used qualitative coding, a method of attaching "labels to segments of data that describe what each segment is about". Coding was primarily used to raise analytic questions, to distill the data, sort it and allow analytical comparison with other segments of the data (Charmaz, 2014). The analysis was based on the use of interview transcripts provided and has been conducted using thematic analysis.

There are three classical types of coding system which lead to one another. The first level of coding which is open coding takes place as the data is collected. It is involved in the reading of the transcripts several times and creating labels for parts of the data. There is an intermediate step in which the initial open coding is re-examined and focused. This will lead the researcher

to the second level which the axial coding. This type of coding involves the identification of the relationships among the open codes and categories from the first level. Finally, the last step of the data analysis is the selective coding. At this stage the core concepts emerged and identified through the previous coding (open and axial) are grouped into categories and the process completed.

The first two interviews were coded by the researcher and checked by an expert in qualitative research within the faculty of KSAU-HS for accuracy and consistency of coding. The coding of the rest of the interviews were checked and revised by the project supervisors who were experienced in qualitative research. Moreover, it is a contextual method that could acknowledge the ways participants interpret their experience and in turn, the ways the broader social, institutional and educational context impose on those interpretations.

4.8.5 Data coding

Data coding involved identification of bits of data that were meaningful in relation to the research question, and through comparisons - looking for patterns or variations in the data. As decisions were made continuously about which bits of data could be assigned to categorize, the meaning of patterns, categories and themes emerged from the data evolved during coding, (Boyatzis, 1998):

> *The qualitative analyst's effort at uncovering patterns, themes, and categories is a creative process that requires making carefully considered judgments about what is really significant and meaningful in the data (p. 406) (Boyatzis, 1998)*

Coffey and *Atkinson* (1996, p27) indicated that:

"Coding can be thought about as a way of relating our data to our ideas about these data" (Coffey & Atkinson, 1996).

In order to obtain a summary and establish acquaintance of the data, the transcripts were read and re-read. It also enabled in recognizing inceptive ideas. This was achieved by penning down preliminary notes on the hand margins of the transcripts, also comprising initial opinions and comments. These ideas were then coded or encrypted within each transcribed interview whereas phrases, metaphors, or statements were retained as far as viable in the participants' own words while when naming codes.

In the event of prior issues which had taken place earlier, care was taken to maintain openness and pliability during coding. Coding the data comprised of logical and instinctive thinking. It comprised of few judgments on meanings, significance and relevance of issues.

After the initial code frame was developed, it was applied to the rest of the raw data bearing in mind that this frame could be evolving as the transcripts were read. A process of cross-checking then followed that involved the re-examination of all codes previously generated in order to assess the appropriateness of their labels as well as to discover any overlaps across codes or any that were effectively redundant.

The constant comparison technique was used where new codes were applied to the previously coded transcripts to make sure that all the data was considered as and while the analysis progressed (Charmaz, 2006).

Inter-connected codes were then clustered together. This yielded a list of what appeared to be important *categories* within the data. The meanings of categories were on one hand with the assigned bits of data, and on the other hand, with the ideas they expressed (Dye, Schatz, Rosenberg, & Coleman, 2000). The bits of data that "look alike" and "feel alike" were aggregated if they were related to each other conceptually enough to be categorized in a meaningful manner. Lincoln and Guba emphasized that categorization is to group data bits that apparently related to the same topic (Lincoln & Guba, 1985).

> *Devise rules that describe* **category** *properties and that can, ultimately, be used to justify the inclusion of each data bit that remains assigned to the category as well as to provide a basis for later tests of replicability (p.347) (Lincoln & Guba 1985).*

These categories were then sorted and grouped under broader '*themes*' identifying links between categories to group them thematically, Figure 4-5. However, it was kept in mind that the structure was not necessarily permanent and could be changed at a later stage depending on the importance and persistent presence of each code and category within the theme.

Clustering of codes and categories into themes was conducted with great openness and flexibility to perceive and recognize the emerging pattern. Emerging themes were described in terms that stayed close to the language and terms used in the data set.

The above process of analysis was described by Boyatzis as a *way of seeing* (thematic analysis) that involved three phases of inquiry: seeing and recognizing something preceding encoding, which in turn precedes interpretation (Boyatzis, 1998). The analysis uncovered five main themes from the collected data. These themes identified in the data revolve around (contextual,

supervisor and student factors) organizational rules and regulations, student-supervisor interaction, professional development opportunities, motivational factors and challenges.

Transcribed interviews (raw data)

⇩

Initial transcripts were read & re-read

⇩

Initial *ideas* identified

⇩

Ideas *Coded* for initial interviews (double coding)

⇩

Code frame developed

⇩

Codes applied to the new transcripts

⇩

New codes appeared and added to the *code frame*

⇩

Codes constantly compared and applied to previously coded transcripts

⇩

Inter-connected codes clustered into *Categories*

⇩

Categories grouped into *Themes*
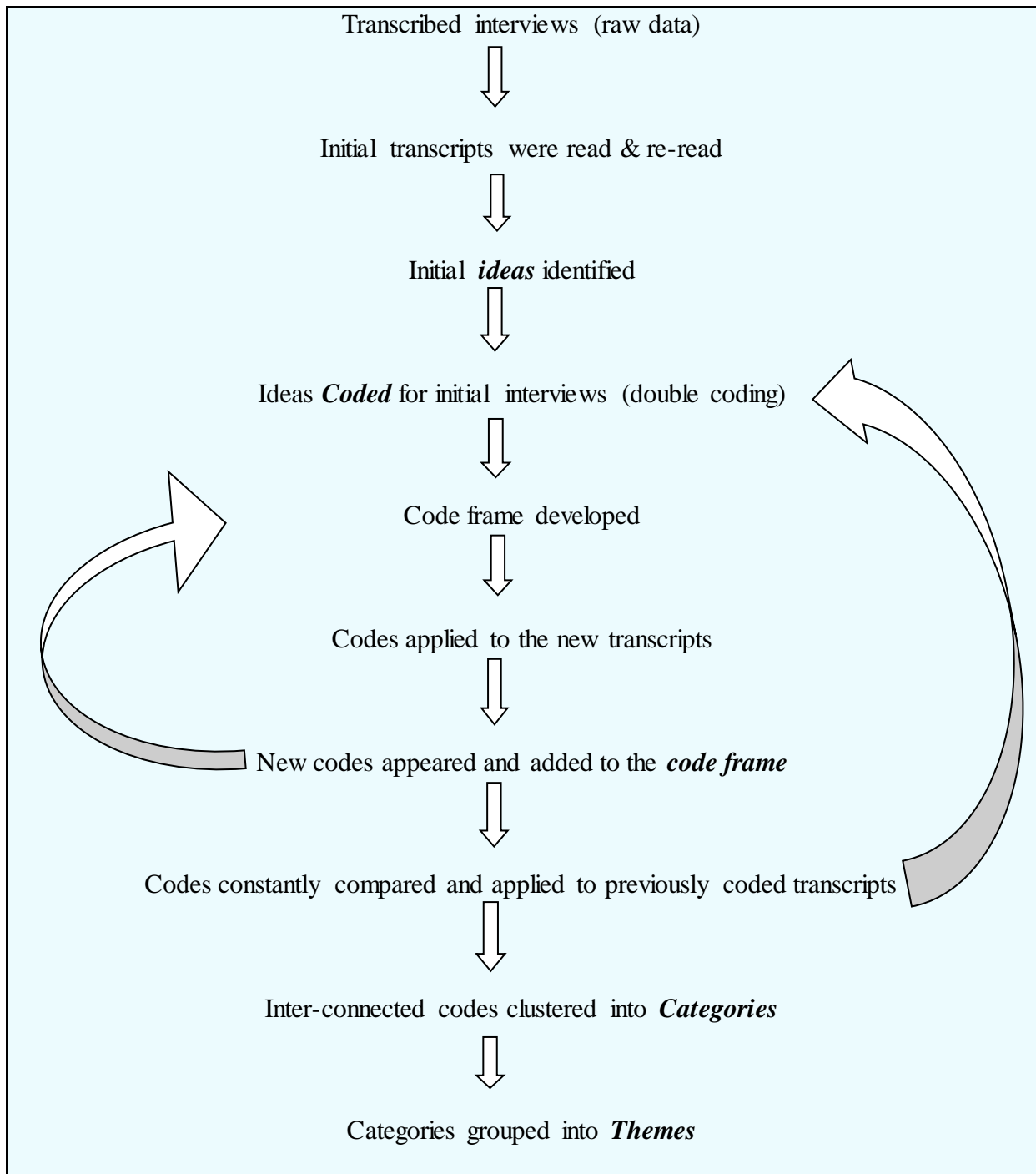
Figure 4-5: Thematic analysis process

Descriptive account

Themes were written using all the codes and categories within each theme with quotes to produce descriptive accounts of what was happening in that theme. The quotes in the descriptive accounts were sequenced taking into consideration similar beliefs, standpoints or events together. Direct quotes from the interview data were utilized to strengthen the face validity and authenticity of the displayed findings and indicated the integrity and proficiency of the results (Patton, 1990).

Explanatory account

Generating explanatory accounts comprised of finding associations between two or more themes. It was an activity consisting of discovering connections and specific behavioral patterns, even divergent ones. This enabled systematic clustering of themes that are potentially associated in a conceptual and sensible manner. For example, two or may be more themes could be linked to explain the process of supervision. This could be a subjective approach but if linked to previous similar research findings, especially if it comes from the same context, it would be an acceptable conclusion that could enrich further our understanding of research supervisor experiences.

4.8.6 Quality of data coding (trustworthiness)

To ensure the robustness of the data analysis, quality measures were undertaken to enhance the validity and reliability of the findings from the interviews. This was done with the help of the research supervisor, who has an experience with qualitative research. Analysis was performed

with two main stages involved in its process. The first or initial stage requires data coding, and the second or final comprising of comprehending through illustrative or descriptive accounts. In addition, there was an ongoing reflective dialogue with research supervisors about the analytic process in order to ascertain data analysis and description of high quality and rigor. Furthermore, to prevent a threat to validity and to enhance the rigor within this study, self-awareness and critical reflection by the primary researcher of any personal influences and their effects on the study were considered (Morse, Barrett, Mayan, Olson, & Spiers, 2002).

4.9 Stage three (quantitative component)

4.9.1 Quantitative research methods

Some of the main characteristics of quantitative studies are the instruments that it uses such as surveys or exams to gather information, its dependence on the probability theory for testing statistical hypotheses, it's typically drawn towards prediction and it assumes that there is only a single truth that is out there and is independent of one's perception. Unlike qualitative methods research, quantitative studies are deductive in nature as they have preconceived research questions. Quantitative methods also heavily rely on statistical inferences to generalize their findings to the general population (Lincoln & Guba, 1985).

They aim of quantitative research methods is to maximize how the finding is more or less objective, replicable and generalizable. What is vital to this approach is expecting the researcher to forgo his/her presumptions, prejudice and experience to ensure that the study and what it reflects is objective and that the inferences drawn from it are also objective. (Lincoln & Guba, 1985).

The main objective of this stage was to explore factors affecting research supervisors, determine academic readiness of research supervisors and to measure the validity and reliability of the instrument (RSARS).

4.9.2 Data collection instrument

Refining the instrument follows stage one and the five phases of the preliminary/initial development of the Research Supervision and Academic Readiness Scale (RSARS).

The research instrument constituted 4 main sections:

- **Demographics** including age, gender, level of qualification, academic involvement, years in teaching and level of teaching students.

- **Research training and experience** including involvement in research training activities, research interest areas and active involvement in research activities in the last five years in the form of writing proposals, publications (journals/books) and presentations (oral/poster) at national or international levels.

- **Research supervision experience** if they were actively involved in supervising research students, the level of student supervised including undergraduate or postgraduate or both and the load of students supervised.

- **Readiness scale items**

A checklist of items which included 38 items to measure the research supervisors' readiness/preparedness, including the three main domains such as institutional, personal skills required by research supervisors and interpersonal skills (professionalism) domains on five point Likert scale where 1=Disagree and 5= Agree, See Appendix.

- Domains of the readiness scale checklist items:

Institutional: This constitutes the administrative needs required by supervisors in order to supervise efficiently and were categorised into four main areas (4 items) including given protected time by the institution, having conducive research environment including availability of resources and admin support, in addition to institutional support and having access to adequate facilities.

The **skills required** by the faculty to supervise included the generic steps required for conducting research and comprised of 21 items.

The **interpersonal skills** needed for interactions with different students and being able to facilitate, give feedback and being a role model for research students. (Professionalism) was comprised of 13 items. See appendix

Following the conduction and analysis of the qualitative data, several items were generated, and modification of the existing ones was made. To check the content validity of the survey tool, they were sent to an expert panel (n=10) from both universities. The expert panel included educators, PhD students and educators with medical education background for their inputs on the clarity of the questions, check for duplications and redundancy of the items. The review process was conducted through an online questionnaire. The experts worked independently to evaluate the survey tool.

After reviewing the feedback from the ten experts, and checking the questions for duplication and removing any redundancy, 30 items were retained out of the 38 in the initial list. Following this, the questionnaire was piloted on 20 participants from KSAU-HS faculty see Appendix.

4.9.3 Participants and recruitment in stage III

Academics that had previously or were currently supervising undergraduate, and or postgraduate students' research projects were eligible as per university rules. Invitations were sent via e-mails with the participant information statement, participant consent form and the Research Supervision and Academic Readiness Scale (RSARS).

Eligible supervisors were again identified conveniently through existing university records/registry, and communications with coordinators of research supervisors of undergraduate and postgraduate programs at both universities. The questionnaire was sent to eligible subjects along with an introductory letter and a consent form explaining the purpose of the study and the task required to complete the questionnaire which will take approximately 10-15 minutes for completion. The questionnaire had four main sections: demographics, research training and experience, research supervision experience and self-reported research supervisory readiness scale.

4.9.4 Pilot and survey monkey

The questionnaire items were modified and were built through online survey monkey. It was piloted on 20 participants within KSAU-HS academic staff to check for clarity and smoothness when filling up the survey online and looking for any possible difficulty or query when filing the survey.

To obtain a high participants completion rate, participants, were notified about the study in advance and were informed about survey distribution and collection in a suitable manner.

Data were collected to further assess the psychometric properties (validity and reliability) of the RSARS. Data were collected from academics (n>200) who were engaged in supervising undergraduate and or postgraduate research students.

4.10 Data management and analysis plan

4.10.1 Validity and reliability (construct validity of the scale)

The aim of this analysis was to explore the possibility of carrying out factor analysis on all items in the questionnaire in order to evaluate sampling adequacy for each item using Kaiser-Meyer-Olkin (KMO) and the anti-image correlation matrix. This has enabled the researcher to check if measurements of the items are above the recommended cut-off point of 0.5.

To start with, KMO measure was performed to find out the correlations between overall and individual items in the scale and determine if the values are closer to 1 in a range of 0 to 1. KMO values that are greater than 0.8 are regarded as very good, which will allow factor analysis to go ahead while those items with values less than 0.5 may need to be reversed if they are negatively worded or eliminated if they are not absolutely necessary to be retained. The Bartlett's Tests of sphericity was used to ascertain the level of the Chi square and whether factor analysis can be carried out.

Number of criteria were deployed to determine the factors that were extracted. One of the common criteria is the Kaiser criterion, wherein all factors with eigenvalues greater than 1 are considered for retention. Cattell's scree plot is another criterion where the eigenvalues of the correlation matrix are plotted. Any number that is above the point of inflexion or the elbow was retained.

For the rotated component matrix, this study selected the Varimax option as this is the recommended technique when there is no evidence to suggest that the components are correlated. Finally, factor loadings that were equal or greater than 0.4 were retained. Any cross-loadings were evaluated, and only higher loadings were retained. Factors that had less than three items were not considered for retention.

4.10.2 Statistical Analysis

Statistical analyses were carried out utilizing Statistical Package for Social Science (SPSS) version 20. The original 30 items were reduced to 15 items after running factor analysis. Total score, as the mean of the items, was calculated for the retained 15 items. Similarly, total sub-scores of institutional support, professionalism and supervisory skills were also calculated. Frequencies and percentages were used to present background information on the participant's characteristics including demographics, research training experiences and research supervision experiences of research supervisors.

Chi-square test was employed to evaluate the difference in the baseline features or characteristics between the two study site participants, Sydney and KSAU-HS. The two study sites were analyzed separately due the significant difference between KSAU-HS and Sydney participants. Nonparametric tests were used to compare the median of the readiness domains since the total scores of these domains are not normally distributed. Mann-Whitney test was used the compare the median scores of supervisory skills, professionalism, institutional support and the overall total score of variables with two categories such gender and qualification; while Kruskal Wallis test was used for variable with more than two categories such as level of

teaching and number of years involved in teaching. A p-value of <0.05 was taken to indicate statistical significance.

CHAPTER FIVE: RESULTS I

(QUALITATIVE)

5 RESULTS I: (QUALITATIVE)
(SEMI-STRUCTURED INTERVIEWS)

In this chapter, I will describe the results of the qualitative part of my thesis which aims to evaluate the research supervisor's experiences and explore their readiness to supervise research student projects, at undergraduate and or postgraduate levels. This chapter addresses the second research question for this study which is 'what are the factors and experiences of research supervision from the perspective of research supervisors?'

This qualitative part of the study took place in the two universities KSAU-HS and Sydney University. Eighteen participants were interviewed; seven were from University of Sydney (Australia), and eleven from KSAU-HS (Riyadh, Saudi Arabia). Interview time ranged between 35 to 60 minutes. Seven of them were females and eleven were males. Majority of study participants were involved in both undergraduate and postgraduate supervision. They were engaged in different kinds of research activities and had variable duration of years in supervision ranging from 1 - 33 years. Their current student load and joint publication also differed widely. Participants' student load ranged from 1 - 13 and their joint publication ranged from pending to more than 40. Participant's characteristics are summarized in Table 5-1.

Table 5-1: Interviewed participant's characteristics

N	Participants		Gender	Years of supervision	Level of involvement	N of students supervised	Kind of research/ area of interest	Current student load	Joint publication
P1	SC	Aus 1	Female	5 years	Postgraduate	10-12	Qualitative health research	8-10	A lot, Can't remember
P2	CR	Aus 2	Female	1 ½ year	Undergraduate (honors) & postgraduate	11	Obstetric, epidemiology, systematic reviews	10	>40
P3	AH	Aus 3	Female	6 mon (1year)	Postgraduate	1	Prognostic, Diabetes	1	In preparation
P4	MS	Aus 4	Male	11 years	Postgraduate	18	Clinical cancer research	6	~ 40
P5	LT	Aus 5	Female	7 years	Undergraduate (honors) & postgraduate	18	Cancer prevention, education	4	15-20
P6	SL	Aus 6	Male	33 years	Undergraduate (honors) & postgraduate	10-15	Public health	4	A lot
P7	PH	Aus 7	Male	15 years	Undergraduate (honors) & postgraduate	12	Lab, clinical projects, clinical trial	4	10
P8	SK	SA 1	Female	8 years	Undergraduate & postgraduate	15	Psychology/ education	5	4
P9	AO	SA 2	Male	10 years	Undergraduate & postgraduate	50	Basic clinical research, public health, medical education	5	10-12
P10	HK	SA 3	Female	10 years	Undergraduate & postgraduate	20	Medical (Obs/Gyn), medical education	13	5-6
P11	IA	SA 4	Male	7 years	Both	9	Endocrine/ medical education	8	12-14
P12	HB	SA 5	Female	3 years	Undergraduate & postgraduate	15	Clinical, epidemiology, medical education	4	Pending
P13	MN	SA 6	Male	4 years	Undergraduate	6	Surgery	4	---
P14	AH	SA 7	Male	12	Both	10	Clinical/ educational	2	1
P15	MF	SA 8	Male	12	Both	20	Clinical (chronic diseases/ DM)	4	1
P16	GG	SA 9	Male	25	Both	30	Basic sciences/ clinical	3	10
P17	HJ	SA 10	Male	8-9	Both	18	Clinical (Respiratory) /ethics	5	6
P18	AK	SA 11	Male	6	Both	12	Breast / Gyn oncology	2	2/15

In this chapter, as a common practice in qualitative research, I used the participants' quotes to support my interpretation of the data. For the purpose of identification, the participants were coded or numbered according to the source of the study site, with a code of Aus 1-7 for the Sydney University participants and SA 1-11 for the KSAU-HS participants.

In this chapter, I will present the analysis using the social cognitive theory (SCT) as the analytic lens. As explained earlier, this theory suggests that people learn from each other via observation, imitation and modeling. It also includes both cognitive and behavioral aspects. The social element in the theory refers to the context within which research supervision occurs. This means I was looking for those three major factors (i.e. context, cognition and behavior) in the collected data to determine how it impacted the participants' perception of good research supervision.

The interview data provided rich information about the research supervisor's subjective views and experience. Clustering of the interconnected codes to find patterns in supervisor experiences of research supervision yielded important categories, which were grouped forming the themes that represented the result of this chapter. There were five main themes emerging from the data as follows:

- Organizational rules and regulation (institutional factors)

- Supervisor/student interaction

- Professional development opportunities

- Motivational factors

- Challenges

The analysis of the interview data from both contexts was very similar. Therefore, it will be presented together under the defined themes. However, a few differences were noted between the participants from different contexts; and the difference if present in their perceptions, will be presented under the respective themes.

These emerging themes and sub-themes are further described in Table 5-2.

Table 5-2: Emerging themes and sub-themes

N	Main Themes	Sub-Themes
1.	**Institutional factors**	↓ Clear defined roles of primary and associate supervisor ↓ Knowledge of rules and regulations (formal and didactic) ↓ Selection of students ↓ Valuing supervision ↓ Other institutional factors
2.	**Supervisor/student interaction**	↓ Commitment and responsibility ↓ Interpersonal skills ↓ Effective communications ↓ Flexible and accommodating ↓ Feedback to students ↓ Mentorship
3.	**Professional development opportunities**	↓ Career flourishing/Building novice researcher ↓ Learning by supervising ↓ Supervisory training / discussion with seniors
4.	**Motivational factors**	↓ Publication of work/research outputs ↓ Student-related factors ↓ Enthusiastic students ↓ Students' satisfactory progress and transformation ↓ Feedback to supervisors
5.	**Challenges**	↓ Time challenges/constraints ↓ Being a good academician ↓ Importance of trained supervisors ↓ Student related issues ↓ Research environment

The chapter continues with a more detailed description of each theme and sub-theme below:

5.1 Institutional factors (organizational rules and regulations)

In this theme, I will describe the participant's perceptions about institutional factors that affect research supervision practices. These include supervisor's clarity in understanding their different supervisory roles, knowledge about their institutional rules and regulations (formal and didactic), their rights in selecting students, and how the institution valued their research supervision experiences and practices.

5.1.1 Clarity of supervisory roles (primary versus associate supervision)

Participants in this study from both universities expressed the need for knowing their defined roles clearly as research supervisors; whether primary or associate supervisor. The Sydney group noted that there was a lack of clarity in the exact role of primary and associate or co-supervision. They expressed their need for a clear definition of their role.

> *"People are talking to me, that they often think that associate supervisors have more contact with the students. I don't know if that's true or not, I think at the end of the day, the primary supervisor is the one who takes over the responsibility for the students in terms of timeliness..... I haven't seen the job description for an associate supervisor, not really......I know there are certain requirements, certain things that primary supervisor has to do." Aus 3.*

On the other hand, some reflected on their experience with research supervision and believed that there is a difference between primary and associate supervision where the main responsibility goes to the primary supervisor while the associate is involved when a specific advice is needed for a research student.

> *"I think the primary supervisor is the main one and the main primary resource person....once I was an associate supervisor and I had a more backseat role.... there's a big difference between the primary and the associate supervisor and that person who is doing most of the supervision and the other people are contributing which is not like an equal division situation." Aus 4*

There was a slight difference in the perception of some participants from Sydney University. They voiced their opinion that they were not sure what the requirements are, and what is the process for becoming a primary supervisor:

> *"My understanding is that you have to be an associate supervisor before you can be a primary supervisor for a year…" I've seen more senior came into this university and had already supervised student, they wouldn't be required to do the course Aus 3*

Meanwhile, some KSAU-HS participants mentioned that they did not have the experience of associate supervision. They expressed their understanding based on their perception. They also emphasized the importance of understanding the different supervisory roles by their organization.

> *"Primary supervisor is the main person who helps from the very beginning and will be involved in all parts of the project. But the co- supervisor, he has the same responsibilities but he for example helps if the students have a problem" SA 1*

> *"I didn't have experience as secondary supervisor or something like this. But usually in our daily life activities that something is primary and secondary, usually the secondary has very little role if any. And in the absence of known duties and responsibilities of each and everybody, the things are left mainly with the primary supervisor." SA 7*

Participants from both universities were of the view that research supervisors have different roles within a research project according to their expertise and area of interest. In addition, they also stated that it is more to do with collaborating and complementing each other's work and about team supervision. Some supervisors reflected on their personal experiences and shared their thoughts:

> *"I had two supervisors, now I don't think there is really the primary and the secondary. They had experience in completely different areas. So one was a methodological person, and the other one was a person really experience in the subject area that I was working in. I really don't know who is the primary and the secondary, they were complementing each other as a research team" Aus 3.*

> *"And the reason for this is because I believe more than one brain is better…. it was very good for the student and when they are not around, I work as their supervisor and at the*

> *end when we wanted to present our paper we sit together, we go through a lot of discussions so the students will know this is not a one-man show and always you need a lot of help from people who are expert in this field" SA 10*

One participant mentioned about the importance of collaborative work and communication between the different supervisors for the benefit of the research students.

> *"The associate supervisor has to work with the primary supervisor. They have a secondary role and it's usually around defined skills, he might be a statistician for example, or in providing back-up support if the primary supervisor will take 3 months of sabbatical leave. Then the student can have someone to talk to. Also the associate supervisor can help provide a different perspective and sometimes help mediate conflict. Help in the politics" Aus 7*

There was discussion about the negative aspects associated with the experience of associate supervision. Participants from the Sydney group described their negative experiences. The frustration was evident from how the participants expressed their views and went on to use strong phrases to show their feelings with their negative experiences. One participant described the position of associate supervisor as a "real trap".

> *"In some ways associate supervision is a real trap. It can suck up a lot of time without necessarily showing up on your own CV. And I think there are primary supervisors, particularly very senior academic who take advantage of knowing that juniors will more pick up after them" Aus 1*

There was a feeling of discomfort in how senior research supervisors worked in a supervisory team with junior members. Supervisors were concerned that the "very senior academics take advantage of knowing that juniors will pick up after them". This hierarchical approach appeared to be based on poorly defined differences in the roles of supervisors within the team. Participants used interesting analogies to describe the relation between different supervisors.

> *"I don't think associate supervisors matter much, unless they have expertise in a particular area or something like that…..This maybe an idiosyncratic view of a supervisor's role but I don't think it adds up too much……So I think it's a pretty frustrating role… it's like a mother-in-law or something, they interfere every now and then….I mean they're just making a deficiency of the primary supervisor and the*

associate supervisor gets none of the credit….. But you don't get much reward for being an associate supervisor." Aus 6

Participants were of the view that both primary and secondary supervisors were equally responsible for their research student:

"I feel much more burden or responsibility for a primary one. Having said that though, some of the associate supervisor roles are also of very big responsibility" Aus 2

5.1.2 Knowledge of rules and regulations (formal and didactic)

Study participants from both KSAU-HS and Sydney universities reflected on the importance of being aware of their university rules and regulations. Although all the interviewed supervisors were trying to do their best, they still wanted more information about what is expected from them as research supervisors in terms of their formal duties towards research students and their expected outcomes. In addition, they were keen to keep themselves updated or posted with their university rules and guidelines that might change from time to time. The participants described how they felt confused with not being updated with the changes in the university rules and regulations, especially if it was related to their work as research supervisors.

"So these are the issues that some supervisors they don't know about and the college did not make it clear at the start so the college when they send someone to the supervisor they have to have a clear policy.. I don't know what exactly the college wants from me… We don't know for sure if we met the objective that the university requires from us, I don't know I have supervised more than ten and I don't know the answer. SA 10

At the same time, the lack of proper communication between the university and supervisors potentially hinders the whole experience of their supervision.

"What is required of the supervisors from the university or from the college is not very clear…. they don't communicate properly with the supervisors so the supervisors are completely independent and it is completely left to the supervisors to do what they want, which I think is not right"… SA 11

It was interesting to note that some of the participants were not clear about the university requirements to becoming a research supervisor; whether a primary or an associate supervisor. This can be ascertained by the participants' comment when they reflected about their duties. Most of the information was based on their beliefs and experiences as opposed to what the policies specified.

> "In my understanding, you have to be an associate supervisor before you be a primary supervisor and you have to have done the foundations for research supervision course…..
> My understanding is that you have to be an associate supervisor before you can be a primary supervisor for a year" Aus 3

The participants shared examples of information that need to be included in the university policy document. Examples included knowing the timelines and deadlines for their research students as well as being involved in all the different stages of their students' research.

> "I think we need timelines, deadlines and stuff like that. They do invite us for their final presentation at the end of the year which is nice. I think we should do that more often and we should be more engaged when they're presenting at the end of the year, we want to know about it." SA 5

The participants had different views on the number of students that a research supervisor could handle at a time.

> "There are limits here to how many research students one person can have and I think its six. But I think it's hard to cope with 6 students…. I don't know the exact number but that is about that level, I think" Aus 3

5.1.3 Decision to choose research students

Among the interviewed research supervisors from KSAU-HS participants, there were expressions of different experiences on the student selection process. The majority did not know on what basis the students were selecting them to supervise their projects.

> *"I don't know what basis the students are selecting their supervisors because I'm not sure if our CVs, our experience, our competence in doing research, our knowledge in research types, research designs, our knowledge of statistics. I'm not sure if all these are available to the students when they are asked to select or they will just select on their own way. I don't know how they select us"* SA 8.

Some of the participants were of the view that they ought to have an opportunity to meet with the student prior to making the decision whether they agreed to accept the supervision role of the respective student.

> *"First it was like a student approached me and wanted to take me as supervisor. After that what I did was select from the basis of their previous record and their knowledge. I organize interviews with them, see their approach and their level of understanding and their interest in the particular topic or in a particular field. And also their interest and motivation."* SA 1

The participants were unclear on how the research student had chosen them to be their supervisor.

> *"Although it's not completely clear to the student and the supervisor but probably this is something initiated by the student himself or herself"* SA 7

Meanwhile, research supervisors from the Sydney group had varied experiences when they decided which group of students they were supervising. In case of junior students (undergraduate and honors), the student usually approached the supervisor.

> *"With all of those they came to me, and so with those the Honor students and Master students they were in situations so they will come to me saying they want to do X and could I help them with that. And with the PhD students it's been the other way around and I've identified them with medical students or when they're training there could be good people to work with and I've encouraged them over the years and then when they've come and say look I'd be interested in doing research and what sort of things are available, then we've come up with projects together, so with the PhDs and nearly all the PhD projects"* Aus 4

On the other hand, senior students were often approached by the supervisors themselves or in some cases, supervisors encouraged the good students to pursue research under their guidance. Some supervisors have grants for which they might recruit research students.

> *"Most of the students that I have come to me, approach me. I do have one student who I recruited because I had a grant that was funding a scholarship, and we have a task. The other students have approached me" Aus 5*

The KSAU-HS participants stated that they do not choose the student. It is important to mention that the KSAU-HS supervisors were involved in supervising undergraduate medical students and not PhD. However, this was not the case with the Sydney group experience.

> *"Usually the students selected us. They had the topics and they came to us and we did not really choose between them". SA 2*

> *"They show up at my door but it's a good question. How do they find me, I don't know? They have somebody come to me or they just hear about me. I also have my colleagues and even for me sometimes when the students ask me, I find out what their field of interest is, then I tell them if they want an Urology go to this person, it you want Pulmonology go to this person . I think it's mainly by word of mouth. I don't know if the college has a system that I am aware about." SA 5*

Despite the provided quotes about the experience of being selected as supervisor and how they feel about selecting their student researchers, some of the participants seem to match their content expert area or interest as a condition of supervision.

> *"They are the ones who approach me and then I will decide whether I will take them or not to take them. The proper way is to ask the students in one area and I didn't do it before." SA 11*

> *"I think one of the things I've learned about being a supervisor is how to say no to projects that aren't close enough to my interests" Aus 1*

For some supervisors, therefore, there are certain criteria being applied to decisions about whom to accept as a supervisee including their intellectual level, undergraduate or postgraduate.

> *"I like dealing with the students. I like helping them. The students are fresh so you can do anything and manipulate them but the seniors, it's difficult because it's difficult to change their ideas but with the students you can because they are just starting and they will listen to you. The senior they might not even listen to you because they have their own fixed idea and identity and they will argue so much. But with the students they will not do this and that's a good investment and that's what they see. Certain areas it is difficult sometimes because they don't have enough background that's why I usually like senior students" SA 11*

> *"And then it's not till later on now that I thought about how I would in the future select students. And I'll be more careful about selecting students" Aus 2*

5.1.4 Valuing research supervision

Research supervisor participants from both universities in this study voiced the importance of being appreciated by their institutions. They expressed a feeling of lack of recognition.

> *"It would actually in some ways be good to have a culture of recognition for good supervision coz' I don't think that really exists..." Aus 1*

> *"I don't know how they're valuing it ....I think you guys can give us something that we need. We just need some recognition to thank us for doing this. But personalizing it. (Arabic… 15 years ago I still have that". SA 5*

Participants expressed the importance of including research supervision as part of their teaching or academic load.

> *"Unfortunately it's not valued too much [the participant means not valued enough]. I cannot see anything that express that the task is valued by the administration of the academic. They said they have something in planning for the future to recognize it, but until now it's not yet recognized as part of the teaching load. And it's really left for the interest of the supervisor." SA 7*

Some of the participants suggested a way for being appreciated such as appreciation or thank you letter to show the value of their own supervision.

"I don't see them valuing it. ... but even a thank you letter I haven't seen it or appreciation from other angle" SA 11

5.1.5 Other institutional support

Participants reported an ambivalent feeling regarding support from their institutions for themselves and students to enhance skills.

"It does try to foster research students, I don't know if it fosters research supervisors, but it holds different seminars and different things to helping a student and tries to give the student the necessary skills to get through their degree program....I don't think there's anything particular for supervisors" Aus 2

Participants preferred a two-way communication in the form of feedback about the supervision process or inviting them to research supervisors' gathering or forum where they could meet with other research supervisors including senior colleagues and share their experiences and learn from each other.

"I guess having a research supervisors like special interest group or discussion, or forum or something would be a good thing. Because there's a lot of much more senior academics in school and in the faculty who've had lots more experience supervising who could probably pass down some really good tips especially coz there are lots of people who's interested in this kind of thing" Aus 2

Other research supervisors suggested ways to overcome barriers such as time and lack of resources and proposed solutions to improve their supervision practices. In addition:

"Time is very important and also the support of facilities. You know research if you want to do something good, it needs a lot of sources, resources and administrative, data entry, technician, statistician, and so also availability of scientific papers, librarian who can help you. All these are needed but unfortunately the students with the help of the supervisors, they are doing all of these and probably yes it will benefit or give the students will learn, but probably will not be motivated to do it and will miss the opportunities of keeping it an ongoing process....to make the supervision process as a whole to be more organized , to offer more resources , more incentives for supervisors, and make the environment more suitable or encouraging people to contribute and participate in this process ". SA 7

Some senior supervisors reflected on the importance of the institution's role to make sure the students get proper and sufficient support from their supervisors which can help students fulfil their projects efficiently.

> *"There is a variation in the supervisor, there is variation in the experience and unfortunately there is a lot of efforts are done by the student so the college they choose everybody and they want to be it so some student they are stuck and they go to someone who doesn't have an experience but not anybody can admit this shortcoming and at the end the student will be blamed because they didn't do it and they will say I didn't do it. And this is one of the problems and I noticed with 1 student they started with this project and there is no supervision and they are stuck, there is not more time, and really time is past and that's going to affect their grades and their interest in research so it's important that they have to look" SA 10*

In summary, the institutional factors theme included participants expressing the need for knowing their clear defined roles as research supervisors, whether primary or associate. In addition, they were keen to keep themselves updated or posted about university rules and guidelines that might change from time to time. It seems that there is frustration with organization rules and regulations or the lack of them. In addition, majority of research supervisors expressed their need to be appreciated by their institutions. Despite the cardinal importance of the supervision role in students' intellectual growth in these organizations, it seems that the majority of interviewed supervisors are working based on their own interpretation and understanding of what is the best practice.

5.2 Student-supervisor interaction

In this theme, I will explore the meaning of research supervision and describe it from the participant's point of view and what it entails along with the different roles expected of research supervisors. This theme represents the supervisor-and-student interaction, which symbolizes the behavioral factors of our adapted social cognitive theory. These sub-themes include

commitment and responsibility, interpersonal skills which includes (effective communication and flexibility and accommodating), feedback to students and mentorship.

5.2.1 Commitment and responsibility

Almost all research supervisors interviewed in this study from both universities discussed their understanding of what research supervision meant, which is the high sense of responsibility and commitment toward their research students and acknowledged their vital role in facilitating the process and making sure that the students experience a positive learning experience from it. This is in addition to the dedicated time they need to provide help their students.

> *"Research supervision means commitment, maybe to the task, follow-up , facilitation that I try to help the student to facilitate the process rather than do it myself and opportunities to learn for myself and for the student but at the same time it's hard work , if it's commitment, it needs a lot of time and effort and hard work is there . And also, sometimes, you are faced with things and areas you don't know anything so we need to learn some methodologies, statistical tests. So it's opportunity for learning for me as supervisor and for the student himself." SA 7*

One participant reflected on the feeling of high sense of responsibility toward students since they have the resources such as the experience and the database, which will help students in conducting their research projects.

> *"For me, I feel the responsibility, I can't say no because I have databases. And there are not a whole lot of people in the hospital who can help so in a way it's a responsibility for me so I have to do it. By half, I have databases, I have researches ongoing and I have some people with me. I have to educate them and I have to be part of it." SA 5*

> *"It is actually commitment. You are committed to a very noble cause and that has to be finished till end." SA 9*

In addition to the supervisor commitment, which was voiced by majority of participants, some mentioned the importance of ongoing learning process happening within supervision and student development as a researcher.

"To me it is an obligation… commitment, a lot of commitment and it's also a learning process" SA 10

"As a supervisor, you've got an obligation to oversee that person's development" Aus 6

Participants described the research students as customers and the supervisors as service providers in which their main responsibility is to help students achieve their goal.

"Students are essentially customers and you are a service provider more or less, and yes you have a responsibility but really it's about them and getting them primary at the end". Aus 1

Also, research supervisors reflected on their understanding of the different needs of research students depending on their level, whether undergraduate or postgraduate, and how to cope with their needs and provide guidance accordingly.

"In the undergraduate medical student, usually there is more effort. This is their 1st research experience" SA 7

"It's a lot of dedication especially for the medical students because it's their first experience" SA 5

"It is different in the matter of direction and supervision required with the honor students where they're starting pretty much from ground zero so they weren't even qualified doctors… There are 2 Master students and 1 of them already had a PhD and was doing clinical Masters and the other one was already medical oncologist practicing palliative care physician so they were very grown up and had a pretty clear idea of what they wanted to do so they're just giving guidance and methodological kind of support" Aus 4

Some participants viewed the importance of role modeling and providing guidance to students. Meanwhile, it is the supervisors' obligation and responsibility to make sure that their students are progressing well and are achieving their goals.

"It means that I have to provide the students with the role model, I need to provide the students with guidelines, guidance on how to conduct the research, how to start teaching the students skills in collecting information required by the research" SA 11

> *"It means I'm responsible for that individual's progress; it means I have an obligation to them to ensure that they are trained as an adequate research worker, that I have an obligation to them to see them if they have problems, that I have an obligation to see them anyway, and I try to do that on a weekly basis, with all my PhD students if I can if not weekly, fortnightly at least to make sure that things are going well. Those are the things I do, so I guess that's what it means to me. That I have the responsibility to make sure things are going well" Aus 6*

The participants acknowledged the importance of making sure that their student gets through their research supervision experience smoothly, efficiently, painlessly and successfully. This is in addition to having an enjoyable experience.

> *"I think it is my responsibility to help them pass. Yes, I think I have to make sure they get through things as efficiently and painlessly and enjoy what they are doing." Aus 4*

> *"My experience all along is that I have a high level of responsibility, try to ensure that they get through like complete it successfully. So I regard it as a supervisor's responsibility rather than a student to make sure they pass." Aus 6*

5.2.2 Interpersonal skills

Almost all study participants agreed on the importance of having good interpersonal skills to supervise students effectively.

> *"A lot of a job of supervision is actually about interpersonal skills. A lot of it is about being good communicator, about being emphatic, it's about being really able I was really listened to where students at and to make them understand that they are being listened to. I think often students get frustrated because they think supervisors do not pay enough attention to them and that they do not care about the student's future. I think being able to genuinely care and communicate well is probably the most important skill". Aus 1*

Some research supervisors reflected on their own experience as research students and acknowledged the influence of good supervisors and their essential role in supporting and helping their students and appreciating different student needs.

> *"I was fortunate I have a good supervisor but the thing that I really remember...and this probably paved the way I think about supervision...And my supervisor in particular is very much "what do you think" right from the start. Gave the ideas, gave the framework, really kind of give me the freedom. I think that is very important...coz if you have a research project you probably have ideas how it could be done but I think you have to*

give them the opportunity to make it their own. Sort of individualize it….To support but not to channel the person…. Interested and caring, supportive, inspiring."Aus 3

Effective communications

Participants reflected that one of the important skills for research supervisor is to have good communication skills that could be adjusted according to their student need. This helped to facilitate research supervision process smoothly and effectively.

"They were very comfortable with me and whenever they felt burned out, they said just because they had in their mind that the doctor's not there and she won't help us. Most other students say that they had a good supervisor who has a very supportive attitude, they were very happy with them because they have at the back of their mind that whenever they are stuck up or feel burned out there is a person who can take care of them. So this attitude was there. Even my students were very cooperative in the sense that if I say that this is the deadline for this work, they will try to finish their task. The friendly part is there. In research part, when you're open, cooperative and supportive, your students will definitely come to you and they will try to do their best just to keep you happy and satisfied." SA 1

Some supervisors reflected on their own way they supervise research students in which they were more assertive and transparent with their students to make sure they were doing the right job.

"I'm a little bit more assertive of what I require to make sure that the students get the job done because I know the students don't want to fail and sit there and not do anything. He didn't even tell me that it wasn't good enough. That is the essence of bad supervision, I think." Aus 7

Flexible and accommodating

Majority of study participants in this study appreciated the important role of research supervisors in which they need to be patient, flexible, adaptive and accommodating to different type of students and their needs. Their role also included the responsibility to help students to develop their ideas while maintaining the student's focus and guide them throughout the process.

"I think he should be very open-minded and can be prepared for new things like learning new things and so on" SA 7

"Some of the students come and they're very eager and they want to publish something but because of the nature of the medical students and their project is a 2- to 3-year process so they need to understand that it will need more time to do the literature research and it's more difficult for them. That's the difference between the Masters and Medical Students because they have their other studies to do. They do the first step, do the contract and then disappear and come back and do the literature portion and then again disappear. So I have to be more patient with them because they need more time" SA 5

One of the participants stated the important role as a research supervisor as being open and critical with students while sharing own experiences to help them throughout their project.

"He should be flexible and he should be understanding and share experiences with his students openly and he's the person who has to take the criticism on his work openly. There are actually many skills and he should be hardworking as well" SA 1

Another participant described the research supervisors as "a garden" for their students in which they can accommodate and support different types of students.

"You are like a garden for the students because the students are different. First of all there's a dilemma that they face they have to do it. Sometimes they get stuck because they don't have the experience, they don't have a good background.....I like to make it easy for the students so they can finish their studies in a lot of time so I'm not very strict because I want them to have a good experience so they can do research in the future." SA 10

Another participant described the importance of research supervisor's own willingness and emphasis on being familiar with what is the actual requirement for their students.

"And definitely he is willing and he is patient enough to supervise the student and he needs to be familiar with what is required for these students to achieve not to overshoot or undershoot otherwise that's what will happen" SA 11

Some participants reflected on the importance of utilizing their own experience as a student and reflecting on the different roles that research supervisor played and how that could help appreciate the different students and adjust to their needs accordingly.

"I think it's good being able to remember what it's like being a student. I think that does help. I think they have to also be a leader to lead the student when they need that kind of role. I think you have to be very adoptable, you have to be flexible, you have to be open, and you have to be very available." Aus 2

"They've got to have patience and willingness to devote time and energy to the promotion and progress of the student and personal attributes go with that." Aus 6

Some of the participants described their own ways to help leading students and admitted their strengths and weaknesses and the importance of giving time to their students to help them.

"I'm a very good laissez-faire person to not drive the student mad. And I'm also quite good when the student says I really need to see you, I listen to them and I do that. But I don't know but want to be as good as I can be in terms of being a little more assertive and going thru everything really in detail with them all the time. I have my strengths but I also have my weaknesses, what can I say" Aus 7

Also some participants reflected on their own experiences with different types of students and described their own ways and practices in dealing with them.

"I think the undergrads are way too ambitious on what they want to try and do so I spend a lot of time helping them to get their ideas into a manageable size in the amount of time that they have" Aus 5

5.2.3 Feedback to students

Majority of research supervisors in this study acknowledged the importance of having and giving feedback to their students in a constructive way and in a timely manner for students to progress and complete their projects.

"I think the mentors have to have good feedback skills. They have to learn how to give feedback to the students, how to motivate them, how to correct their mistakes" SA 5

"My responsibility is of someone to guide the student, to provide and contacts to provide background on the area of research, to provide support, to provide feedback, to kind of give my experience to someone who is new, to generally nurture the student the process of carrying out a research project......I think the worst thing is when the supervisor don't give timely feedback" Aus 3.

One of the participants reflected on his experience with feedback and described the importance of giving feedback in a timely manner and how it affects the relationship between the supervisor and the student.

> *"You also need to be available to the students and provide them with timely feedback because I hated that one as a student when I didn't get timely feedback. I must admit my PhD supervisor was very good. And another thing I learned from him he would tell that I can't give you feedback on that until next week but I'll do it then and he would. He would keep his promises" Aus 5*

On the other hand, some of the participants reflected on the importance of dealing with or acting on the feedback from students as it could affect student's feelings and interaction with the supervisor.

> *"Mainly acting on the student feedback would be a good thing to do. Maybe the student is feeling neglected or deficient on some aspects especially in terms of their supervision." Aus 6*

5.2.4 Mentorship

The majority of study participants discussed and described the way they saw the supervisor-student relationship and mentorship where there is a lot of guidance and support during the journey of research supervision process.

> *"I see our relationship with my primary supervision students as really being kind of a mentoring and teamwork kind of relationship" Aus 1*

Some of the participants described the different roles that a research supervisor would play with different students, such as teaching, advising, guiding, etc. according to the context that might face the supervision process.

> *"Research supervision means mentoring, it means going through all the business of teaching, advising, guiding, feedback, everything. So in fact, it's a responsibility. But it's a fruitful responsibility" SA 3*

The Sydney group added a unique description to the mentorship experience with PhD students. They discussed their experience with PhD students in which they spent a longer time with the process and are subjected to difficulties and problems; thereby needing special attention and continuous support throughout their research journey.

> "Mentoring part is very important in PhD program....They face so many problems during their PhD work and the counseling part is always important. I always keep track of those feelings and I was not only a supervisor, but also a friend to them. So whenever they have psychological problems related to their homes, their jobs, their thesis they would talk with me and tell me they are going through such and such problems. So with counseling and with advice and support we were able to overcome these problems" SA 1.

Others reflected on the importance of being close to students and guiding students appropriately as they see this is part of their responsibility to produce high research work which will carry their names on it.

> "I think that a research supervisor is there for guidance and direction…..for me being a research supervisor is closely linked to being a mentor and I see those two sets of skills very interlinked. I also see that as my responsibility, which I haven't really said I guess. That is my responsibility, hope not try the next lot of people who will be the researchers of the future and I definitely do feel the responsibility in making sure that they produce really high quality. And I also said that their outputs with my name on it is very...that I want it to be the highest quality because I don't want to put something with my name on it" Aus 2

They also discussed the hard work needed and the difficulties that could be faced with unprepared students

> "It's too hard. It's hard. Supervising students is a lot of work, and I am interested in supervising, mentoring and I would like to be a good supervisor. But I find it very difficult when the student doesn't have the necessary skills, experience or capabilities" Aus 2

In summary, this theme reflected on the important aspects of supervisor-and-student interactions and different roles and characteristics needed by the research supervisors, in addition to other factors that would influence the success of the research supervision process.

5.3 Professional development opportunities

In this theme, I will describe the participant's views and experiences with the research supervision process. This part represents both the cognitive and behavioral aspects of our adapted theory (social cognitive theory), in which there is interaction between research supervisors and their research students, which requires attention, ongoing learning and developing capabilities. The sub-themes include career development and developing novice researchers, supervisors learning by supervising and supervision training and discussion with seniors. Research supervisors reflected on their different experiences with supervising research students and what they thought about it in terms of carrier development, developing novice researchers, and learning by supervising and training supervisors.

5.3.1 Career development/developing researchers

Research supervisors acknowledged the important professional development opportunities which is building a career of research students and that the whole process of conducting research helped in building students' career and developed their skills and capabilities as novice researchers.

> *"Essentially working together on how can we make a career for them, how can we get them to apply when they are ready to launch, what they want their career to be at the end of their thesis. I say that is my primary responsibility as primary supervisor. And then, closely related but taking responsibility is that to make sure we got a good thesis in the process. But I think the career building responsibility is actually the biggest one…………my role as their supervisor is to help him have the career that wanna have. That is my responsibility… I see a big part of that is actually building them up and making them believe in what they are capable of doing and telling them that they do deserve opportunities and they should be bold and go out there and contact people and do network for themselves and I do a lot of tasks of telling them that. I think they can do it, and they should do it." Aus 1*

Participants reflected on their experience with good students and described their feeling of great satisfaction when seeing their students transform and develop.

> *"Recently I had a really great student whom I could see being transformed into a researcher and that was a big buzz. I saw her present the work that we have done together and that was really great and I feel really proud of her. I felt proud of myself"* Aus 2

Others described the research supervision process differently and used the metaphor of 'rose blooming', where a lot of activity is happening and stated that it is interesting.

> *"It's like seeing a rose blooming. You're looking at your creativity, and how it's going. It's like you're painting something. Everyday it's something different. So every day you take a picture of what you have done, so this is really interesting"* SA 3

Participants reflected on what they believed when practicing research supervision as sharing experiences and learning together with their students. This will help to develop their skills as researchers.

> *"It's a partnership. For me, it's about me sharing my experiences and my learning with the student and I may learn things from them as well. But me being able to help give them skills to be researcher themselves, I want to support them and help them develop the skills, gain the knowledge and experience to be a researcher themselves"* Aus 2

> *"Also we can see the progress of someone that we are taking care of. We see him start and he doesn't know it we need to write a draft and present it and so we see a lot of satisfaction"* SA 10

On the other hand, one of the participants discussed the mutual relationship where both parties get the benefit and do what they want.

> *"Here the students need someone to supervise them and I need someone to do the work for me so it's a mutual interest where I can do my research and they can benefit from me, something like that. A win-win situation. They help me and I help them"* SA 10

5.3.2 Learning through supervision

Research supervisors in this study expressed the two way dialogue in professional development and reflected on how their experience with supervising research students had improved their knowledge and skills and become better supervisors by practicing research supervision even better than attending specific activities such as courses. They also find it a better learning experience for themselves and their students. Where they do learn from questions raised and reflection on what has been done and the process of ongoing learning.

> *"I've learned a lot through my supervision rather than from in any of the courses"* SA 2

> *"It's opportunity for learning for me as supervisor and for the student himself ….sometimes you are faced with things and areas you don't know anything so we need to learn some methodologies, statistical tests. So it's opportunity for learning for me as supervisor and for the student himself. SA 7*

One of the participants stated that the process of research supervision helps in the learning process of the supervisor himself, while developing his personal growth and boosting his confidence.

> *"There would be learning but this learning also helps the supervisor as well and I think this is personal growth of mine in it and it gives me confidence"* SA 1

Other participants discussed the teaching going on within the research supervision process as it needs close monitoring and there is rich learning experience for both the supervisor and the student.

> *"There are always people that you have to train them that you teach them to be patient and you also have to be sure that you supervise them very closely…. So there's a lot of teaching – from teaching the student the process and it's a good learning experience for both of us, not only for the student."* SA 10

On the other hand, some supervisors reflected on their own experience and the hard work of reading which helped them in supervising research students.

> *"I've only learned that very recently through quite a lot of hard work on reading, a lot of books on academic writing and making myself learn nice skills and develop that language which I didn't have before"* Aus 1

Some of the participants reflected on their own experience of being supervised as research students, whether positive or negative, and how it affected their decision and practice in their current supervisory role.

> *"I guess that my research experience as a supervisor has been formed by my experience as being supervised. And as I came towards the end of my PhD I thought about how I was being supervised and became much more engaged in the process of being supervised" Aus 2*

> *"I didn't have any course, or workshop. It's a personal experience based on my experience or other people who supervised me. So I'm trying to convey the message that I have been supervised" SA 11*

One of the participants reflected on his negative experience as a research student with the supervisor and how this affected his decision to learn from what was going wrong.

> *"I remember a lot about my supervisor and a lot of it is bad but I think I learned a lot of that supervision from what he did wrong." Aus 7*

Participants reflected on their experience with preparing potential and capable PhD students to co-supervise other research students.

> *"There probably would be people who would be capable of co-supervising maybe straight after their PhD. I mean I tried doing that with all my PhD people who finished the degree and had them supervising somebody else as well." Aus 4*

In addition, some of the participants reflected on their own personality characteristics and how it played a role in their development and growth as supervisors.

> *"I know how because I'm pretty hard on myself. I know I'm doing a pretty good job myself. I guess compared to 5 years ago I'm a little bit more confident to identify when I'm not satisfied and to do something about it myself and to say it's my responsibility to do something about it" Aus 7*

5.3.3 Supervisory training/discussions with seniors

KSAU-HS participants in this study reported their variable research training activities and experiences. In addition, participants reflected on the importance of such training activities while others felt that they need more such faculty enhancement activities to develop their skills and capabilities as research supervisors. On the other hand, some supervisors acknowledged the importance of sharing experience with seniors.

> *"I attended different courses or workshops on supervisory skills. But like I said there should be workshops in supervisory skills that are required…."these trainings are necessary. I am confident now; there are still many things especially in qualitative but sometimes I feel I need more training in coding because sometimes I am stuck up in coding aspects basically in grounded theory. Basically if I want to do some qualitative work, I am not very confident when the process of grounded theory comes. So in qualitative and statistics part, I still feel I need training as course supervisor to improve my skills" SA 1*

> *"During residency I have training and some courses in research methodology and also as continuous professional development in some courses and research methodology, and some courses in statistics. But the things I learned most are from my personal effort. For example if there is something new for me, I will go and read about it by reviewing the literature. If I have any difficulty in certain research methodology, then I learn it for myself, read it. I think practice is also very important to update yourself, skills and knowledge and also getting feedback from others. It definitely has a major role in improvement." SA 7*

Some research supervisors seem to appreciate that being academic is a dynamic process and that they looked forward to refining their skills and keeping themselves up to date with standards.

> *"I think it's occupational, has been academic to you, that someone has to get better whatever it is that you are doing. We are all highly motivated to keep improving. ..."Aus 1*

> *"I love seeing peoples' careers going somewhere as part of the experience, I think that is the major reward. ..." Aus 1 Motivation*

It seems that these research participants perceived that the learning experience comes through either interaction with senior researchers or through rigorous research courses.

> *"I think having one supervisor is not ideal and I think if you've got a team of 3 or 4 people , a dozen of 2 or 3 people maybe not every one of them have done a PhD, maybe not everyone needs a PhD. Maybe somebody who's done a PhD, somebody who's done a specific research expertise or somebody who's done a clinical I can see how that model will work. But I think the supervision package but somebody must have done something similar to what the students are doing, otherwise it's going to be blind leading the blind"* Aus 4 trained supervisors experience

> *"It's hard so I think you have to have that experience. And you have to be organized and you have to have writing skills and communication skills to talk to the student, to listen to the student, understand them and you have to be a specialist in a certain research area and you have to have those skills. You cannot supervise gnomic research ideas if you don't understand that field obviously"* Aus 7 Trained supervisors

In summary, this theme explored the different perspectives of study participants in regard to professional development opportunities that could be of benefit for both the research supervisors and research students. The participants pointed out the importance of developing future researchers and learning opportunities for lifelong learners.

5.4 Motivational factors

In this theme, I will describe the participant's perception about different motivational factors that affect the research supervision process from their point of view. This theme represents different aspects of our social cognitive theory which could be affected by the context which is the research environment, the supervisor-student interactions and student-related factors. Research supervisors discussed and suggested that there are several motivational factors which implicate the progress of supervision in general, according to the interview perceptive.

These factors include issues like publications, research outputs, and promotions, student-related factors (e.g. the enthusiasm of the student and their satisfactory progress.) and feedback to supervisors.

5.4.1 Publication /research outputs/promotions

Motivational factors affecting supervisors and their practices with research supervision, publication and research outputs seem to be among the most common motivating factors that helped supervisors to encourage supervising students' research projects. For example, one of the interviewees clearly stated the importance of publication as a way to contribute to the general knowledge.

> *"I think one of the high motivating things is publication. When you publish you get good motivation for the researcher. In our setting, maybe this is the high and because by publication you have this feeling that you contribute to the body of the knowledge of that particular subject" SA 7*

Another participant used the word "prize" specifically to describe research output by publication that is yielded from supervision.

> *"That's one of the good things about students doing their thesis by publications.....then everyone gets something from the prizes, so that's often a good thing, it's more of an incentive" Aus 1*

This is in addition to the fact that some participants have valued motivation as a self-satisfaction issue.

> *"Motivation is self-satisfaction, this is what keeps me going through research and publishing so I'm still there and active" SA 10*

Supervisors described being motivated by the idea that publications will help in their promotions as it adds up on their CV's which is an important aspect of their academic career or records.

> *"...now many people are interested in research because of promotion" SA 10*
> *"I mean also to be honest because I am a researcher and one of my important research outputs is having students so that is motivating thing for me as well that I will... I need that for my own CV, my own track record" Aus 2*

5.4.2 Student-related factors

The data collected in this section implies that there are two motivational factors related to students. The first is the enthusiasm of students. The second one is the satisfactory progress of students and their professional growth.

Enthusiastic students

It seems that one of the important factors contributing to increased motivation of research supervisors is related to students. The hardworking, enthusiastic student makes supervisors highly engaged and the experience enjoyable with the supervision process.

> *"Basically, it's the students' attitude - if they are motivated, good and open to learn. These things make me say yes, I can supervise these people, plus my will to be involved and to guide someone and to learn from others. These also keep me motivated" SA 1*

Although the following quote shows the supervisor's feeling of being overwhelmed to the whole supervisory process, it also indicates that motivated and hardworking students seem to be a main factor in persuading supervisors to take more students than what they initially planned to.

> *"Every time I go through the experience I always think I'm done and I'm not doing this anymore. But I think the students motivate me. The girl that I have now, the one that I'm working with she's amazing. Even though I was overwhelmed and I was hesitant because I had three approached me at the same time. She wanted to be with me and I was hoping she would decide to go to somebody else then I ended up with 2 instead of 3 which is good. But she's so enthusiastic so that's what keeps me going" SA 5*

> *"I am usually interested in those who are committed and not just because they have to do the job" SA 11*

> *"I'm so fortunate as they are wonderful, wonderful women, incredibly enthusiastic, diligent, smart, fabulous……...like we have to work hard but they are both so determined to do a great job. So it's a joy to be a supervisor for them…..Its actually really good fun, I enjoy it, and that probably I'm with very good students...Aus 1"*

"I like working with smart and enthusiastic young people...... And I'm very lucky that the people I've worked with are really good" Aus 4

Students' satisfactory progress and transformation

Among the important factors that helped in increasing motivation among research supervisors was the successful completion of the student's project and observing their professional growth and transformation into potential researchers.

"I think maybe one [of the] enjoyable thing is the transfer of skills or merits to the learner or the student. That if you witness that you are given some medical students or postgrads students they learn something from this actively, there is something positive. In addition to the outcome the research, hopefully there is something new, you will find enjoyment if you confirm it or verify it as a result of the research." SA 7

In the above quote, the interviewee's native language is not English; therefore, what was said is not fully grammatically correct, I understood what the participant meant because we share the same culture and the language. The interviewee expressed the utmost joy of transferring the knowledge to students while seeing the students flourish as new researchers.
"I enjoy the outcome at the end. The students being happy, the students' satisfaction to me is very important" SA 5

"To seeing growth in their potential as researchers that's very motivating..." Aus 2

Other participants described and valued the research supervision experience as a fun experience.

"It's fun seeing young or inexperienced researchers develop. It's fantastic seeing them develop skills because of the mentoring that you are giving them and in the experiences that they are having   I love seeing people's careers going somewhere as part of the experience, I think that is the major reward.." Aus 1

In addition, some of the participants expressed their great appreciation, self-satisfaction and increased confidence with the positive experience they had with the outcomes of student projects.

"The recognition from student honestly, I see the student appreciate that you are helping them, and you see also the self-satisfaction that you are giving for the student as well,

because I learned research because some people they help me and some people you teach them and they learn then there is give and take…the only thing that I like is when the student leaves and they are happy and they remember the 1st paper that they publish, they communicate with me." SA 7

The point was illustrated by the following quote in the way that the interviewee expressed being proud of his students who are now at top positions and still consider him as a mentor and examiner of their own students.

"I feel very much proud and many of the students are still in top positions and also they give honor to me and they invite sometimes to attend. Sometimes they invite me as examiner also for their students." SA 9

It seems that the Sydney university supervisors' experience is in agreement with the KSAU-HS, in the way that transforming a student into a flourished researcher is an important motivating factor.

"Recently I had a really great student. Who I could see being transformed into a researcher and that was a big buzz. I saw her present the work that we have done together and that was really great and I feel really proud of her. I felt proud of myself.....seeing growth in their potential as researchers that's very motivating" Aus 2

"Success keeps you going and seeing a student graduate, seeing a student produce both research data, research paper and research degree. That's very rewarding, and mentoring young persons and seeing them become independent professionals, that's rewarding." Aus 7

5.4.3 Feedback to supervisors

Research supervisors in this study expressed the importance of having a feedback process to reflect on their practices and outcomes with students. In addition, they thought that having some sort of regular activity with other supervisors', especially senior faculty where they can share and exchange experience, would help them in improving supervision practices.

"I have been doing this for the last 6 years but I never get any feedback. Not good or bad I don't know. It's a growing university. There's new and there are those who lack experience in all levels of supervisors." SA 7

"I think it would always be insightful to have reflections from more experienced people within the school. On their experience, I mean I guess there always different style, but in terms of my supervision, I don't have anybody that I can talk to and ask about …….
"I don't think within the school there is any form of discussion or feedback…..get feedback from students. Although it's probably quite hard whether a student would give on his feedback but I understand that when they finished, I think they would actually fill out a sort of a general survey about their experience" Aus 3

In summary, it can be stated that according to the collected data in this section, supervisors' motivation is a major theme. In that theme, they stressed on the factors that influenced them and kept them producing high quality supervision. Those factors were fairly distributed between the perception of the importance of publication as a valuable outcome, student factors like their enthusiasm towards the work as well as their growing ability in research.

5.5 Challenges

In this theme, I will describe the various challenges faced by the supervisors during the supervision process. These include personal, institutional and student-related factors which represent different parts of our social cognitive theory.

5.5.1 Time constraints/challenges

It seems that the interviewees' reflected that among the challenges they had to endure was the time factor from two different angles: the first was allocating time to the process of supervision and the second was keeping to timelines with students, which requires patience and understanding.

"Not having enough time to give to the students. Too many commitments crowding you and not having enough time to give them much as I would like to" Aus 5

> *"[T] time is the most difficult, time constraints. Plus we have been detached and attracted from many areas, administrations, clinical, service, teaching the undergrad students, it's taking so much time and that's the most difficult… Now unfortunately I don't have time, and I don't even have time with the residents and it makes it really difficult. It's frustrating for me." SA 11*

In addition to the time challenge that supervisors faced, they were concerned about keeping to timelines and expressed their needs to be aware of deadline and timeframes which students have in order to help and fulfil the task.

> *"There has to be clear guidelines and we have to be as mentors - educated about the deadlines" SA 5*

> *"You don't have time allocated for you and you don't know what time the students can provide. This alone is a challenge. The 2nd challenge is that you have a student who is very busy with very limited time and you want to finish a research project" SA 6*

Meanwhile, other supervisors felt that the problem is related to students' time management. It could be that time challenge stemmed from the lack of the student's time management skills and their attitude in leaving tasks to the very last minute. The following quote illustrates how this challenge was remedied by the interviewees.

> *"It's really a problem and although it's not a priority I told them not to neglect it to the last moment….we have problems because we have limited time for the students" SA 8*

> *"I think 2 things I was doing were okay. The first thing is the progress report. They have to submit it in certain time and also the time plan. These are the 2 things. At least the students will be committed. And by encouraging them and letting them like research by describing the importance of research by just getting them interested in research." SA 8*

Despite the time constraints, participants stressed on the importance to be patient with students because it is the best opportunity for them to learn.

> *"Sometimes you say I can do it faster/myself. They are busy, they are new and their expectation is different. These are the challenges for both the student and me as research supervisor. Because I can do things faster… you need to be patient with them and you*

need to allow them to do it.....It takes time but in the end the aim of this supervision is fine" SA 4

5.5.2 Being a good academician

Also data collected from research supervisors of both universities acknowledged the importance of being an educator as well as a researcher and how they are inter-related and its effect on the process of supervising research students where there is a lot of interaction and transfer of knowledge and skills.

"Teaching and research is inter-related. And if you are a good teacher, you have to be a good researcher as well. Because of the help of your research" SA 1

"They always say a good researcher should always be a good academician" SA 10
"I think you have to be a good educator" Aus 3

Some have differentiated between being a good researcher and being a good teacher. In the context of this study, it seems that being a good educator is an important role in knowledge transfer during the process of supervision.

"Just because you're good in research doesn't mean you're good in teaching it. I think you need to be a good research and a good teacher. I think teacher is not right because good supervision requires a research degree" Aus 4

"I think it's an important part of being an academic" Aus 5

5.5.3 Importance of trained supervisors/assessors

Participants expressed their point of view on the importance of having qualified or trained research supervisors in different basic skills related to research in order to help students.

"I think the training is important. I did my research but I think as supervisor, there should be training on writing skills or process related to research skills to improve your students' level of understanding that a supervisor should know. So these skills should be taught before and because these are required for a supervisor" SA 1

> *"I'm not saying they have to have good or excellent background or certificate of statistics but at least they should know the basics of how to do statistics,… writing skills is important also, they should have skills in writing and they also should have good communication skills. When you do research you should know how to communicate with the people to get them interested, showing your experience in exchange of ideas, collaborating, writing together"* SA 10

The previous quote seems to link the importance of respecting the student's time to the seniority of the supervisor. This can be taken as an acknowledgement of the time challenge that students face and at the same time how a good senior research supervisor can remedy this challenge by firm and experienced supervision. On the other hand, some of the participants conveyed a clear message that the source of their experience imitates a good previous experience being supervised earlier.

> *"Unfortunately …. I don't have any course, or workshop. It's a personal experience based on my experience or other people who supervised me. So I'm trying to convey the message that I have been supervised"* SA 11

In addition to the lack of training for some of the participants, they stressed the need for clear guidance and criteria for them to undertake research students, either as primary or as associate supervisor.

> *"I personally wanted to have some guidance, I think other people don't necessarily want the guidance, but I find it very useful"* Aus 3

> *"The process at the moment is that you need to have done that course and you need to be an associate supervisor before you can be a primary supervisor. I don't if there are any other criteria but I think that's basically that it"* Aus 4

> *"The university has rules that you have to do some supervision training. They introduce that rule for new supervisors."* Aus 7

It is important to mention a point that was introduced by one of the senior supervisors regarding the assessors of the final product, which in this case was a PhD. It seems that the lack of

guidance resulted in lack of unified system of assessment and a clear system of selecting assessors.

> *"I think one of the other things that hasn't really been addressed is universities don't train people to mark thesis even though we expect them to do the same way they expect people to supervise them and then they don't train them so I expect them to mark and train them. But I think it's just another side of them. I think as a supervisor when you've done enough of them you start to see how inconsistent the reports are while saying that the other one was extraordinary. Two of them said they started at the dance and the other ones they go back and rewrite it and basically do it all over again.....and we actually came to the judgment that it wasn't very valid assessment. But on the other hand, I don't know if you've seen the form, but it's basically the same as A, B, C or D. and then you have to write some comments and don't give you much guidance on how you should do it." Aus 4*

5.5.4 Student-related issues

Student skills, abilities and needs were perceived as challenges by the supervisors. For example, some have shared stories about their frustration over the students' intellectual abilities.

> *"She didn't listen when you tell her what to do. She wouldn't listen and do what I tell her to do. So it's hard and she took 5 years or something. (Australian supervisor)*

> *"It's when you try to get the research idea into someone and you feel that he/she is not getting it. It's really challenging because you think it's clear for you, and you're trying to get it clear to that person and in every research visit which I usually give regularly at least twice a month to discuss with them whatever is happening, you feel that that person is asking you the same question every time. I feel sometimes that I am not able to transfer the idea to him/her and I see it challenging and start thinking how I can do it." SA 3*

Some participants described facing the challenge of students with unrealistic objectives, underestimating the time and resource challenges.

> *"His aim is a huge project that it was done by several European countries and in North America, Unrealistic objectives. So I tried to tell him that as a clinician I cannot reach that point. For you as a student, the aim is totally different. You need to know from your skills the opening and to understand what research is" SA 4*

"The undergrads are very naïve when it comes to research and they need one-on-one tutoring, they need more time to discuss the project but the Masters students may be a little bit more independent, they know the field better so they're a little bit more knowledgeable." SA 5

Language seems to be rated as a double burden among those who are not native English speakers.

"Anyone that is not from a native English language, obviously their research, it becomes double burden; double challenge not a burden because they not only have to go through the basic research theories, the different concepts but they also have to overcome their weakness in English as a first language" SA 2

"The type of students themselves. Sometimes some students are very clever, very smart, they prepare everything. They come really prepared they review the articles, but others are not." SA 8

On the contrary, some supervisors felt that the student should have a fair chance regardless of how competent they may be regarded.

"To select the people that you know will be committed and I don't think that's right to select people who only want to finish the research project. I don't think that's fair to only supervise the good students." SA MN

5.5.5 Research environment

Among the challenges that were reported by many of the interviewees was the inadequacy of a conducive research culture that nurtures supervisors, students, and the research process itself. The outcome could be that the student will learn something but on the expense of losing interest.

"I think there should be an open and relaxed environment for those who are in research and who are supervising research students. It should be an open, conducive and relaxed environment. And again if they are interested in training, the university should organize such type of support for the students, faculty and even the researcher.." SA 1

> *"I think research supervision is enjoyable, probably rewarding experience, but it is very demanding in terms of time, effort and resources. Without appropriate and enough support, this process might be disturbed at any time...students will learn, but probably will not be motivated to do it and will miss the opportunities of keeping it an ongoing process"* SA 7

> *"I think the faculty or school does have a great responsibility to sight who is in an appropriate position to do it"* Aus 4

Sometimes, it seems that the lack of research support to the student might affect the research process and its outcome. It was stressed that both the student and supervisors change their plans to compromise their original goals.

> *"He was a genius student and we put challenges to the project which was accepted by the research center. But halfway through the summer he said no because an RIB will take 4 months. So the poor student in the summer couldn't finish the study and he was happy that we gave it somebody else who finished it in the end of the year."* IA 4

In summary, this chapter presents the results of the qualitative part of the study using the SCT as a theoretical lens. The results were summarized into five main themes. These themes are related into issues concerning supervisors, students and their contexts. Results highlighted that research supervision is influenced by multiple factors. There was consensus between supervisors regarding their personal concerns, motivation and challenges faced when supervising research students. However, some structural differences were observed between the academic institutions.

CHAPTER SIX: RESULTS II

(QUANTITATIVE ANALYSIS)

6 RESULTS II: (QUANTITATIVE ANALYSIS)

A) QUESTIONNAIRE REFINEMENT

This section describes the processes that were followed during validation. Exploratory factor analysis, item reduction process and the overall internal consistency (Cronbach's alpha) of the scale will be explained.

6.1 Exploratory factor analysis

Principal Component Analysis (PCA) was used to explore latent constructs and also to assess the dimensionality of this newly created scale. Before carrying out this analysis, number of tests regarding the suitability of factor analysis of the data were done. The overall Kaiser-Meyer-Olkin (KMO) statistic was measured and found to be 0.86. Bartlett's test of sphericity was significant $(\chi^2(435) = 2635.2, p < .001)$. The correlation matrix did not show any extreme multicollinearity or singularity. The majority of items showed correlations >0.6 and the highest correlation between items was 0.93.

Sampling adequacy for each of the original 30 items were examined with the anti-image of the correlation matrix with those items that scored above 0.9 being only five (marvellous), with 19 items being 0.8 and above (meritorious). Only four items 0.7 and above (middling), and 2 between 0.6 and 0.7 (mediocre) were the lowest scoring items. Some of the items with low KMO statistics were considered to be removed from future analysis. However, expert judgements were made on a number of items, whether to retain or drop. The discussion also settled some items which had strong cross loadings and could have been placed under two different dimensions. Out of the 30 items that the scale comprised, 15 items were removed.

Overall, these judgements were based on the magnitudes of commonalities, low individual measures of sampling adequacy and factor loadings.

To determine the number of factors, a variety of statistics that included Kaiser Criterion, scree plots and percentage of variance were taken into account. Although these statistical results were of great importance, suitability of the items to a particular factor and their interpretability have also played important roles in deciding items which needed to be discarded.

For the initial eigenvalues, seven factors showed eigenvalues that were above one, explaining 60.8% of the variance. The scree plot (Figure 6-1) also showed 7 factor solution and these were explored in-depth by evaluating items step by step iteratively after each removal of items. Finally, 15 items were retained and found to represent the main variables theorised. When factorability was measured again, Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.87, above the recommended value of 0.6, and Bartlett's test of sphericity was significant ($\chi^2(105) = 1343.2$, $p < .001$). The factor analysis also showed a good total variance explaining 59.5% of the cumulative variance.
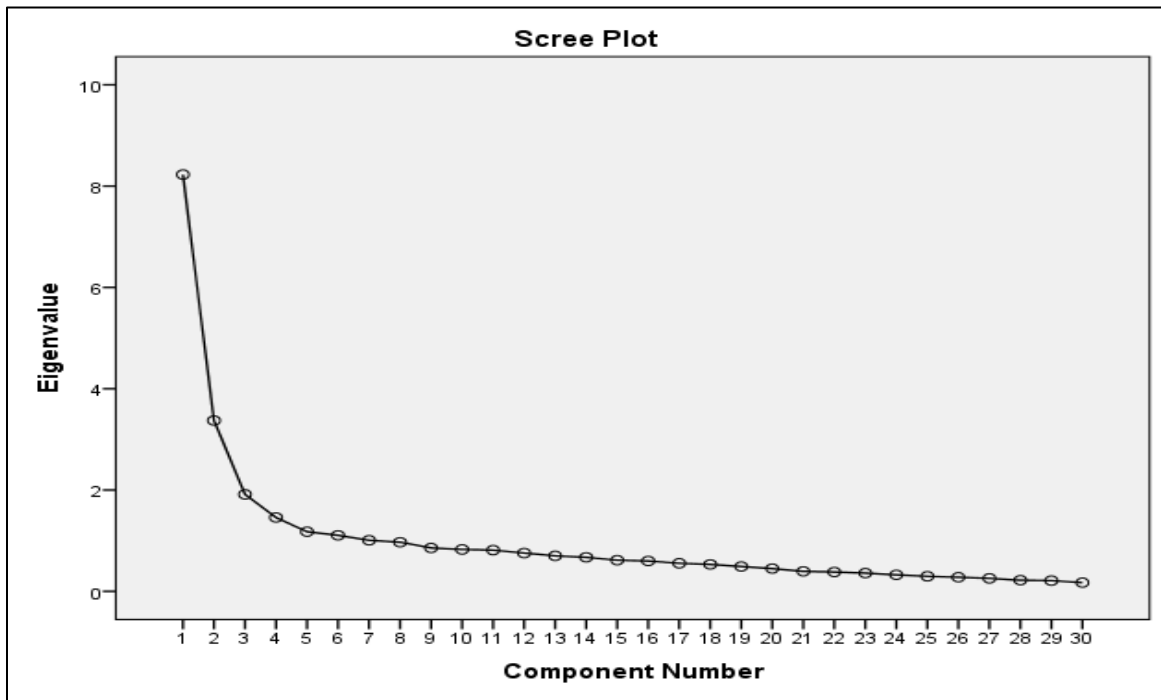
Figure 6-1: Scree plot for initial 30-item scale with 7 factors
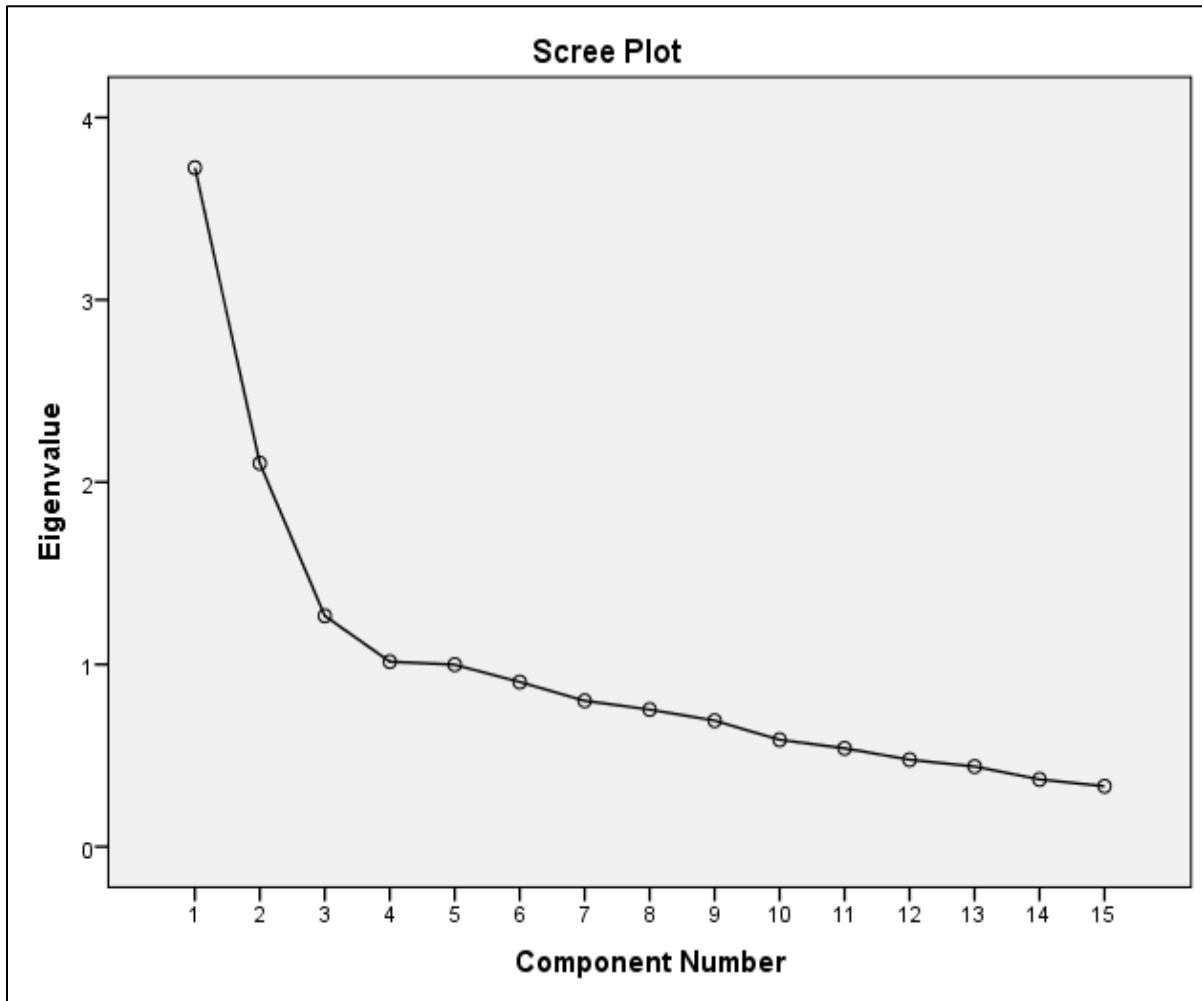
Figure 6-2: Scree plot of reduced 15-item scale with three factors.

Table 6-1: Factor analysis showing rotated component matrix of the final 15 items of RSARS instrument.

	Theorised Factors			
N	Items	Supervisory Skills	Institutional Support	Professionalism
15	I have the necessary skills to guide my students to carry out literature search	**0.83**	0.12	0.06
14	I am confident of my ability to help students in preparing research proposals	**0.81**	0.06	0.14
17	I have enough knowledge of the principles of research ethics	**0.80**	0.08	0.24
16	I am able to help students in analysing research data	**0.77**	0.20	-0.08
18	I am supportive of writing scientific papers with students	**0.73**	0.19	0.33
21	I am able to provide constructive feedback to students on their research	**0.62**	0.12	0.45
8	My institution provides assistance to students, in academic writing skills and editing services of research manuscript	-0.06	**0.82**	-0.03
11	My institution provides clear written guidance for both supervisors and research students	0.12	**0.81**	0.08
10	My institution provides staff development opportunities for supervisors to enhance relevant research knowledge and skills	0.07	**0.79**	0.17
3	Appropriate facilities (space, equipment etc.) are available to conduct research	0.29	**0.69**	0.11
1	I have been given protected time from the institution to supervise students	0.27	**0.65**	0.03
29	I believe that commitment by the supervisor is important for the success of the student's research project	0.04	0.04	**0.71**
23	I believe that working with enthusiastic students is motivating for supervisors	0.15	0.15	**0.69**
25	I believe it is important to be a role model for research students	0.13	-0.03	**0.65**
20	I believe a good supervisor, should be a researcher as well as an educator	0.41	0.22	**0.43**

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 4 iterations.

6.2 Internal consistency

Cronbach's alpha for the internal consistency of the 15 items that contained the Research Supervision and Academic Readiness Scale (RSARS) was 0.84 with corrected item-total correlations between 0.44 and 0.62 for 12 items. Three items with lower item-total correlations of (0.21, 0.23 and 0.33) were also kept as the research team felt they fit with other items of the scale. Also Cronbach's alpha of the final three factors; supervisory skills (α 0.86), institutional support (α 0.82) and professionalism (α 0.57) were also calculated separately.

Table 6-2: Internal consistency and item-total correlation for 15-items of RSARS for total sample

N	Items	Item total Correlation	Cronbach's alpha if Item Deleted
1	I have been given protected time from the institution to supervise students	0.55	0.82
3	Appropriate facilities (space, equipment etc.) are available to conduct research	0.63	0.81
4	My institution provides a variety of research support services e.g. Specialist laboratory assistance, qualitative data analysis, etc. ….	0.44	0.83
8	My institution provides assistance to students, in academic writing skills and editing services of research manuscript	0.57	0.82
10	My institution provides staff development opportunities for supervisors to enhance relevant research knowledge and skills	0.58	0.82
14	I am confident of my ability to help students in preparing research proposals	0.5	0.83
15	I have the necessary skills to guide my students to carry out literature search	0.53	0.82
16	I am able to help students in analysing research data	0.5	0.82
17	I have enough knowledge of the principles of research ethics	0.54	0.82
18	I am supportive of writing scientific papers with students	0.61	0.82
20	I believe a good supervisor, should be a researcher as well as an educator	0.46	0.83
21	I am able to provide constructive feedback to students on their research	0.53	0.82
23	I believe that working with enthusiastic students is motivating for supervisors	0.35	0.83
25	I believe it is important to be a role model for research students	0.21	0.84
29	I believe that commitment by the supervisor is important for the success of the student's research project	0.23	0.84

(QUANTITATIVE SURVEY DATA)

B) QUANTITATIVE SURVEY DATA

This chapter will illustrate the general description of collected data from all participants of King Saud Bin Abdul Aziz University (KSAU-HS) and Sydney University (Sydney). After the general descriptive illustration, the data will be categorized according to the two different study sites. Then there will be a description of the research supervision readiness scale item frequencies followed by the level of agreement between both universities. The relevant comparisons will be done using inferential statistics. The inferential statistics will illustrate the total scores and sub-scores of the three main domains (i.e. institutional, supervisory skills and professionalism) and compare them against the two sites with the different characteristics of participant and other related factors in order to test the significant differences between the two organizations and the characteristics of the participants.

6.3   Descriptive analysis

This section demonstrates the general characteristics of the study participants that include background demographics, teaching experiences, research related activities, and the overall self-rating of their research supervision experience. The percentages were calculated according to the total completed questions in each section of the survey (valid percent), since some of the participants had not filled some parts of the survey.

6.3.1 Socio-demographics characteristics of participants

A total of 235 participants were involved in this study with n = 112 (48%) recruited from King Saud Bin Abdul Aziz University for Health Sciences (KSAU-HS) and n = 123 (52%) from the University of Sydney (Sydney) Table 6.3.

The sample included a total n = 133/231 of males (57.6%) and n = 98/231 (42.4%) females. More than one-third of the total participants 84/231 (36.4 %) were in the age group of 40 - 49 and just under one-third (29.4%) were between 50 and 59. Less than 20% of participants were less than 40 years of age.

With regard to participants' nationality, the KSAU-HS participant n = 110, (65.5%) of the sample were of Saudi nationality n = 72 and one-third were non-Saudis accounting for n = 38 (34.5%). While participants from the University of Sydney n = 120, Australian nationals accounted for n=104 (86.7%) and n=16 (13.3%) were non-Australians.

6.3.2 Participant's qualification and background

Overall, more than one-half i.e. n = 136/229 (59.4%) of the research supervisors who responded to the survey were PhD holders or equivalent, whilst one-third n = 84 (36.7%) had a clinical fellowship training.

Almost all participants n = 230 were either full-time faculty or had joint appointments with their respective universities. More than one-half of the research supervisors (57.8%) had Assistant or Associate Professor positions whereas full-time Professors accounted for 18.7%. Only 5.7% of the total sample had no academic position within their university.

At the time of the study, almost all of the study participants n = 230 (96.1%) were involved in teaching students at different degree levels with varying levels of experience that ranged from less than 6 years to more than 20 years.

In terms of levels of teaching, n = 163/228 (71.5%) of study participants were involved in both undergraduate and postgraduate teaching activities while those who were involved in teaching only postgraduates or undergraduate programs were 20.6% and 7.9% respectively.

The majority of participants who responded to the survey were involved as research supervisors in this study as well as involved in other activities such as clinical duties in which they had direct contact with patients. Academic responsibilities included teaching and supervising both undergraduate health science students and postgraduate students such as residents, masters and doctoral candidates. Administrative roles included directorships of units, heads of departments, deans and other administrative responsibilities. More than two-thirds of participants n = 174 (74%) were involved in academic activities. In addition to the academic activities, more than one-half of the study population were also involved in research activities n = 129 (54.9%) and clinical work n = 125 (53.2%) respectively. Only one-third of the sample n = 75 (31.9%) were involved in administrative activities.

The study participant had a wide range of involvement in both clinical and non-clinical disciplines. About one-quarter, n = 62 (26.4%) of the participants were from the discipline of medicine followed by pediatrics n = 32 (13.6%) and general practice n = 23 (9.8%). While in the non-clinical disciplines; public health n = 53 (22.6%) was among the highest reported discipline followed by basic sciences n = 31 (13.2%) and medical education n = 17 (7.2%).

Table 6.3: Socio-demographic characteristics of the study participants

Variable	Categories	N	%
Gender (N=231)	Female	98	42.4
	Male	133	57.6
Age (N=231)	less than 40	46	19.9
	40-49	84	36.4
	50-59	68	29.4
	60+	33	14.3
Study-sites (N=235)	KSAU-HS	112	47.7
	Sydney	123	52.3
Nationality (N=230)	Saudi	72	31.3
	Non-Saudi	38	16.5
	Australian	104	45.2
	Non-Australian	16	7.0
Highest qualification (N=229)	Master	9	3.9
	PhD	136	59.4
	Fellowship	84	36.7
Current academic position (N=230)	None	13	5.7
	Lecturer	16	7.0
	Senior Lecturer	25	10.9
	Assistant Professor	83	36.1
	Associate Professor	50	21.7
	Professor	43	18.7
Currently teaching students (N=230)	Yes	221	96.1
	No	9	3.9
Number of years involved in teaching students (N=230)	<= 6	66	28.7
	7-12	49	21.3
	13 – 20	61	26.5
	21+	54	23.5
Level of teaching currently involved in (N=228)	Undergraduate	18	7.9
	Postgraduate	47	20.6
	Both	163	71.5
Work type (N=235)*	Clinical	125	53.2
	Administrative	75	31.9
	Academic	174	74.0
	Researcher	129	54.9
Discipline (N=235)*	Medicine	62	26.4
	Surgery	17	7.2
	Pediatrics	32	13.6
	Obstetrics/Gynecology	14	6.0
	Medical Education	17	7.2
	Family Medicine	23	9.8
	Public Health	53	22.6
	Basic Sciences	31	13.2

*Total more than 100% as some of the participants were involved in several work type and more than one discipline

6.3.3 Research training experience of study participants

This section describes the research training experiences of research supervisors, which are summarized in table 6-4. More than 90% of the participants n = 208/230 have undertaken research training activities. Study participants had variable research training involvement including attending courses, seminars and workshops. Almost two-thirds n = 152/208 had attended courses (64.7%) followed by those who attended workshops n = 138 (58.7%) and seminars n = 108 (46%) respectively.

Regarding the type of training activities involvement, participants reported different formats of research training activities, such as online, self-study, and classroom-based. More than two-thirds n = 186/208 (79%) of participants reported attending classroom-based activities where face-to-face interaction was the most common way of delivery method. This was followed by self-study n = 97 (41.3%) and online courses n = 72 (30.6%). On the other hand, participants had reported different types of research training activities that included qualitative and quantitative research training methods. Approximately, two-thirds n = 157 (66.8%) had quantitative research training experience. In addition to quantitative training, close to one-half of the participants also reported qualitative training experiences n = 130 (55.3%).

All study participants, n = 235, demonstrated a wide range of research interest areas that included clinical, educational and epidemiological. Almost two-thirds of all study subjects n = 143 (60.9%) showed interest in clinical research areas followed by health services research n = 64 (27.2%), epidemiological n = 63 (26.8%), public health n = 55 (23.4%) and medical education n = 4(19.1%). Whereas basic sciences n = 40 (17%) and psychosocial n = 25 (10.6%) were among the lowest reported research interests among the listed disciplines.

With regard to participants' research expertise, n = 232, they reported variable areas of main research expertise such as qualitative, quantitative and both. Almost one-half of the participants n = 105 (44.7%) were involved in both quantitative and qualitative, where majority n = 98 (41.7%) were involved in quantitative research. On the other hand, only n = 29 (12.3%) of the total participants were involved with qualitative research.

This study also investigated the research supervisors' experiences and involvements in developing or preparing research proposals to conduct a research. More than one-third n = 83/226 (36.7%) had submitted five or less proposals. While those who submitted over 20 proposals were only 18%. Participants had variable experiences with publishing different articles in peer-reviewed journals. However, the percentages were evenly distributed among the different categories of the total sample. Participants also reported variable experiences with different types of national and international oral or poster presentations, but again did not show that much of variation among these categories. With regard to supervisors publishing a book or contributing in a chapter, more than one-third of the participants 51 (41.6%) of the total sample had no publications. While those who published 2 or more were 22.6% and those who had more than five publications accounting for 20.4%.

Table 6-4: Frequencies of Research Training and faculty enhancement activities

Variables	Sub-variables	N	%
Undertaken research training (N=230)	Yes	208	90.4
	No	22	9.6
Form of research Training (N=235)*	Courses	152	64.7
	Seminars	108	46
	Workshops	138	58.7
Delivery Method (N=235)*	Online	72	30.6
	Self-Study	97	41.3
	Classroom based	186	79.1
Type of Research Training (N=235)*	Qualitative	130	55.3
	Quantitative	157	66.8
Main research interest (N=235)*	Clinical	143	60.9
	Educational	45	19.1
	Basic Sciences	40	17
	Psychosocial	25	10.6
	Epidemiology	63	26.8
	Public Health	55	23.4
	Health Services	64	27.2
Research expertise (N=235)	Qualitative	29	12.3
	Quantitative	98	41.7
	Both	105	44.7
Research proposals submitted (N=226)	<= 5	83	36.7
	6-10	56	24.8
	11-20	46	20.4
	21+	41	18.1
Articles published in peer reviewed journals (N=226)	<= 4	57	25.2
	5-20	63	27.9
	21 – 50	53	23.5
	51+	53	23.5
Presentations at National / International (N=226)	<= 4	60	26.5
	5-12	54	23.9
	13 – 40	61	27
	41+	51	22.6
Books/book chapters published (N=226)	<= 0	94	41.6
	1	35	15.5
	2-4	51	22.6
	5+	46	20.4

*Total more than 100% as some the participants were involved in more than one category

6.3.4 Research supervision experience of the study participants

When looking into research supervisors' experiences with supervision, almost one-half of the total participants, $n = 116/224$ (51.8%) from both study sites reported having undertaken some sort of research supervision training while the other half $n = 108$ (48.2%) did not have any training. Nearly all study participants, $n = 218$ (97.3%) had been actively involved in supervising undergraduate or postgraduates research students in the last five years except for six (2.7%) participants who were not active during that period.

Participants had variable experiences in supervising undergraduate and/or postgraduate (Masters and PhD) students. One-third of the participants did not supervise undergraduate research students in the past and about one-half of participants (47.7%) had no current undergraduate research students. On the other hand, 46% of the study participants had been involved in supervising three or more undergraduate students in the past. Moreover, majority(more than half to two-thirds) of the included research supervisors were not involved with students doing Masters, either in the past or currently, 51.9% and 76.6% respectively, compared to PhD students where more than one-half of all participants were involved in supervising one or more students, either in the past or currently (Table 6-5).

Participants included in this study were asked about their involvement with supervising research students either as primary $n = 216$ and/or associate supervisor $n = 184$. Around one-quarter $n = 56/216$ (25.9%) of primary supervisors were involved in supervising up to two research students, and $n = 62$ (28.7%) of them were supervising 3 to 5 research students while $n = 47$ (21.8%) reported supervising more than 10 students (Table 6-5). On the other hand, participants' experience in the associate supervision role was variable. One quarter were involved in associate supervision of up to two research students and one-third of the total

participants n = 59/184 (32.1%) were involved with supervising 2 to 3 research students and only n = 33 (17.9%) of them were involved in supervising 7 or more research students.

Table 6-5: Research supervision experiences of the study participants

Research supervision experiences	Category	N	%
Undertaken any research supervision training (n=224)	No	108	48.2
	Yes	116	51.8
Supervised research students (under and/ or postgraduate) in the last FIVE years? (n=224)	No	6	2.7
	Yes	218	97.3
Undergraduate: Number of Past students supervised (completed) (n=235)	0	81	34.5
	1	19	8.1
	2	27	11.5
	3+	108	46
Undergraduate: Number of Current students under supervision (n=235)	0	112	47.7
	1	42	17.9
	2	26	11.1
	3+	55	23.4
Postgraduate (Masters): Number of Past students (completed) (n=235)	0	122	51.9
	1	32	13.6
	2	25	10.6
	3+	56	23.8
Postgraduate (Masters): Number of Current students under supervision (n=235)	0	180	76.6
	1	32	13.6
	2	11	4.7
	3+	12	5.1
Postgraduate (PhD/Board): Number of Past students (completed) (n=235)	0	116	49.4
	1	23	9.8
	2	21	8.9
	3+	75	31.9
Postgraduate (PhD/Board): Number of Current students under supervision) (n=235)	0	102	43.4
	1	37	15.7
	2	28	11.9
	3+	68	28.9
• Primary supervisor (n=216)	<= 2	56	25.9
	3-5	62	28.7
	6-10	51	23.6
	11+	47	21.8
• Associate supervisor (n=184)	<= 2	46	25.0
	2-3	59	32.1
	4-6	46	25.0
	7+	33	17.9

6.3.5 Overall Self-rating of research supervisors

When supervisors were asked about overall self-rating of their supervision practice, only n = 31/223 (13.9%) of the study participants rated themselves as excellent while more than half n = 118 (52.9%) rated themselves as above average. The remaining participants n = 68 (30.5%) and n = 6 (2.7%) rated themselves as average and below average respectively.

Table 6-6: Overall rating of research supervisors (N=223)

Supervisors' self-rating	Total	
	Count	%
Below Average	6	2.7
Average	68	30.5
Above Average	118	52.9
Excellent	31	13.9

6.4 Baseline characteristics of participants according to the study sites

This section will describe all participants' characteristics and other related factors to research supervision experiences and practice according to the study sites.

Upon reviewing the source of study site and the gender of the study participants, males n = 75/110 accounted for more than two-thirds (68.2%) of KSAU-HS participants while the Sydney participants n = 58/121 accounted for 47.9% compared to female participants who were around one-third, n = 35/110 in KSAU-HS (31.8%) and in the Sydney group n = 63/121 (52.1%) with a significant p-value of 0.002.

Participants who were of the younger age group were more in the KSAU-HS group when compared to those from the Sydney group with a p-value of <0.001.

In the KSAU-HS participants, almost one-half of them n = 55/112 (49%) were clinical fellowship holders compared to the Sydney group. On the other hand, more than two-thirds of the Sydney participants n = 86/123 (69.9%) were PhD holders compared to KSAU-HS participants. Regarding the study participants and their academic positions with their respected university, more than two-thirds of the KSAU-HS group n = 76/109 (67.9%) had academic titles with the university as Assistant Professors compared to the Sydney group n = 121 where more than one-half of the participants were holding a position of an Associate Professor or Professor, accounting for 25.6%, 31.4% respectively, (Table 6-7).

Table 6-7: Baseline demographic characteristics with study-sites' participants

Variable	Category	KSAU-HS (N=110)		Sydney (n=121)		P-value
		N	%	N	%	
Gender	Female	35	31.8	63	52.1	0.002
	Male	75	68.2	58	47.9	
Age	less than 40	28	25.5	18	14.9	<0.001
	40-49	56	50.9	28	23.1	
	50-59	17	15.2	51	42.1	
	60+	9	8.2	24	19.8	
Highest qualification	Master	4	3.6	5	4.1	<0.001
	PhD	50	45.5	86	71.1	
	Fellowship	55	50.0	29	24.0	
Current academic position	None	2	1.8	11	9.1	<0.001
	Lecturer	3	2.7	13	10.7	
	Senior Lecturer	4	3.6	21	17.4	
	Assistant Professor	76	69.1	7	5.8	
	Associate Professor	19	17.3	31	25.6	
	Professor	5	4.5	38	31.4	

6.4.1 Research supervisors and teaching experiences according to participants study-sites

Study participants had variable duration with teaching students. Two-thirds of the KSAU-HS group were involved in teaching for less than 12 years compared to the Sydney group, where more than one-half had been teaching for more than 13 years, with a p-value of < 0.001. Participants from both study sites had also variable teaching experience within their universities. Supervisors involved in teaching undergraduate students were more among KSAU-HS group compared to the Sydney group where participants were more involved with teaching postgraduate students with statistically significant p-value of < 0.001.

While looking at the study participants' involvement in research training, both KSAU-HS and Sydney participants had reported their participation in research training activities with no significant difference (p-value of 0.48) between the two groups, (Table 6-8).

Table 6-8: Continued baseline characteristics of the study participants

Variables	Category	Total (N=230)	KSAU-HS (N=109)		Sydney (n=121)		P-value
		N	n	%	n	%	
Currently teaching students?	Yes	221	108	99.1	113	93.4	0.03
	No	9	1	0.9	8	6.6	
Number of years involved in teaching?	<= 6	66	40	36.7	26	21.5	<0.001
	7 – 12	49	29	26.6	20	16.5	
	13 – 20	61	26	23.2	35	28.9	
	21+	54	14	12.8	40	33.1	
Level of teaching currently involved in?	Undergraduate	18	17	15.7	1	0.8	<0.001
	Postgraduate	47	10	9.3	37	30.8	
	Both	163	81	75.0	82	68.3	
Undertaken research training before?	Yes	208	97	89.0	111	91.7	0.48
	No	22	12	11.0	10	8.3	

6.4.2 Work type and disciplines of study site participants

The data from both universities showed that the majority of participants were involved in academic work type, i.e. different teaching activities with students. However, KSAU-HS participants were more involved (80.4%) in the academic activities compared to participants from Sydney group (68.3%) with a significant p-value of 0.04. Similarly, more KSAU-HS study participants were also found to be more involved in clinical work (83%) compared to participants from Sydney group (42%) with a p-value of <0.001. However, the Sydney participants reported more research supervisors who were actively involved as researchers accounting for more than two-thirds (65%) of the participants compared to KSAU-HS participants (43.8%) with a significant p-value of <0.001. At the same time, there was no significant difference observed in study participants with regard to their involvement with administrative work type, p-value 0.08 (Table 6-9).

Table 6-9: Work type and discipline of the study participants according to study site

Variables		Total (N=235)	KSAU-HS (N=112)		Sydney (n=123)		p-value
		N	n	%*	n	%*	
Work type*	Clinical	125	83	74.1	42	34.1	<0.001
	Administrative	75	42	37.5	33	26.8	0.08
	Academic	174	90	80.4	84	68.3	0.04
	Researcher	129	49	43.8	80	65	<0.001
Discipline*	Medicine	62	20	17.9	42	34.1	0.005
	Surgery	17	11	9.8	6	4.9	0.14
	Pediatrics	32	24	21.4	8	6.5	<0.001
	Obstetrics/Gynecology	14	8	7.1	6	4.9	0.46
	Medical Education	17	10	8.9	7	5.7	0.34
	Family Medicine	23	18	16.1	5	4.1	0.002
	Public Health	53	20	17.9	33	26.8	0.10
	Basic Sciences	31	11	9.8	33	26.8	0.15

*Total more than 100% as some the participants were involved in several work type and more than one discipline

Moreover, participants from both sites had variable involvement with diverse clinical and scientific disciplines. There was a significant difference between those disciplines. For example, within the discipline of Medicine, KSAU-HS participants were 17.9% compared to Sydney 34.1% with a p-value of 0.005. There were also differences observed among participants within the discipline of Paediatrics and Family Medicine, where more paediatricians and family physicians were from the KSAU-HS group compared to the Sydney group with a significant p-value of 0.001 and 0.002 respectively. However, no differences were reported among the disciplines of Surgery, Obstetrics/Gynaecology, or Public Health, (Table 6-9).

6.4.3 Differences in research training and experience among study participants

With regard to participants in this study attending various courses and workshop activities, both KSAU-HS and Sydney participants reported similar contribution in the form of attendance in different research training activities with no significant differences, p-value of 0.067 and 0.392 respectively. KSAU-HS participants reported lower attendance for seminar activities, only about one-third (36.6%) attending compared to more than one-half of Sydney participants attending such activities (54.5%) with a significant p-value of 0.006 (Table 6-10).

Furthermore, both KSAU-HS and Sydney study participants reported similar exposure to classroom-based (face-to-face) activities with no significant difference between the two groups with a p-value of 0.16. However, a significant difference was observed with the online and self-study format delivery method where KSAU-HS participants reported lower usage of such methods compared to Sydney participants.

The online format used by the KSAU-HS participants was (17%) compared to the Sydney participants (43.1%) with a significant p-value of < 0.001. The self-study format was reported at 34.8% in the KSAU-HS group compared to 47.2% in the Sydney group with a marginally significant p-value of 0.05.

Table 6-10: Research training experience of study participants

Variables	Total (N=235)	KSAU-HS (N=112)		Sydney (n=123)		p-value
	N	n	%*	n	%	
Courses	152	74	66.1	78	63.4	0.67
Seminars	108	41	36.6	67	54.5	0.006
Workshops	138	69	61.6	69	56.1	0.39
Online	72	19	17	53	43.1	<0.001
Self-Study	97	39	34.8	58	47.2	0.05
Classroom Based	186	93	83	93	75.6	0.16

*Total more than 100% as some participants had several research training experiences and delivery methods

6.4.4 Main research interest and expertise of the study participants

On reviewing both universities' study participants' area of research interest, KSAU-HS participants were found to have higher rates of research interest in clinical (75%) and educational (25%) areas when compared to the Sydney participants (48%) and (13.8%) with significant p-values of 0.001 and 0.03 respectively. On the other hand, the Sydney participants reported more research interest in basic sciences (22.8%) and health services (35.8%) compared to KSAU-HS participants (10.7%) and (17.9%) respectively with significant p-values of 0.01 and 0.002 respectively. KSAU-HS and Sydney participants did not show any significant difference in the other research-oriented areas such as psychosocial, epidemiology and public health. Similarly, study participants from both KSAU-HS and Sydney participants had variable research expertise with qualitative, quantitative and both, but there was no significant difference between the two study site participants (Table 6-11).

Table 6-11: Research interest and expertise of the study participants

Variables		Total (N=235)	KSAU-HS (N=112)		Sydney (n=123)		P-value
	Category	N	n	%*	N	%*	
Main research interest*	Clinical	143	84	75	59	48	<0.001
	Education	45	28	25	17	13.8	0.03
	Basic Sciences	40	12	10.7	28	22.8	0.01
	Psychosocial	25	8	7.1	17	13.8	0.10
	Epidemiology	63	34	30.4	29	23.6	0.24
	Public Health	55	29	25.9	26	21.1	0.39
	Health Services	64	20	17.9	44	35.8	0.002
Research expertise	Qualitative	29	15	13.4	14	11.4	0.64
	Quantitative	98	48	42.9	50	40.7	0.73
	Both	105	48	42.9	57	46.3	0.59

*Total more than 100% as some participants had more than one research interest areas

6.4.5 Research activities and supervisors' experiences of study participants

Research supervisors included in this study had a wide range of research activities including number of proposal submissions, publications and abstract presentations in local or international conferences within the last five years. More than half of KSAU-HS participants (51.9%) submitted five or less research proposals and around one-quarter (24.1%) submitted between 6 and 10 proposals. On the other hand, more than half of Sydney participants (51.7%) had more than 10 proposals submitted compared to KSAU-HS with a significant p-value of <0.001.

Moreover, participants reported their variable contributions towards publishing in peer reviewed journals. Majority of KSAU-HS participants were involved in publishing between <4 to 20 publications compared to Sydney participants where majority had more than 20 and above publications with a significant p-value of <0.001.

In addition, study participants had variable participation in either oral or poster presentations in local or international conferences. KSAU-HS participants reported up to 12 presentations

compared to Sydney participants where majority of participants had at least 13 to as high as 40 different presentations with observed significant difference between different groups (p-value <0.001). Furthermore, with regard to the participants' involvement in publishing a book or a chapter of it, KSAU-HS participants had fewer contributions with around 70% of participants with zero book publications compared to 16.1% of the Sydney group. On the other hand, Sydney participants reported higher rates in publishing books or a chapter of a book with a significant difference reported among different categories, p-value <0.001, (Table 6-12).

Table 6-12: Research experiences of the study participants

Research experiences	Category	Total (N=224)	KSAU-HS (N=108)		Sydney (n=116)		p-value
		N	n	%	N	n	
No. of research proposals submitted	<= 5	83	56	51.9	27	22.9	<0.001
	6 - 10	56	26	24.1	30	25.4	
	11 - 20	46	13	12.0	33	28.0	
	21+	41	13	12.0	28	23.7	
No. of articles published in peer reviewed journals	<= 4	57	54	50.0	3	2.5	<0.001
	5 – 20	63	39	36.1	24	20.3	
	21 – 50	53	8	7.4	45	38.1	
	51+	53	7	6.5	46	39.0	
No. of oral and or poster presentations at National / International	<= 4	60	57	52.8	3	2.5	<0.001
	5 – 12	54	28	25.9	26	22.0	
	13 – 40	61	15	13.9	46	39.0	
	41+	51	8	7.4	43	36.4	
No. of book / book chapters published	0	94	75	69.4	19	16.1	<0.001
	1	35	15	13.9	20	16.9	
	2 – 4	51	13	12.0	38	32.2	
	5+	46	5	4.6	41	34.7	

6.4.6 Research supervision experiences of study participants

With regards to research supervisors included in this study and their research supervision training experiences, around one-third (34.3%) of the KSAU-HS study participants had undertaken previous supervision training activities compared to the Sydney group where more than two-thirds (68.1%) had research supervision training with a significant p-value of <0.001. There was no significant difference between the KSAU-HS and Sydney participants with regard to supervising undergraduate and/or postgraduate students in the last five years, p-value 0.36, Table 6-13.

Table 6-13: Research supervisors' training experiences of study participants

Supervisors training experiences		Total (N=224)	KSAU-HS (N=108)		Sydney (n=116)		P-Value
		N	n	%	n	%	
Undertaken any research supervision training	No	108	71	65.7	37	31.9	<0.001
	Yes	116	37	34.3	79	68.1	
Have you supervised research students (undergraduate and/ or postgraduate)	No	6	4	3.7	2	1.7	0.36
	Yes	218	104	96.3	114	98.3	

This study also investigated the number of times the study participants supervised students at different levels within their universities (Table 6-14). Regarding supervising undergraduate students, there was no significant difference in the number of undergraduate students supervised in the past who had completed their research in both KSAU-HS and Sydney, p-value 0.48. However, this study found that there was a significant difference in the number of current undergraduate students supervised where KSAU-HS participants were more engaged in supervising students compared to Sydney participants with a p-value of <0.001.

Moreover, although lower numbers of postgraduate student supervision were observed for all participants, there was no significant difference between the two study sites with regard to the

number of student projects supervised whether in the past or under current supervision, p-value 0.330 and 0.372 respectively. With regard to supervising PhD students, 67.9% of KSAU-HS participants had no experience in supervising doctoral students in the past and 71.4% reported to have no current doctoral supervision. In contrast, Sydney participants had at least one or more students being supervised whether in the past or current with a significant p-value of <0.001, (Table 6-14).

Table 6-14: Different levels of students supervised by the study participants

Level of students supervised		Total (N=235)	KSAU-HS (N=112)		Sydney (N=123)		P-value
		N	n	%	n	%	
Undergraduate: Number of Past students supervised (completed)	0	81	35	31.3	46	37.4	0.48
	1	19	12	10.7	7	5.7	
	2	27	13	11.6	14	11.4	
	3+	108	52	46.4	56	45.5	
Undergraduate: Number of Current students under supervision	0	112	36	32.1	76	61.8	<0.001
	1	42	19	17	23	18.7	
	2	26	15	13.4	11	8.9	
	3+	55	42	37.5	13	10.6	
Postgraduate (Masters): Number of Past students (completed)	0	122	63	56.3	59	48	0.33
	1	32	11	9.8	21	17.1	
	2	25	13	11.6	12	9.8	
	3+	56	25	22.3	31	25.2	
Postgraduate (Masters): Number of Current students under supervision	0	180	88	78.6	92	74.8	0.37
	1	32	11	9.8	21	17.1	
	2	11	6	5.4	5	4.1	
	3+	12	7	6.3	5	4.1	
Postgraduate (PhD/Board): Number of Past students (completed)	0	116	76	67.9	22	17.9	<0.001
	1	23	8	7.1	20	16.3	
	2	21	8	7.1	21	17.1	
	3+	75	20	17.9	60	48.8	
Postgraduate (PhD/Board): Number of Current students under supervision)	0	102	80	71.4	22	17.9	<0.001
	1	37	17	15.2	20	16.3	
	2	28	7	6.3	21	17.1	
	3+	68	8	7.1	60	48.8	

6.4.7 Primary vs associate supervision involvement of the study participants

On reviewing the study participants' level of supervision involvement with different research students, KSAU-HS and Sydney research supervisors did not differ in the number of participants who were involved with primary supervision, (p-value of 0.18). However, KSAU-HS research supervisors where less involved as associate supervisors compared to Sydney participants with a statistically significant p-value of <0.001, (Table 6-15).

Table 6-15: Research supervisors and their level of involvement with research students

Supervisor involvement		Total (N=216)	KSAU-HS (N=107)		Sydney (N=109)		P-value
		n	n	%	N	%	
Primary supervisor	<= 2	56	26	24.3	30	27.5	0.18
	3 – 5	62	38	35.5	24	22	
	6 – 10	51	22	20.6	29	26.6	
	11+	47	21	19.6	26	23.9	
		Total (N=184)	KSAU-HS (N=72)		Sydney (N=112)		
Associate supervisor	<= 2	46	31	43.1	15	13.4	**0.001**
	2 – 3	59	20	27.8	39	34.8	
	4 – 6	46	10	13.9	36	32.1	
	7+	33	11	15.3	22	19.6	

6.4.8   Overall rating of research supervisors

Table 6-16 shows that the majority of study participants from both universities had self-ratings of average or above average, where 39.8% of KSAU-HS participants had average self-ratings compared to Sydney participants' 21.7%. On the other hand, KSAU-HS participants had 43.5% of above average self-ratings compared to Sydney group, where 61.7% rated themselves as above average with a significant p-value of 0.006.

Table 6-16: Overall rating of research supervisors

Ratings	Total (N=223)	KSAU-HS (N=108)		Sydney (N=115)		P-value
	N	n	%	n	%	
Below Average	6	4	3.7	2	1.7	0.006
Average	68	43	39.8	25	21.7	
Above Average	118	47	43.5	71	61.7	
Excellent	31	14	13.0	17	14.8	

6.5 Inferential statistics

In this section, I will describe the inferential statistics including the mean scores in the form of readiness scores and sub-scores of participants' item rating and compare them between the two study sites.

6.5.1 The research supervisors' readiness scale item ratings according to the study-sites

This section describes the frequencies of item rating among participants under the three domains including institutional factors, supervisory skills and professionalism in the two study sites, (KSAU-HS and Sydney), Table 6-17.

Items categorized under each domain were as follows: items 1 to 5 were meant to measure institutional factors, 6 to 10 were meant to measure supervisors' personal skills, and 11 to 15 were meant to measure interpersonal skills (professionalism), followed by the level of agreement (Agree and somewhat Agree) of the study participants in the two institutions.

6.5.2 Institutional factors/support

Eighty percent of KSAU-HS participants disagreed or somewhat disagreed that they had protected time from their institutions compared to Sydney participants of whom only 37.2% disagreed. Over 50% of the participants from KSAU-HS also disagreed or somewhat disagreed that appropriate facilities to conduct research were available at their institution compared to Sydney participants (8.2%). More than one-half of both KSAU-HS (55.8%) and Sydney (70.2%) participants reported high levels of agreement on support and assistance provided to research students in academic writing skills and editing services by both universities.

In comparison to 97.1% of Sydney participants, only 49% of KSAU-HS participants reported having staff development opportunities offered by their institutions to enhance their research knowledge and skills. More than one-third (36.6%) of KSAU-HS participants disagreed or somewhat disagreed about their institution providing clear written guidance for both supervisors and students. Only one-third of KSAU-HS participants agreed or somewhat agreed while two-thirds of Sydney participants reported that their university supported them with clear written instructions.

6.5.3 Supervisory skills (personal factors)

Just over three-quarters (76.4%) of Sydney participants reported their agreement in their confidence and abilities to help students in preparing research proposals compared to 57% from KSAU-HS participants.

Though of different levels of agreement, KSAU-HS and Sydney participants were both confident with their abilities of having necessary skills to guide students to carry out their own

literature search, accounting for 93.7% and 96.7% respectively. More than two-thirds of KSAU-HS participants (70.9%) reported their agreement on their abilities to help their students to analyze research data compared to 91.8% of the Sydney participants.

Similarly, KSAU-HS and Sydney participants (91.8% and 98.3% respectively) have both reported having sufficient knowledge of principles of research ethics and majority of the participants [(KSAU-HS (90%) and Sydney (100%)] agreed that they support students in writing scientific papers.

6.5.4 Interpersonal skills (Professionalism)

Eighty nine percent of KSAU-HS participants reported high level of agreement regarding their belief that a good research supervisor should be a researcher as well as an educator compared to 97% of Sydney participants who were in agreement for the same.

Both KSAU-HS and Sydney participants reported high level of agreement regarding confidence in their abilities to provide constructive feedback to students on their research, accounting for 95.7% and 99.9% respectively.

Both KSAU-HS (95.5%) and Sydney (100%) participants reported high level of agreement with regard to their belief that working with enthusiastic students is among the most important motivating factors to research supervisors.

When asked about their belief in the importance of being role models for their research students, both KSAU-HS and Sydney participants reported high level of agreement accounting for 94.5% and 97.6% respectively.

Both KSAU-HS and Sydney participants reported high level of agreement regarding their belief that commitment by the research supervisors is an important factor for the success of their student's research project accounting for 96.4% and 99.2% respectively.

Table 6-17: Items frequencies ratings by the study participants

Items	Disagree		Somewhat Disagree		Neutral		Somewhat Agree		Agree	
	KSAU-HS	Sydney	KSAU-HS	Sydney	KSAU-HS	Sydney	KSAU-HS	Sydney	KSAU-HS	Sydney
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
1. I have been given protected time from the institution to supervise students	73(65.2)	26(21.1)	18(16.1)	22(18)	6(5.4)	15(12.3)	7(6.3)	28(23)	8(7.1)	31(25.4)
2. Appropriate facilities (space, equipment etc.) are available to conduct research	28(25.2)	2(1.6)	35(31.5)	8(6.6)	16(14.4)	12(9.8)	21(18.9)	37(30.3)	11(9.9)	63(51.6)
3. My institution provides assistance to students, in academic writing skills and editing services	21(18.9)	3(2.5)	22(19.8)	13(10.7)	21(18.9)	20(16.5)	31(27.9)	42(34.7)	16(27.9)	43(35.5)
4. My institution provides staff development opportunities for supervisors to enhance relevant research skills	16(14.3)	4(3.3)	17(15.2)	5(4.1)	24(21.4)	16(13.1)	41(36.6)	43(35.2)	14(12.5)	54(43.9)
5. My institution provides clear written guidance for both supervisors and research students	21(18.8)	2(1.7)	29(25.9)	14(11.6)	21(18.8)	22(18.2)	30(26.8)	41(33.9)	11(9.8)	42(34.7)
6. I am confident of my ability to help students in preparing research proposals	1(0.9)	0(0)	1(0.9)	5(4.1)	8(7.2)	23(19)	38(34.2)	0(0)	63(56.8)	93(76.9)
7. I have the necessary skills to guide my students to carry out literature search	2(1.8)	0(0)	1(0.9)	1(0.8)	4(3.6)	6(4.9)	39(34.8)	25(20.3)	66(58.9)	94(76.4)
8. I am able to help students in analyzing research data	9(8.2)	1(0.8)	8(7.3)	3(2.5)	15(13.4)	6(4.9)	38(34.5)	33(27)	40(36.4)	79(64.8)
9. I have enough knowledge of the principles of research ethics	0(0)	0(0)	2(1.8)	0(0)	7(6.4)	2(1.6)	31(28.2)	11(9)	70(63.6)	109(89.3)
10. I am supportive of writing scientific papers with students	2(1.9)	0(0)	2(1.9)	0(0)	7(6.3)	0(0)	33(30.6)	5(4.1)	64(59.3)	117(95.9)
11. I believe a good supervisor, should be a researcher as well as an educator	2(1.8)	0(0)	3(2.7)	1(0.8)	7(6.3)	2(1.6)	26(23.6)	18(14.8)	72(65.5)	101(82.1)
12. I am able to provide constructive feedback to students on their research	0(0)	0(0)	0(0)	0(0)	4(3.6)	0(0)	39(34.8)	17(13.8)	67(60.9)	105(86.1)
13. I believe that working with enthusiastic students is motivating for supervisors	0(0)	0(0)	1(0.9)	0(0)	4(3.7)	0(0)	15(13.8)	9(7.4)	89(81.7)	112(92.6)
14. I believe it is important to be a role model for research students	1(0.9)	0(0)	0(0)	0(0)	5(4.6)	3(2.5)	27(24.8)	29(23.8)	76(69.7)	90(73.8)
15. I believe that commitment by the supervisor is important for the success of the student's research project	0(0)	0(0)	0(0)	0(0)	4(3.6)	1(0.8)	20(18.2)	24(19.7)	86(78.2)	97(79.5)

6.5.5 Level of agreement between the two study-sites participants

Regarding the "agree" and "somewhat agree" responses among all items, there was less agreement between KSAU-HS and Sydney participants in the first five items which represents the institutional factors while there was good agreement between the two study site participants in the rest of the items of both domains: the supervisory skills and the professionalism with the exception of one item from the research supervisors personal skills in which KSAU-HS participants were less confident in helping students with analyzing their research data, (Table 6-18).

Table 6-18: Level of agreement between the two study site participants

Items	Level of agreement		P-value
	KSAU-HS	Sydney	
1) I have been given protected time from the institution to supervise students	13.4%	48.4%	0.001
3) Appropriate facilities (space, equipment etc.) are available to conduct research	28.8%	81.9%	0.001
8) My institution provides assistance to students, in academic writing skills and editing services of research manuscript	42.3%	70.2%	0.001
10) My institution provides staff development opportunities for supervisors to enhance relevant research knowledge and skills	49.1%	79.5%	0.001
11) My institution provides clear written guidance for both supervisors and research students	36.6%	68.6%	0.001
14) I am confident of my ability to help students in preparing research proposals	91.0%	95.9%	0.131
15) I have the necessary skills to guide my students to carry out literature search	93.7%	96.7%	0.277
16) I am able to help students in analyzing research data	70.9%	91.8%	0.001
17) I have enough knowledge of the principles of research ethics	91.8%	98.3%	0.019
18) I am supportive of writing scientific papers with students	89.9%	100%	0.001
20) I believe a good supervisor, should be a researcher as well as an educator	89.1%	97.6%	0.009
21) I am able to provide constructive feedback to students on their research	96.4%	100%	0.034
23) I believe that working with enthusiastic students is motivating for supervisors	95.5%	100%	0.017
25) I believe it is important to be a role model for research students	94.5%	97.6%	0.232
29) I believe that commitment by the supervisor is important for the success of the student's research project	96.4%	99.2%	0.140

Table 6-19: Correlation between total readiness score and its sub-scores

Spearman's rho	Institutional	Supervisory skills	Professionalism	Total Score
Institutional	1			
Supervisory skills	0.310**	1		
Professionalism	0.303**	0.463**	1	
Total Score	0.893**	0.634**	0.573**	1
** Correlation is significant at the 0.01 level (2-tailed).				

Table above shows high correlation between total readiness score and institutional factor when compared to the other two domains of supervisory skills and professionalism.

Table 6-20: Correlation between total readiness score and its sub-scores by study site

Study site	Spearman's rho	Institutional	Supervisory skills	Professionalism	Total Score
KSAU-HS	Institutional	1			
	Supervisory skills	0.048	1		
	Professionalism	0.108	0.543**	1	
	Total Score	0.677**	0.660**	0.626**	1
Sydney	Institutional	1			
	Supervisory skills	0.247**	1		
	Professionalism	0.221*	0.227*	1	
	Total Score	0.921**	0.509**	0.438**	1
** Correlation is significant at the 0.01 level (2-tailed).					
* Correlation is significant at the 0.05 level (2-tailed).					

When comparing between the two study site participants with regard to the total and its sub scores, KSAU-HS group scores demonstrated positive correlation in all domains. However, Sydney group scores were low in two sub-scores except institutional domain where the correlation was found to be very high (0.92), Table 6-20.

6.5.6 Distribution of readiness scores versus factors affecting supervision

Since there were differences between the KSAU-HS and Sydney university participants, the total readiness scores and sub-scores of the three main domains (institutional, supervisory skills and professionalism) were calculated for different demographic, supervision training and experiences variables. Because of the ordinal data, non-parametric testing was used namely Mann-Whitney for the binary data and Kruskal Wallis for the multiple categories.

6.5.7 Comparing total readiness scores of participants according to study-sites

Table 6-21 shows the total readiness score and its sub-scores according to study sites. There was a significant difference between the KSAU-HS and Sydney participants in the mean ranks of the total readiness score (mean rank 75.4 vs 156.7, p-value <0.001). When the mean ranks of the sub-scores of the different domains were further investigated, there were significant differences with all sub-scores, including institutional (mean rank 76.6 vs 155, p value <0.001), supervisory skills (mean rank 95.7 vs 138.2, p value <0.001) and professionalism scores (mean rank 99.5 vs 131.8, p value <0.001). This shows that University of Sydney participants have more readiness to supervise research students compared to KSAU-HS participants.

Table 6-21: Total readiness score and its sub-scores by study-sites

Domain	Study-site	N	Mean Rank	Mann-Whitney U	P-value
Institutional	KSAU-HS	112	76.6	2255	0.001
	Sydney	122	155.0		
Supervisory skills	KSAU-HS	112	95.7	4401	0.001
	Sydney	123	138.2		
Professionalism	KSAU-HS	110	99.5	4841	0.001
	Sydney	122	131.8		
Total score	KSAU-HS	112	75.4	2123.5	0.001
	Sydney	123	156.7		

6.5.8 Distribution of total readiness scores of participants' genders in the study-sites

Table 6-22 presents the results of gender difference regarding total readiness in each study site. There was a significant difference between females and males in the total readiness score of the KSAU-HS participants with a mean rank of 44.3 vs 60.7 and p-value of 0.012. While looking into sub-scores, the main difference was observed in the supervisory skills sub-score domain with a mean tank of 43.8 vs 60.9 and p-value 0.008, which indicated that males were more ready to supervise compared to females within the KSAU-HS group. On the other hand, there was no significant gender difference in the Sydney participants with all domains and total scores.

Table 6-22: The distribution of total readiness score among genders in each study sites

Study-Site	Readiness	Gender	N	Mean Rank	Mann-Whitney U	P-value
KSAU-HS	Institutional	Female	35	48.0	1051	0.092
		Male	75	59.0		
	Supervisory skills	Female	35	43.8	904.5	0.008
		Male	75	60.9		
	Professionalism	Female	35	51.2	1163	0.320
		Male	75	57.5		
	Total score	Female	35	44.3	920.5	0.012
		Male	75	60.7		
Sydney	Institutional	Female	63	61.6	3380.5	0.720
		Male	57	59.3		
	Supervisory skills	Female	63	56.0	3528.5	0.080
		Male	58	66.4		
	Professionalism	Female	63	63.6	3251.5	0.253
		Male	57	57.0		
	Total score	Female	63	59.3	3737.5	0.583
		Male	58	62.8		

6.5.9 Qualification of participants and source of study sites

While looking into the highest qualifications of study participants and the source of study sites, there was no significant difference in the total scores of participants from both universities with a mean rank (54.9 vs 51.2, p-value 0.531) in the KSAU-HS participants and a mean rank (60.4 vs 50.9, p-value 0.184) in Sydney participants. However, there was a significant difference in the supervisory skills sub-score in the KSAU-HS participants where more PhD holders and/or board certified participants reported better supervisory skills compared to participants with clinical fellowship with a mean rank (59.2 vs 47.3, p-value 0.043). No significant difference was observed in any of the sub-score domains in the Sydney participants, Table 6-23.

Table 6-23: Distribution of total readiness score and its sub-scores according to study-sites and participant qualification

Study-site	Readiness	Qualification	N	Mean Rank	Mann-Whitney U	P-value
KSAU-HS	Institutional	PhD	50	53.2	1364.5	0.946
		Fellowship	55	52.8		
	Supervisory skills	PhD	50	59.2	1064.5	0.043
		Fellowship	55	47.3		
	Professionalism	PhD	50	51.4	1298.5	0.611
		Fellowship	55	54.3		
	Total score	PhD	50	54.9	1277.5	0.531
		Fellowship	55	51.2		
Sydney	Institutional	PhD	85	59.2	1083.5	0.33
		Fellowship	29	52.3		
	Supervisory skills	PhD	86	60.3	1046	0.161
		Fellowship	29	51.0		
	Professionalism	PhD	85	60.2	1000	0.095
		Fellowship	29	49.5		
	Total score	PhD	86	60.4	1041	0.184
		Fellowship	29	50.9		

6.5.10 Work type of study participants according the source of study sites

Table 6-24 summarises the research supervisor's activities and the different work types they are engaged with their affiliated universities. Within the KSAU-HS participants, although there was no difference reported in the mean ranks of total scores of all domains, it was observed that the supervisory skills of participants who were more involved in clinical work had lower scores compared to those who are not (mean rank 49.9 vs 75.4, p-value <0.001). Moreover, supervisors who were more involved in academic work had better supervisory skills compared to those who were not involved in academia (mean rank 60 vs 42.2, p-value 0.02). However, there was no significant difference observed in the mean ranks of the total scores or sub-scores of the administrative and research work type activities of KSAU-HS participants. No significant difference was found in mean ranks of the total scores and sub-scores of the participants in Sydney participants within any of the different work types.

Table 6-24: Total readiness scores and sub scores by study-sites and work-type of the study participants

| Work Type | Category | KSAU-HS | | | | | Sydney | | | | |
		N	Institutional	Supervisory skills	Professionalism	Total score	N	Institutional	Supervisory skills	Professionalism	Total score
Clinical	No	29	56.8	75.4	63.0	65.7	80	62.6	64.7	62.5	63.5
	Yes	83	56.4	49.9	53.1	53.3	42	59.5	56.8	59.6	59.0
	P-value		0.958	0.001	0.143	0.075		0.642	0.21	0.624	0.504
Administrative	No	70	55.9	57.1	55.6	55.6	89	60.4	62.9	61.4	60.5
	Yes	42	57.5	55.5	55.4	58.1	33	64.5	59.7	61.8	66.0
	P-value		0.805	0.791	0.97	0.695		0.565	0.635	0.954	0.447
Academic	No	22	59.2	42.2	58.5	49.3	39	56.3	61.4	63.4	57.9
	Yes	90	55.9	60.0	54.8	58.3	83	63.9	62.3	60.6	63.9
	P-value		0.667	0.02	0.63	0.246		0.264	0.882	0.65	0.381
Researcher	No	63	58.7	53.3	57.9	56.2	42	63.4	58.8	56.8	61.0
	Yes	49	53.7	60.6	52.5	56.9	80	60.5	63.7	64.0	62.5
	P-value		0.419	0.229	0.363	0.916		0.667	0.437	0.235	0.817

6.5.11 *Number of years involved in teaching and source of participants*

Table 6-25 shows research supervisors' involvement in teaching students. KSAU-HS participants reported significant difference among different categories in the number of years involved in teaching students and the mean rank of the total readiness score (p-value 0.001). When looking into the mean ranks of sub-score domains, this was obvious with supervisory skills and professionalism sub-scores with the highest mean rank scores for supervisors who have been teaching for 13 years and more, p-value 0.043 and 0.016 respectively. For the Sydney participants, no significant difference was found in all mean rank scores or sub-scores.

Table 6-25: Total readiness scores and sub-scores by study sites and number of years supervisors involved in teaching

| No. of years involved in teaching | Study-sites | | | | | | | | | |
| | KSAU-HS | | | | | Sydney | | | | |
	N	Institutional	Supervisory skills	Professionalism	Total score	N	Institutional	Supervisory skills	Professionalism	Total score
<= 6	40	58.2	54.6	54.6	54.7	26	64.9	50.9	61.6	61.2
7-12	29	42.0	43.9	44.8	38.5	20	49.5	66.9	54.2	52.3
13 – 20	26	62.0	67.9	70.3	71.8	35	67.9	57.9	54.5	64.2
21+	14	59.6	55.1	48.8	58.7	39	56.6	67.3	68.4	62.4
P-value		0.074	0.043	0.016	0.001		0.206	0.179	0.205	0.659

6.5.12 *Level of teaching and source of participants*

On looking into the research supervisors' involvement in teaching different levels of students, Table 6-26, there was no significant difference shown in the mean ranks of total scores of both study site participants, p-value of 0.692 and 0.56 respectively.

However, in the KSAU-HS participants, the supervisory skills were shown to be better with supervisors involved in postgraduate teaching than those with undergraduates (mean rank of 76.7 vs 47.2) with a significant p-value of 0.044. There was no significant difference in the mean ranks of sub-scores between different levels of teaching reported in the Sydney participants

Table 6-26: Total readiness score and sub-scores by study-sites and level of teaching

| Study-sites | | | | | | | | | | |
| Level of teaching | KSAU-HS | | | | | Sydney | | | | |
	N	Institutional	Supervisory skills	Professionalism	Total score	N	Institutional	Supervisory skills	Professionalism	Total score
Undergraduate	17	65.2	47.2	52.1	60.2	1	42.5	24.5	87.0	41.5
Postgraduate	10	39.7	76.7	55.2	55.8	37	53.1	62.9	58.9	56.3
Both	81	54.1	53.3	54.9	53.1	82	63.2	59.9	60.1	62.6
P-value		0.12	0.044	0.938	0.692		0.296	0.479	0.675	0.56

6.5.13 Research training experience of research supervisors and the study sites

With regard to research supervisor's training experience, this study did not find any significant difference in the mean ranks of the total scores and sub-scores among participants within the KSAU-HS group.

However, in the Sydney participants, there was a significant difference in the mean ranks of the total readiness scores and the institutional sub-score domain with a p-value of 0.001, Table 6-27.

Table 6-27: Total readiness score and sub-scores by study sites and research training

| Research Training experiences | Study-sites | | | | | | | | | |
| | KSAU-HS | | | | | Sydney | | | | |
	N	Institutional	Supervisory skills	Professionalism	Total score	N	Institutional	Supervisory skills	Professionalism	Total score
No	12	54	41.3	52.5	47.8	10	26.1	46.5	50.4	25.9
Yes	97	55.1	56.7	55.3	55.9	111	63.6	62.3	61.4	64.2
P-value		0.907	0.106	0.764	0.401		0.001	0.143	0.287	0.001

6.5.14 Method of training delivery and the study sites

Table 6-28 shows the different delivery methods of research training activities received by participants. In the KSAU-HS group, the total readiness scores showed a significant difference in the mean ranks (66.8 vs 51) regarding the self-study method of delivery with a p-value of 0.014.

On reviewing the different domains, there was no significant difference in the institutional subs-score domain (mean rank 54.5 vs 60.3), p-value 0.366, while the supervisory skills (mean rank 67.2 vs 50.8) and professionalism (mean rank 65.4 vs 50.1) domain sub-scores showed a significant difference among those who used self-study method and those who did not, with a p-value of 0.01 and 0.012 respectively.

In the Sydney participants, there was also a significant difference in the total readiness score of the classroom-based (mean rank 66.1 vs 49.4) and the institutional sub-score (mean rank 65.7 vs 48.1), p-values of 0.026 and 0.019 respectively.

Table 6-28: Total readiness score and sub-scores by study sites and training delivery method

Training delivery method	Category		KSAU-HS					Sydney			
		N	Institutional	Supervisory skills	Professionalism	Total score	N	Institutional	Supervisory skills	Professionalism	Total score
Online	No	93	58.6	51.7	53.4	55.1	70	61.4	61.7	63.7	62.2
	Yes	19	46.3	79.9	65.4	63.6	53	61.7	62.5	58.7	61.7
	P-value		0.134	0	0.124	0.298		0.961	0.895	0.387	0.937
Self-study	No	73	54.5	50.8	50.1	51.0	65	60.8	66.0	65.7	63.9
	Yes	39	60.3	67.2	65.4	66.8	58	62.3	57.5	56.9	59.9
	P-value		0.366	0.01	0.012	0.014		0.821	0.158	0.126	0.527
Classroom based	No	19	59.5	46.7	58.5	50.4	30	48.1	52.8	58.5	49.4
	Yes	93	55.9	58.5	55.0	57.7	93	65.7	65.0	62.4	66.1
	P-value		0.661	0.144	0.659	0.37		0.019	0.08	0.564	0.026

This indicates that self-study was more helpful for KSAU-HS supervisors in terms of supervisory skills and professionalism while the Sydney supervisors reported that they had more institutional support in providing classroom-based activities. However, the on-line training delivery method did not show any significant difference in the mean rank scores or sub-scores of both study site participants.

6.5.15 Type of research training and the study-sites

This study also examined the different types of research training experiences of research supervisors (Table 6-29). The KSAU-HS participants reported no significant differences in the mean ranks of the total readiness scores of different types of research training except in the area of supervisory skills. Quantitative (mean rank 62.5 vs 42.6) and statistics (mean rank 64.4 vs 45.9) research training activities helped the KSAU-HS participants' supervisory skills with a p-value of 0.002 for both. Similarly, Sydney participants were found to have a significant difference in the mean rank of the total readiness score with the quantitative research training experiences (mean rank 66.9 vs 53.1), p-value of 0.039, where supervisors reported more institutional support (mean rank 68.1 vs 49.5) for the quantitative research training compared to other research training activities such as qualitative and statistics with p-value of 0.005.

Table 6-29: Total readiness score and sub-scores by study sites and type of research training

Type of Research Training	Category			Study-sites							
		KSAU-HS					Sydney				
		N	Institutional	Supervisory skills	Professionalism	Total score	N	Institutional	Supervisory skills	Professionalism	Total score
Qualitative	No	49	56.3	51.0	55.2	52.8	56	60.7	61.6	57.1	60.5
	Yes	63	56.7	60.8	55.7	59.4	67	62.2	62.3	65.1	63.2
	P-value		0.953	0.106	0.94	0.287		0.82	0.907	0.169	0.675
Quantitative	No	34	59.2	42.6	52.7	48.9	44	49.5	60.8	59.6	53.1
	Yes	78	55.3	62.5	56.6	59.8	79	68.1	62.7	62.6	66.9
	P-value		0.562	0.002	0.544	0.101		0.005	0.762	0.62	0.039
Statistics	No	48	59.2	45.9	51.2	51.8	53	56.3	60.0	66.0	59.4
	Yes	64	54.5	64.4	58.6	60.0	69	65.5	63.6	58.0	64.0
	P-value		0.45	0.002	0.214	0.182		0.155	0.559	0.169	0.478

6.5.16 Main research interest and study sites

Table 6-30 shows the main research interest of research supervisor participants. The KSAU-HS participants reported a significant difference in the mean ranks of the total readiness score of basic sciences (mean rank 74.9 vs 54.3) and epidemiological (mean rank 66.3 vs 52.2) research interest areas with a p-value of 0.038 and 0.034 respectively. The KSAU-HS participants who were interested in Basic sciences and Epidemiology were found to have better supervisory skills compared to other research areas with a p-value of 0.034 and 0.001 respectively. In addition, participants with epidemiological research interest showed better professionalism sub-score (mean rank 65.4 vs 51.1) with significant p-value of 0.025. For the Sydney participants, there was no significant difference in the mean ranks of total readiness scores of different research interest areas.

Table 6-30: Total readiness score and sub-scores by study sites and main research supervisor's interest

Main Research Interest	Category	KSAU-HS					Sydney				
		N	Institutional	Supervisory skills	Professionalism	Total score	N	Institutional	Supervisory skills	Professionalism	Total score
Clinical	No	28	62.2	66.0	63.8	64.4	64	62.3	67.9	62.6	65.9
	Yes	84	54.6	53.3	52.9	53.9	59	60.7	55.6	60.3	57.8
	P-value		0.286	0.07	0.115	0.135		0.799	0.039	0.685	0.205
Educational	No	84	57.4	55.3	54.2	56.0	106	60.6	62.8	60.5	62.3
	Yes	28	53.8	60.3	59.3	57.9	17	67.2	56.8	67.4	60.5
	P-value		0.606	0.474	0.447	0.79		0.474	0.489	0.41	0.849
Basic sciences	No	100	55.6	54.3	53.9	54.3	95	62.4	58.9	59.7	61.4
	Yes	12	63.8	75.0	69.0	74.9	28	58.6	72.6	67.4	64.0
	P-value		0.406	0.034	0.108	0.038		0.614	0.054	0.264	0.74
Psycho-social	No	104	57.5	55.9	55.3	56.7	106	61.0	62.2	58.8	61.3
	Yes	8	43.8	64.9	57.8	54.5	17	64.5	60.9	78.2	66.2
	P-value		0.25	0.439	0.825	0.856		0.702	0.887	0.02	0.6
Epidemiological	No	78	56.9	50.0	51.1	52.2	94	60.6	63.6	65.0	62.5
	Yes	34	55.7	71.5	65.4	66.3	29	64.5	57.0	50.3	60.5
	P-value		0.856	0.001	0.025	0.034		0.597	0.352	0.031	0.79
Public Health	No	83	57.6	49.7	52.6	53.4	97	63.8	62.2	62.3	64.0
	Yes	29	53.3	76.1	63.7	65.3	26	52.9	61.1	58.7	54.5
	P-value		0.54	0	0.095	0.09		0.158	0.879	0.608	0.229
Health Services	No	92	58.6	51.5	52.6	54.6	79	62.5	61.9	61.4	63.4
	Yes	20	46.9	79.4	68.6	65.1	44	59.8	62.2	61.7	59.6
	P-value		0.144	0.001	0.036	0.192		0.684	0.959	0.958	0.573

In summary, this chapter describes the quantitative part of the results including scale refinement, descriptive and inferential statistics of the data with relevant comparisons according to the site of study participants between the two universities.

CHAPTER SEVEN: DISCUSSION

7 DISCUSSION

7.1 Introduction

The present study explored faculty perspectives on research supervision, experiences and the factors that may affect supervision practices. This study is expected to help researchers and their academic institutions to measure supervisors readiness for the research supervision as well as illuminating the areas that should be addressed while developing faculty enhancement programs bearing in mind the context of this project academic institution.

The specific objectives of this study were to develop and validate the Research Supervision and Academic Readiness Scale (RSARS), explore factors affecting research supervision process and practices, determine the academic readiness for research supervision of participants. These objectives were achieved in three stages: The first multi-phase stage included expert opinion, focus group discussion, and Delphi techniques resulting in constructing a self-administered questionnaire. The questionnaire was piloted in a sample of 52 participants (research supervisors) from KSAU-HS. This stage dealt with the first objective of the study which was published and provided in the appendix (D).

The second stage covered the qualitative part of the study using semi-structured interviews and conducted in both KSAU-HS and the University of Sydney. The last stage of this study comprised the quantitative part of this project which was conducted at both institutions utilizing the RSARS questionnaire that was further modified and developed based on the findings of previous stages to cover the last objective.

This chapter will discuss the main findings of both qualitative and the quantitative data guided by the objectives and the selected theoretical framework of this project.

The chapter will begin with short discussion on the validity of the developed instrument followed by discussing main findings under three main headings which will cover the main factors of the research supervision. First, the context of research supervision will be discussed including the environment within the institutional infrastructures that may facilitate supervision. Secondly, research supervisors' personal skills including characteristics such as background, experience, and level of involvement. The third area is professionalism which includes factors that facilitate interaction between supervisors and their research students. This structure also goes as well in congruence with the main domains of the chosen theoretical framework which is the social cognitive theory (SCT) including context, personal and behavioral interaction. Then will discuss the important implications of this study. Finally, will evaluate the overall strength and limitations of this study and close the chapter with a conclusion, recommendations and suggestions for future research.

7.2 The development and the validity of the study instrument (RSARS)

The developed tool (RSARS) is a newly developed scale, for which a range of validity evidence has been presented. After modification and validation of the questionnaire, the instrument was found to be a helpful diagnostic tool to evaluate the research supervisors' preparedness and infer their readiness and their needs to undertake research on students' projects. This was based on the merits of the instrument developed which marched through different stages of development (as described earlier in the method section, Chapter 4). Each phase was informed by the previous one.

Some authors had highlighted the importance of using mixed methods which helps in enhancing the development and validation of research instrument (Tashakkori & Teddlie, 2003). The main goal of using such methods, however, is to increase confidence in validity by minimizing the amount of error (Benson & Clark, 1982).

The other merit, is the participatory approach including collecting data from two different academic institutions (Australia and Saudi Arabia). However, some limitation which might affect the generalizability of the developed instrument, is the cross-cultural applicability of the tool within the European, North American and may be other developing counties. Additionally, the use of cross sectional data based on self-assessment might be difficult and therefore subject to bias (Colthart et al., 2008; Eva, 2004). On the other hand, the comprehensive approach that was used in this project might be applicable to other contexts. Because of the developed instrument being the first of its kind may limit its comparison with others.

7.3 How the context influenced the research supervision

The context in this section refers to the institutional factors and the environment in which research supervision is practiced. This includes the infrastructure of the university setting such as manpower, facilities, and support provided. Since context is a very important aspect of the theory used in this project which is the Social Cognitive Theory (SCT), it is important to reflect on the different stages that KSAU-HS and Sydney are at in terms of development as academic centers of excellence.

When considering the two study sites where this study was conducted, the KSAU-HS is a relatively young academic institution as described earlier in the methods section. Therefore, research activities and research supervision are expected to be relatively new in comparison with Sydney University which is a well-established center with a long history in terms of experience in different research activities in different disciplines. With such longer experience than KSAU-HS, the Sydney University staff and clinicians working in a relatively more experienced environment which is more likely to positively impact their practice. This may explain one of the major reported differences in the result section between the two sites indicating that Sydney University staff are more involved in research activities compared with KSAU-HS staff who are more involved in clinical and teaching roles rather than research activities. This may imply that with such experience and research-oriented environment, Sydney staff are in a favorable context to provide a more productive supervision than in KSAU-HS.

The fact that the majority of the KSAU-HS staff are mainly clinicians and have a joint appointment with the KSAU-HS implies that their involvement with their clinical work is more than their commitment as an appointee with the responsibility of research supervision. This could be the reason for KSAU-HS staff response when they were asked to identify their work type, the majority indicated that they are mostly clinicians. In addition, the engagement of KSAU-HS research supervisors were mostly involved with clinical and other educational activities when compared to the Sydney group, where the majority of their research supervisors were actively involved in research activities particularly in basic sciences and health services research.

Being a good clinician is not necceserly equivalent of being a good research supervisor. In KSAU-HS, the staff categorized themselves according to their perception of duty as mainly clinician. This might indicate the need to enforce their perception of themselves as research supervisors in addition to increase their capacities and enhance their skills as an important step to make them better research supervisors and how context might contribute to that way of percieved self-assessment.

Universities usually have multiple responsibilities to respond to workplace needs, engage in capacity building (with staff and students) and to establish specific research platforms that take into account external environment funding contestability (McCallin & Nayar, 2012). According to Shulman (2005), signature pedagogy emphasizing the importance of institutional background and orientation which affects the process and outcomes. KSAU-HS being a clinically-oriented institution, may have had a major impact on the overall research supervision. A finding which is commonly found among healthcare workers in clinical settings (Shulman, 2005). Thus, such a way of teaching personality or signature pedagogy is influenced by such a mindset. Such pedagogy signature and the fact that KSAU-HS is younger institution than the Sydney University could have contributed to these many differences as explored in the results section (see chapter 6, section 6.5 P 167).

Academic institutions and Universities, in general trying to improve its key performance indicators (KPI) as requirement of accreditation standards, recognition and overall ranking. Those indicators are dependents on the institutional mission, strategic goals and priorities. However, research activities and grants are one of those major KPI (Harvey, 2004). The quality of the research

outcome is determined through its novelty, impact it has in the field, utilization, and many other factors. Similarly, the quality of researcher is dependent on the quality of the research they conduct. Therefore, training is instrumental to improve the skills of the research supervisors which in turns will be reflected on the overall quality of the academic institutions (Pearson & Brew, 2002). In this project, there was a significant statistical difference in training for research supervisors between the two universities. Sydney University's supervisors declared that they had more training than what was declared by the KSAU–HS staff (68% compared to 34% respectively). Bearing in mind that there is no statistical significance between the two institutes in term of student supervision intake, and even if we assumed that they are equal in term of quality, the lack of specialized training in research supervision precisely might impact the overall quality of their research supervision. As indicated in the literature review chapter (Section 2.1.2 page 32) being a good researcher does not automatically qualify the faculty to be a good research supervisor. Sydney research supervisors reported higher mean scores, which indicated better support from their institution in regard to time, facilities and faculty enhancement activities compared to the KSAU-HS participants. With that, it can be inferred that the Sydney University environment is closer to better quality than the environment in KSAU-HS.

Although this study showed statistical differences in terms of provision of supervision training, the qualitative part of the project revealed an agreement between both institutes in term of the need to improve the environment, such as having protected time, access to facilities, and academic writing support, this was reported by all participants as a common shortcoming in both institutes. In Sydney for example, the readiness score was higher than KSAU-HS despite the fact that they have expressed the same shortcomings. It seems that even in Sydney with its higher readiness

score, they were still expecting to be more involved, better communicated with, and also reported that they would be more satisfied if appreciated and valued by their institution. Many researchers have concluded that environment has significant role in impacting the overall quality of production; enough change of the environment would enable the improvement of the research supervision processes, even if there were no introduction to extra training or mentoring (Long & McGinnis, 1981; Ramsden, 2003). This might explain the findings of how research supervisors at both institutions reported the same need for improvement despite the fact that one of them has revealed a better score in readiness to supervise. This is in agreement with McCallin (2012) who stressed the importance of the context in terms of external environment and funding contestability as a major player in improving universities academic profile through capacity building and promoting research. (McCallin & Nayar, 2012).

One of the important findings in this study is the lack of clarity between the different roles of supervisors (i.e. primary versus associate or co-supervisors). According to Watts (2010) supervision is a teamwork endeavor that is important as an intellectual and practical engagement between the supervisors and their students. He disagreed with Delamont (2004) who asserted the idea about the joint supervision as just bureaucratic fiction that would make the work looks more scholarly than if it is a single supervision work. Team supervision, according to Watts (2010) this is a valuable asset especially when working with multidisciplinary team where every expert can contribute to enrich the work in his/her specific discipline (Delamont, Atkinson, & Parry, 2004; Watts, 2010). In the context of this project both universities seem to lack in a clear and rigorous definition of different roles of supervisors in particular with the interactions between the two or more supervisors (the main and the associate or co-supervisor). This seems to create an ambiguity

or in some cases frustration in supervisors in differentiating the perceived value of the associate supervisory roles. This lack of clarity in their roles may lead to an individualized way of dealing with the different aspects of the supervision process. In a way, good supervision could be seen as teamwork where everyone is complementing or contributing to a project or a frustration between peers where everyone is trying to understand what their expected role is. The lack of clear institutional regulations to explain the role of associate or co-supervisors in both institutes made it difficult for some to understand their actual role and what they are expected of them. For instance, are they expected to work together in a multi-disciplinary fashion as Watts (2010) suggested, or it is just a bureaucratic step Delamont (2004). In the literature, some authors think that supervision could be seen as a pragmatic tool to elevate the novice supervisors to a more experienced one (Guerin, Green, & Bastalich, 2011). In doing so, their role as learners may start with observing the process with minimal impact on the overall research supervision. This could make the research supervision process of benefit for both parties, where the student is supervised and the novice supervisor is mentored. This way of looking at supervision is in agreement with Grossman and colleague (2015), who concluded that they mainly used co-supervision in two main ways, the first to elevate novice researchers to a more experienced one, and the second is to resonate with the best academic practice (Grossman & Crowther, 2015).

The lack of clear guidelines of the roles of different research supervisors found in this study, revealed different experience of research supervision among the two institutes. For example, Sydney participants elaborated about the uncertainty of the role of the associate or co-supervisor. On the other hand, KSAU-HS participants thought it is more of team supervision rather than stressing on who is the primary and who is the associate. In that context KSAU-HS seemed more

open to the idea of having two senior supervisors in one research project. This finding is consistent with Watts (2010), who found that anecdote experience with how several benefits to a productive relationship between the supervisors and students such as bringing different expertise within a project provides opportunity for student engagement in interdisciplinary interactions (Watts, 2010). This, however, should not eclipse the need for formally clarify roles between the different supervisors and the students and a statement of clear rules and guidelines made by the university. White (2012) also suggested that a junior supervisor needs to negotiate their involvement as an associate supervisor within a project and make clear how this agreement would benefit the student (White, 2012). This finding, as one of the unique outcomes of this project.

7.4 How research supervisors' skills influenced the research supervision

The supervisory skills in this section refers to the personal skills of research supervisors which represent the personal factors in our adapted social cognitive theory. This includes the research supervisors' background characteristics, research experiences and supervision of students whether undergraduate and or postgraduate. The academic faculty background and experiences in research seems to improve the process and the quality of the supervision they provide to their students. This study sought to understand how those researchers assess their skills based on their practical experience. According to Manathunga (2005), the quality of research supervision is dependent on the quality of the supervisor (i.e. skills, experience training, grants, and publication). Ismael, 2011, has agreed with Manathunga, 2005, in the fact that effective supervision is directly related to the knowledge and skills of the supervisor (Ismail, Abiddin, & Hassan, 2011; Manathunga, 2005). As described earlier in the quantitative results chapter, Sydney research supervisors reported higher readiness scores than KSAU-HS and the fact that readiness score is a self-assessment, it important

to note that how people perceive themselves could be linked to their confidence, experience and knowledge that they may have gained either through the process of supervision itself (see qualitative result chapter 5), Learning through supervising) or through training and mentorship. Thus, this can be attributed to the training opportunities available in Sydney as shown in the quantitative findings. Furthermore, the finding illuminates areas of needs and may indicate that there is a significant room for improvement in the KSAU-HS regarding faculty development and capacity building which may improve the overall self-assessment of their skills and readiness. In a way this reflects a high level of understanding of the importance of skill enhancement in such a dynamic field. This finding resonates with McCallin and Nayar's (2012) view that it is part of the context where universities' duties are to provide the needed capacity building for both staff and students. In this project it seems that the use of RSARS was helpful as a screening tool to determine and identify research supervisors' needs, areas for improvement, and plan appropriate training activities and educational interventions for research supervisors.

Data from the quantitative survey showed different levels of student supervision. KSAU-HS, for instance, participants were more involved in supervising undergraduate students compared to Sydney participants who were more involved with PhD students. Recently, supervisors from Sydney are also involved in graduate medical program where all students are required to do research projects. Supervising students undertaking research projects at different levels from pre-degree to doctorates is a significant part of the work of academics. Reflecting on the findings, there seems to be patterns that supervisors prefer to take on postgraduate students and have different supervisory styles according to their background, context, experiences, knowledge and skills (Bøgelund, 2015).

There have been increasing efforts globally to explore further on supervision at the postgraduate level (e.g. completion of doctorate). However, as Todd et al (2006) noted, the research literature concerned with experiences, outlook, and practices at the undergraduate level is underdeveloped and there seems to be little guidance available for research supervisors at this level (Todd, Smith, & Bannister, 2006). Subsequent research is essential to discover and discern students' perspectives of a good research supervision in addition to their research experience.

Research supervision is a deep process of intellectual and critical thinking. It can be rated as an obvious conclusion that the outcome is necessarily dependent on the supervisors' skills. Lee (2007), asserted that the range and depth of concept endured by the supervisor dictated the supervision outcome(Lee, 2007; Lee, 2008). One way of gaining such skills is reflection, self-assessment, and critical thinking that would enable the research supervisors to uncover his/her range of concept and its depth and test them along the way of the supervision (Lee, 2007).

In this project it seemed that the interviewed KSAU-SH staff rated themselves as average and above average while Sydney staff rated themselves as above average and excellent (See Section 6.4.8 Overall Rating of research supervisors). These ratings are consistent with the discussed advantages provided by the context in the previous section where training provided by university is highly required for both institutes' staff. This was represented in the theme of the challenges in the qualitative part and described by KSAU-HS participants who have stressed on the importance of having and developing qualified researches in order to supervise research students efficiently

hence the need for skill improving either by training, learning from each other or long life learning process.

It is important that research supervisors expand their repertoire of skills as educators and leaders. Providing opportunities for supervisors to reflect on their roles and critique their research supervision development can be useful for their self-awareness and practice development (Bills, 2004; Pearson & Brew, 2002). Indeed, the whole process of self-assessment is developmental; it contributes to the learning process and supports learners to recognize their strengths and weaknesses and directs their attention on areas of improvement (Boud & Falchikov, 1989). For example, one of the instances that were experienced during the data collection of this project (Section 5.3.2 learning through supervision) some of the interviewed supervisors expressed their deeper level of reflection ignited by the questions asked in this project.

7.5 How interpersonal skills (professionalism) influenced the research supervision

The term professionalism has its debates of what it means in philosophy, social sciences and law. In this study, the term professionalism was used as an indication of the perception of the interpersonal/interaction skills between supervisor and student such as being a role model for research student, being good supervisor, the ability to give constructive feedback to students, and interacting with different research students.

The findings from this study indicated that research supervisors with longer duration of involvement with teaching had better scores of professionalism compared to those with shorter

duration of teaching involvement. This may seem intuitive; however, this can be explained by the fact that research supervisors with long exposure to teaching furnish them with more opportunities to interact with a wide variety of students and deal with their different personalities and styles.

Role modeling was one of the important outcomes from the qualitative data in the supervisor-student interaction theme, which emphasize the important characteristics research supervisor must have such as being patient, flexible and have effective communication with their students. This is in congruence with other research findings about the characteristics of good supervisors (Van Rensburg, Mayers, & Roets, 2016).

Similarly, the findings from both qualitative and qualitative data showed the importance of being a good supervisor entails being a good researcher as well as good educator. This might be explained by the fact that transmitting research skills to students requires acquiring educational abilities such good communication and breaking barriers between the two parties. In other words, it seems that it is crucial to have both skills (i.e. being a good researcher and being a good educator) to deliver a better supervision with better quality. In other words, the supervisor should have the experience of being a good researcher as well as the tool to teach and transfer these knowledge and skills. This fact is consistent with findings from other professions that reported being a good clinician doesn't automatically mean being a good clinical educator (Ahmed, Farooq, Storie, Hartling, & Oswald, 2016).

As discussed earlier in chapter 2, the importance of self-assessment and identifying gaps and limitations in the supervision process and practices. This is also applicable in case of

professionalism as an important perquisite as well as an indicator of the professional attitude of the research supervisor. The ability to perform a constructive self-assessment and identify self-limitation may create a learning hunger and positive attitude to be a good role model for supervisees which is an important attribute of professionalism. Furthermore, self-accountability and altruism as other professional attributes that may results from this process of self-reflection is a tool to learn more in order to be more professional.

In addition, interviewed participants appreciated the personal and professional learning opportunities that both supervisors and students could achieve through the process of supervision. On the other hand, supervisors added that they are more motivated and satisfied by interacting with enthusiastic students and better outcome is achieved.

One of the major points that seems to impact the quality of supervision and motivation of supervisors which is related to personal and professional development and hence professionalism, was the need of those supervisors to get a positive closure and successful out comes of the research supervision process. They seem to be keen to learn about how their students are flourished and improved by the assistance and help they provide. These were demonstrated through internal drive, interest and satisfactory research outcomes in the form of publication, promotion, students' growth or successful completion of research. In many universities research publications is an important criterion for promotion to a higher academic rank as well as one of the indicators of faculty annual evaluation. It is also one of the standards for accreditation and quality improvement for educational institutions (Harvey, 2004). It is known that research resulting from both undergraduate and postgraduate students contributes significantly to the overall institution

research outputs. This might explain the motivation of faculty and keenness of the educational institutions for research supervision.

The findings of this project showed that the amount and quality of supervisor-student interaction was an important factor to influence their research supervision practices. Supervisors reflected on the need to be provided with clear guidelines for them and their students to enhance better communication and interaction. Interaction may be enhanced by giving and receiving feedback from both students and the institution. Participants from both institutions emphasized the importance of feedback for better supervision and increased motivation. Our results were also consistent with Hattie and Timperley (2007), who argued feedback to be one of the most influential aspects on learning and achievement on both student and faculty (Hattie & Timperley, 2007).

Good interaction and active involvement of undergraduate students in research activities has positive outcomes on them in several ways. They had a better understanding of the research process, better communication and critical thinking as well as improved professional and career interest choices (Hunter, Laursen, & Seymour, 2007).

These findings are further supported by the social cognitive theory presented earlier, in that people learn better from each other, when there is a lot of one to one interaction going on between the research supervisors and their students. During this process of interaction, there is a tremendous amount of expected knowledge and skills gained by the students. In addition there is a lot of professional development opportunities for the supervisors themselves in which they develop and improve their skills.

In conclusion of this section, research supervision skills are multifaceted and include important interpersonal requirements, scientific knowledge and administrative skills, as well as professionalism. Other authors have indicated that there is more to research supervision than technical knowledge and that interpersonal skills are especially important in the student/supervisor relationship (Pearson & Brew, 2002).

7.6 Implications of this study

The study has important implications for research supervisors' professional needs and readiness. Developing a new instrument (i.e. RSARS) to help in assessing of supervisory needs and determine the readiness of research supervisors to undertake research students whether undergraduate or postgraduate. The usefulness of RSARS instrument in its current state as a diagnostic tool to assess the readiness/preparedness of research supervisors for individual assessments and faculty development interventions. This study also evaluated the factors that affect the research supervision phenomena. This will raise the awareness of the academic institutions about the important aspects that contribute to the success of research supervision practices. Furthermore, this will help to determine the different ways to facilitate, support and empower research supervisors to build their capacities, and will help in illuminating the prerequisites for becoming an efficient research supervisor and facilitate the supervision process.

This study indicates the need for resources to help the research supervisors and faculties gain and improve their knowledge and competence skills obtained via capacity building and faculty enhancement programs. Developmental programs of such manner should help both the new

(novice) and the accomplished (experienced/expert) supervisors looking forward to escalating their skills. This should be in alliance with the activities related to research development.

The research supervision field is in great need of capacity building. This is especially for a young university like KSAU-HS having assessed the status quo of the research supervision practices. Having a better understanding and awareness by providing evidence should assist in helping to plan future work around activities or programs for faculty development. One of the most important findings was that both novice and experienced researchers are in need of developmental programs. Thus, it is important to assess the learning need for both groups and specifically designed programs that are suitable to their different levels.

This project was novel in its approach where it concentrated in the actual research supervisors experience and practices in a way to allow them to reflect on those practices to tease out the challenges and the ways to improve it. This is different from the majority of the literature that studied the supervision in general and provided general recommendations without looking deeply into the real-life practices and critical reflection of them. We believe that we have bridged a very important gap between the research supervisor self-assessment, perceptions, needs in one hand and their actual measured readiness on the other hand.

7.7 Limitations of the study

The developed instrument (RSARS) involved self-assessment which is known to be challenging in terms of its rigor of reliability. This is mainly because people are asked to evaluate their own experience and understanding which entertains a risk of subjectivity (Colthart et al., 2008; de

Bono, Gershlick, Samani, & Garratt, 1996; Eva, 2004). Many authors have suggested that self-assessment of competencies; knowledge and skills should be supplemented with researcher/expert observation (Tracey, Arroll, Barham, & Richmond, 1997). However, this limitation was dealt with, to the best of this project, by introducing the qualitative arm. Despite this limitation, the instrument can help determine baseline assessment for medical and other health professional educators to move forward in their efforts to enhance the quality of research supervision.

An important limitation is that the tool was applied in a specific context which might affect it is overall generalizability in another context as discussed earlier.

7.8 Conclusions

Research supervision is a multifaceted educational phenomenon. This project has identified certain factors that affect the readiness for supervision to. For example, it was argued that the factors that should be taken into consideration are the research environment, the supervisor's background experiences and practices and their interaction with students.

This research has addressed an important gap in the research literature by providing initial validated evidence for a new scale to help measure the academic readiness of research supervisors within academic institutions. Second it has provided some preliminary evidence to indicate institutional differences in readiness for research supervision, Third the outcomes of this study indicate that the identified contextual, cognitive and behavioral needs may represent a limitation in the effectiveness of the academic faculty in fulfilling their expected roles as research supervisors

and therefore the university should aim to foster development mainly in these areas whilst providing appropriate administrative support and protected time for research supervision.

Albeit, it is time-consuming and difficult to design a comprehensive self-assessment tool and readiness scale, it was crucial to help in developing a clearer understanding of the individual needs. This in its turn will lead to design a better faculty development programs and activities targetting future and current research supervisor development programs.

In this project, it was clear that there is a need for better and clearer guidelines about the different roles of supervisors. The lack of those guidelines created confusion and frustration among research supervisors. The lack of regulations made the understanding and the practice of the importance of the second supervisors vary based on the different interpretation of the research culture in the two different institutions of this project.

7.9 Recommendations

7.9.1 Recommendation to improve in Research supervision relationships between different factors:

Recommendations can be grouped into three categories. The first category is the *context and environment related*. For research supervision to be effective, the environment and context should be conducive, for e.g. availability of clear & rigorous guidelines, institutional support, appreciation and rewards of research supervisors.

The second category is *supervisory skills-related* recommendations. This includes selection and recruitment of research supervisors should be based on experience, training, and previous research supervision.

The third category is *professionalism-related*, which entails supervisor-student related interactions such as commitment, having enthusiastic students and role modeling. In conclusion, research supervision can be represented in the following model representing three pillars of research supervision: context, supervisor, and supervisor-student interaction.
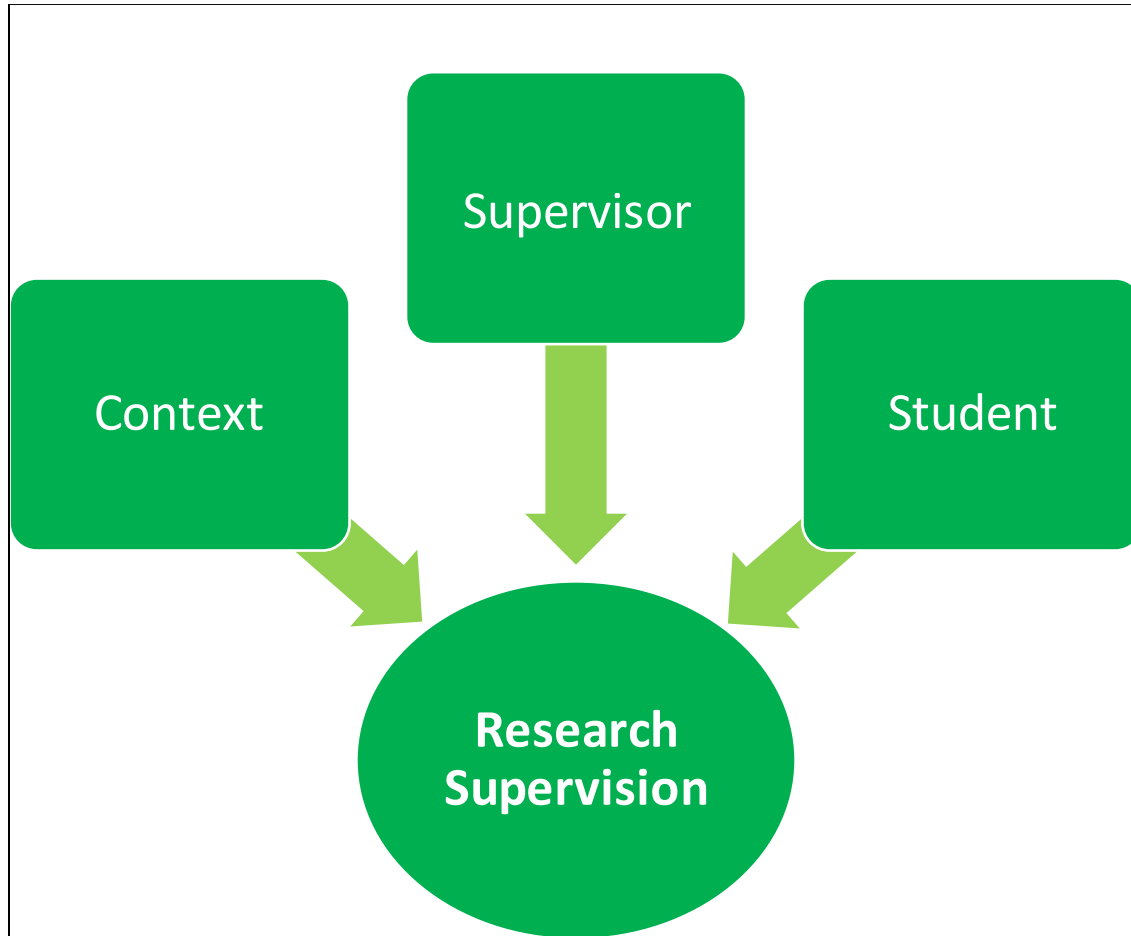
Figure 7-1: Research Supervision Model

This study also recommended the development of a theoretical model/conceptual framework, which summarizes the process of research supervision based on this study findings. The following figure is a graphical summary of my perspectives on factors that foster excellence in research supervision based on the rich qualitative and quantitative data. a theoretical model of factors that foster excellence in research supervision.

7.9.2 Theoretical model fostering excellence and research supervision :

This diagrammatic illustration entails interpersonal skills as the core factor that fosters excellence in research supervision. This factor is influenced and modified by two other factors, which are technical knowledge and skills as well as the context within the institution including administrative and resource support.
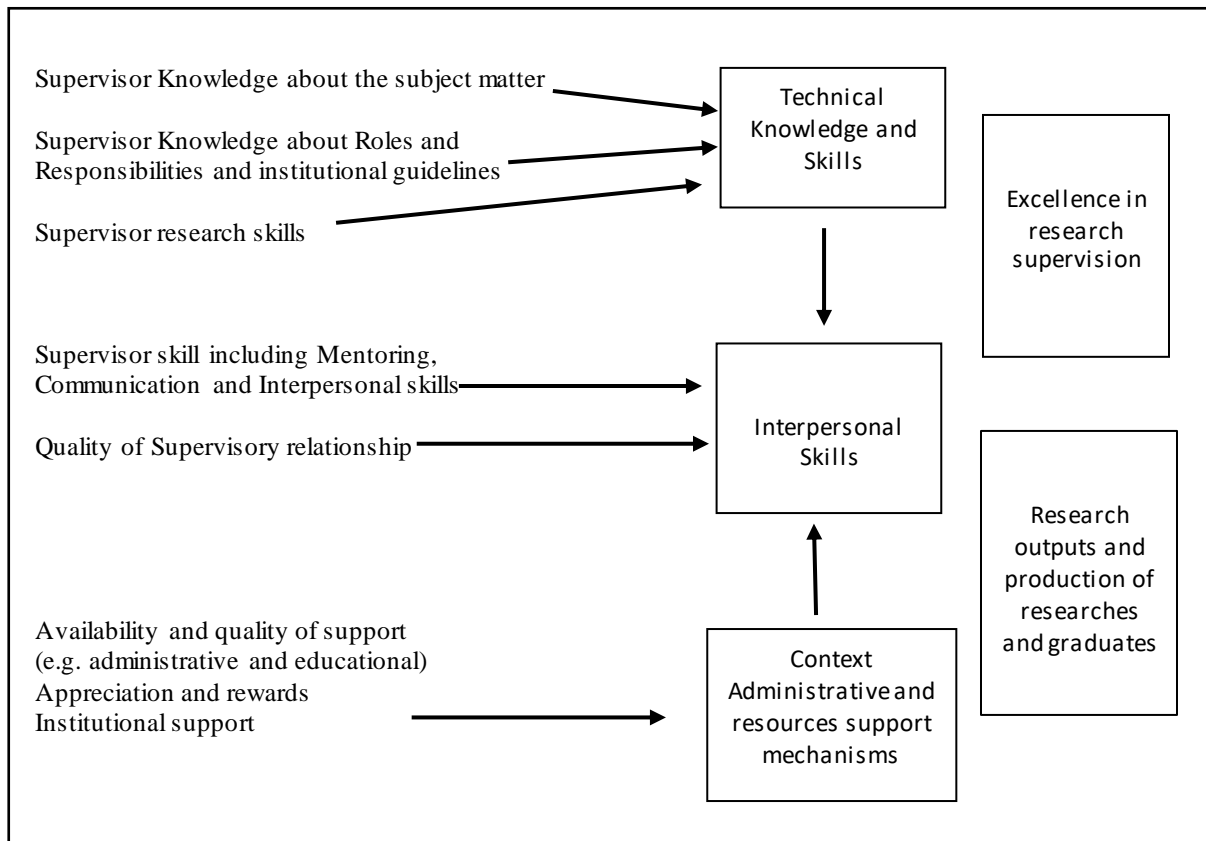

Figure 7-2: Factors fosters excellence in research supervision

Each of the three factors is affected by various variables. For instance, technical knowledge and skills being affected by supervisor background knowledge, skills, and experiences. On the other

hand, the outcomes of the whole process are researchers and graduate production as well as research publication and institutional recognition.

7.9.3 Specific recommendations for Faculty development in emerging academic health science centers

King Saud Bin Abdul Aziz University for Health Sciences (KSAU-HS) is a relatively young academic institution and research activities and supervision are a growing phenomenon. Nevertheless, as research becomes increasingly recognized as vital to innovation and national growth, research education and supervision will be crucial to assure the quality of the process and outcomes of research in any academic institution.

The RSARS tool will help to identify strengths, weakness, and gaps among research supervisors, which help in addressing academic faculty needs and plan for appropriate faculty development activities related to research and research supervision. This is in addition to identify the suitable delivery methods such as online, web-based or face to face activities. Thesis methods should be tailored to fit busy clinicians and health care providers who represent the majority of faculty within KSAU-HS.

From my study findings, I can see the priority areas such as personal and interpersonal skills needs. This will not work without the preparation of the context and availing conducive research environment including institutional support, clear guidelines for both research supervisors and students. Also working on motivating factors such as publications, participating in international conferences, appreciation, and rewards for research supervisors.

7.10 Future research

This study explored many unanswered questions, which includes the following:

➤ What are the perceptions and experience of research students as end-users and beneficiaries?

➤ How contexts such as institutional and leader support influence research supervision process and practices?

➤ What are the further steps needed for validation of the RSARS instrument in a wider sample of academic institutions and research supervisors?

➤ What are the most influential factors to motivate research supervisors?

➤ How to test and validate the suggested theoretical model through confirmatory factor analysis?

➤ How to provide a follow-up measurement for the improvement of research supervisors' behavioral changes?

REFERENCES

REFERENCES

Abiddin, N., Hassan, A., Ahmad, A. (2009). Research student supervision: An approach to good supervisory pratice. *The Open Education Journal, 2*, 11-16.

Adedokun, O. A., Dyehouse, M., Bessenbacher, A., & Burgess, W. D. (2010). Exploring Faculty Perceptions of the Benefits and Challenges of Mentoring Undergraduate Research. [Reports - Research Speeches/Meeting Papers]. *Online Submission. Paper presented at the Annual Meeting of the American Educational Research Association*.

Ahmed, R., Farooq, A., Storie, D., Hartling, L., & Oswald, A. (2016). Building capacity for education research among clinical educators in the health professions: A BEME (Best Evidence Medical Education) Systematic Review of the outcomes of interventions: BEME Guide No. 34. *Medical teacher, 38*(2), 123-136.

Al-Muallem, A., Elzubeir, M., Roberts, C., & Magzoub, M. (2016). Development and Initial Testing of an Instrument for Evaluating Needs and Inferring Readiness of Research Supervisors: A Mixed Methods Approach. *Health Professions Education, 2*(2), 138-147.

Armstrong, M., & Shanker, V. (1983). The Supervision of Undergraduate Research: student perceptions of the supervisor role. *Studies in Higher Education, 8*(2), 177-183.

Bandura, A. (1977). Social learning theory (pp. 21-57): Englewood Cliffs, N.J.: Prentice-Hall.

Bandura, A. (1997). *Self-Efficacy: The Exercise of Control*: Worth Publishers.

Bandura, A. (1999). Social cognitive theory: An agentic perspective. *Asian Journal of Social Psychology, 2*, 21-41.

Bandura, A. (2001). Social Cognitive Theory: And Angetic. *Annual Review of Psychology, 54*(1), 1-26.

Bandura, A. (2006). Guide for constructing self-efficacy scales. *Self-efficacy beliefs of adolescents, 5*(307-337).

Begat, I., Berggren, I., Ellefsen, B., & Severinsson, E. (2003). Australian nurse supervisors' styles and their perceptions of ethical dilemmas within health care. *Journal of Nursing Management, 11*(1), 6-14.

Bender, D. E., & Ewbank, D. (1994a). The focus group as a tool for health research: issues in design and analysis.

Bender, D. E., & Ewbank, D. (1994b). The focus group as a tool for health research: issues in design and analysis. *HEALTH TRANSITION REVIEW 4*(1).

Benson, J., & Clark, F. (1982). A guide for instrument development and validation. *The American Journal of Occupational Therapy, 36*(12), 789-800.

Bills, D. (2004). Supervisors conceptions of research and the implications for supervisor development. *The International Journal for Academic Development, 9*(1), 85-97.

Bøgelund, P. (2015). How supervisors perceive PhD supervision–And how they practice it. *International Journal of Doctoral Studies, 10*(1), 39-55.

Bohman, J. (2016). *Critical Theory*: Metaphysics Research Lab, Stanford University.

Bordage, G. (2009). Conceptual frmeworks to illuminate and magnify. *Medical Education, 43*, 312-319.

Boud, D., & Falchikov, N. (1989). Quantitative studies of student self-assessment in higher education: a critical analysis of findings. *Higher education, 18*(5), 529-549.

Bourget, D. a. M., Angela. (2017). *Phenomenal Intentionality*: Metaphysics Research Lab, Stanford University.

Boyatzis, R. (1998). *Thematic analysis and code development: Transforming Qualitative Information.*: Sage Publication.

Braun, V., & Clarke, V.,. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*, 77-81.

Burnard, P., Commentary. Interviewing. Nurse Researcher, 2005. 13(1): p. 4-6. (2005). Interviewing. [Commentary]. *Nurse Researcher, 13*(1), 4-6.

Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validity by the multitrait-multimethod matrix. *Psychological bulletin, 56*(2), 81-105.

Carrington, G. (2004). Supervision as a reciprocal learning process. *Educational Psychology in Practice, 20*(1), 31-42.

Charmaz, K. (2006). Constructing grounded theory: A practical guide through qualitative research. *SagePublications Ltd, London.*

Charmaz, K. (2014). Constructing grounded theory (Introducing qualitative methods series): London: SAGE Publications Ltd.

Clark, P., Jamieson, A., Launer, J., Trompetas, A., Whiteman, J., & Williamson, D. (2006). Intending to be a supervisor, mentor or coach? Which, what for and why? *Education for Primary Care, 17*(2), 109-116.

Coffey, A., & Atkinson, P. (1996). *Making sense of qualitative data: complementary research strategies*: Sage Publications, Inc.

Collins, K. M. T., Onwuegbuzie, A.J., & Sutton, I.L. (2006). A model incorporating the rationale and purpose for conducting mixed methods research in special education and beyond. *Learning Disabilities: A Contemporary Journal, 4*(1), 67-100.

Colthart, I., Bagnall, G., Evans, A., Allbutt, H., Haig, A., Illing, J., & McKinstry, B. (2008). The effectiveness of self-assessment on the identification of learner needs, learner activity, and impact on clinical practice: BEME Guide no. 10. *Medical teacher, 30*(2), 124-145.

Crandall, S. J. S. (1998). Using interviews as a needs assessment tool. *Journal of Continuing Education in the Health Professions, 18*(3), 155-162.

Creswell, J. W. (2005). *Educational Research: planning, conducting, and evaluating quatitative and qualitative research* (2 ed.).

Cryer, P. (1998). Beyond Codes of Practice: dilemmas in supervising postgraduate research students. *Quality in higher education, 4*(3), 229-234.

DaRosa, D. A., Roland Folse, J., Sachdeva, A.K., Dunnington, G.L., Reznick, R. (1995). Description and results of a needs assessment in preparation for the. *The American journal of surgery, 169*(4), 410-413.

Davis, D. A., Mazmanian, P. E., Fordis, M., Van Harrison, R., Thorpe, K. E., & Perrier, L. (2006). Accuracy of physician self-assessment compared with observed measures of competence: a systematic review. [Research Support, Non-U.S. Gov't

Review]. *JAMA : the journal of the American Medical Association, 296*(9), 1094-1102. doi: 10.1001/jama.296.9.1094

de Bono, D., Gershlick, A. H., Samani, N. J., & Garratt, C. J. (1996). New training guidelines: what are the implications for cardiological research? *Heart, 75*(2), 118-120.

De Villiers, M. R., De Villiers, P. J., & Kent, A. P. (2005). The Delphi technique in health sciences education research. *Medical teacher, 27*(7), 639-643.

Delamont, S., Atkinson, P., & Parry, O. (1997). *Supervising the PhD: a guide to success.* Buckingham: Open University Press.

Delamont, S., Atkinson, P., & Parry, O. (2004). *Supervising the doctorate*: McGraw-Hill Education (UK).

Denscombe, M. (2008). Communities of practice: A research paradigm for the mixed methods approach. *Journal of mixed methods research, 2*(3), 270-283.

Denzin, N. K. (1978). *The research act: A theoretical introduction to sociological methods*. New York: Praeger.

Denzin, N. K., & Lincoln, Y. S. (2005). Qualitative research. *Denzin, NK y Lincoln YS*.

Detsky, M. E., & Detsky, A. S. (2007). Encouraging medical students to do research and write papers. *CMAJ : Canadian Medical Association journal = journal de l'Association medicale canadienne, 176*(12), 1719-1721.

Dobson, P. J. (2002). Critical realism and information systems research: Why bother with philosophy? . *Information Research An International Electronic Journal, 7*(2). Retrieved from http://informationr.net/ir/7-2/paper124.html

Down, C. M., Martin, E., & Bricknell, L. (2000). Student Focused Postgraduate Supervision A Mentoring Approach To Supervising Postgraduate Students (Version 1). *Melbourne: RMIT University*.

Dye, J. F., Schatz, I. M., Rosenberg, B. A., & Coleman, S. T. (2000). Constant comparison method: A kaleidoscope of data. *The qualitative report, 4*(1), 1-10.

Dysthe, O., Samara, A., & Westrheim, K. (2006). Multivoiced supervision of Master's students: a case study of alternative supervision practices in higher education. *Studies in Higher Education, 31*(03), 299-318.

Eva, K. W., Cunnington, J.P.W., Reiter, H.I., Keane, D.R., & Norman, G.R. (2004). How can I know what I don't know? Poor self assessment in a well-defined domain. *Advances in Health Sciences Education, 9*(3), 211-224.

Evans, T. (2001). Tensions and pretensions in doctoral education. *Doctoral education and professional practice: The next generation*, 275-302.

Ford, K., & Jones, A. (1987). *Student supervision*: Macmillan Education.

Grant, B. (2000). Pedagogical Issues in Research Education *In M. Kiley & G. Mullins. (Eds). Quality in Postgraduate Reseach: Making Ends Meet* (pp. 32): Advisory Center for University Education, The University of Adelaide.

Grant, B., & Graham, A. (1999). Naming the game: Reconstructing graduate supervision. *Teaching in Higher Education, 4*(1), 77-89.

Grant, J. (2002). Learning needs assessment: assessing the need. *BMJ, 324*(7330), 156-159.

Grant, J., Kilminster, S., Jolly, B., & Cottrell, D. (2003). Clinical supervision of SpRs: where does it happen, when does it happen and is it effective? *Medical Education, 37*(2), 140-148.

Green, B. (2005). Unfinished business: subjectivity and supervision. *Higher Education Research &# 38; Development, 24*(2), 151-163.

Greene, J. C. (2007). *Mixed methods in social inquiry* (Vol. 9): John Wiley & Sons.

Grossman, E. S., & Crowther, N. J. (2015). Co-supervision in postgraduate training: Ensuring the right hand knows what the left hand is doing. *South African Journal of Science, 111*(11-12), 1-8.

Guba, E. G., & Lincoln, Y. S. . (1994). Competing paradigms in qualitative research. In N. K. Desin, & Lincoln, Y.S. (Eds.) (Ed.), *Handbook of qualitative research* (pp. 105-117): Thousand Oaks, CA: Sage.

.

Guerin, C., Green, I., & Bastalich, W. (2011). *Big love: Managing a team of research supervisors*.

Harris, D., Krause, K., Parish, D., & Smith, M.U. (2007). Academic Competencies for Medical Faculty. *FAMILY MEDICINE 39*(5), 343.

Harvey, L. (2004). The power of accreditation: Views of academics. *Journal of Higher Education Policy and Management, 26*(2), 207-223.

Harwell, M. R. (2011). Research design in qualitative/quantitative/mixed methods. *CONRAD, Clifton F.; SERLIN, Ronald C. The SAGE Handbook for Research in Education: Pursuing ideas as the keystone of exemplary inquiry. 2ª Edition. Thousand Oaks, CA: SAGE Publications*, 147-163.

Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of educational research, 77*(1), 81-112.

Hawkins, P., & Shohet, R. (2000). *Supervision in the helping professions*. Buckingham, Philadelphia: Open University Press.

Hiatt, J. F. (1986). Spirituality, medicine, and healing. *Southern medical journal, 79*(6), 736-743.

Hockey, J. (1997). A complex craft: United Kingdom PhD supervision in the social sciences. *Research in Post-Compulsory Education, 2*(1), 45-70.

Hsu, C.-C., & Sandford, B. A. (2007). The Delphi technique: making sense of consensus. *Practical Assessment, Research & Evaluation, 12*(10), 1-8.

Hunter, A. B., Laursen, S. L., & Seymour, E. (2007). Becoming a scientist: The role of undergraduate research in students' cognitive, personal, and professional development. *Science education, 91*(1), 36-74.

Illing, J. (2010). Thinking about research: frameworks, ethics and scholarship. In T. Swanwick (Ed.), *Understanding Medical Education, Evidence, Theory and Practice* (1 ed., pp. 283-300): Wiley-Blackwell.

Ismail, A., Abiddin, N. Z., & Hassan, A. (2011). Improving the development of postgraduates' research and supervision. *International Education Studies, 4*(1), 78.

Jamieson, S., & Gray, C. (2006). The Supervision of Undergraduate Research Students: Expectations of Students and Supervisor. *Practice and Evidence of Scholarship of teaching and learning in higher Education, 1*(1), 37-59.

Johnson, B., & Turner, L. A. (2003). Data collection strategies in mixed methods research. *Handbook of mixed methods in social and behavioral research*, 297-319.

Johnson, R., & Onwuegbuzie, A. (2004). Mixed methods research: A research paradigm whose time has come. *Educational researcher, 33*(7), 14.

Johnson, R., Onwuegbuzie, A., & Turner, L. (2007). Toward a definition of mixed methods research. *Journal of mixed methods research, 1*(2), 112.

Kaufman, D., Mann, K. (2010). Teaching and learning in medical education: how theory can inform practice. In T. Swanwick (Ed.), *Understanding Medical Education: Evidence, Theory and Practice* (pp. 16-36): Wiley-Blackwell.

Kiley, M. (2011). Developments in research supervisor training: causes and responses. *Studies in Higher Education, 36*(5), 585-599.

Kilminster, S., Cottrell, D., Grant, J., & Jolly, B. (2007). AMEE Guide No. 27: Effective educational and clinical supervision. *Medical teacher, 29*(1), 2-19.

Kilminster, S., & Jolly, B. (2000). Effective supervision in clinical practice settings: a literature review. *Medical Education, 34*(10), 827-840.

Kolb, D., & Fry, R. (1975). Toward an applied theory of experiential learning. In C. Cooper (Ed.), *Theories of group process* (pp. 35-36). London: Jone Wiley.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. New Jersey: Prentice-Hall.

Kolb, D. A., Boyatzis, R. E., & Mainemelis, C. (2001). Experiential learning theory: Previous research and new directions. *Perspectives on thinking, learning, and cognitive styles, 1*, 227-247.

Laurner, J. (2010). Supervision, Mentoring and Coaching *In Swanwick, T. (Eds). Understanding Medical Education: Evidence, Theory and Practice* (pp. 111-123): Wiley-Blackwell.

Lave, J., & Wenger, E. (1991). Communities of practice. *Retrieved September, 16*, 2008.

Lee, A. (2007). Developing effective supervisors: Concepts of research supervision. *South African Journal of Higher Education, 21*(4), 680-693.

Lee, A. (2008). How are doctoral students supervised? Concepts of doctoral research supervision. *Studies in Higher Education, 33*(3).

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry* (Vol. 75): Sage.

Linell, P. (1998). *Approaching dialogue: Talk, interaction and contexts in dialogical perspectives* (Vol. 3): John Benjamins Publishing.

Long, J. S., & McGinnis, R. (1981). Organizational context and scientific productivity. *American sociological review*, 422-442.

Manathunga, C. (2005). The development of research supervision:"Turning the light on a private space". *International Journal for Academic Development, 10*(1), 17-30.

Mann, K. V. (1998). Not another survey! Using questionnaires effectively in needs assessment. *Journal of Continuing Education in the Health Professions, 18*(3), 142-149.

Mann, K. V. (2011). Theoretical perspectives in medical education: past experience and future possibilities. *Medical Education, 45*, 60-68.

McCallin, A., & Nayar, S. (2012). Postgraduate research supervision: a critical review of current practice. *Teaching in Higher Education, 17*(1), 63-74. doi: 10.1080/13562517.2011.590979

Mills, J., Francis, K., & Bonner, A. (2005). Mentoring, clinical supervision and preceptoring: clarifying the conceptual definitions for Australian rural nurses. A review of the literature. *Rural and Remote Health, 5*(3), 1-10.

Moon, J. (1999). *Learning Journals: a handbook for academics, students and professional development*.: London: Kogan Page.

Morse, J. M. (1991). Approaches to qualitative-quantitative methodological triangulation. *Nursing research, 40*(2), 120.

Morse, J. M., Barrett, M., Mayan, M., Olson, K., & Spiers, J. (2002). Verification strategies for establishing reliability and validity in qualitative research. *International journal of qualitative methods, 1*(2), 13-22.

Newble, D., & Cannon, R. A. (2002). *Handbook for Medical Teachers* (4th ed.).

Pajares, F., & Urdan, T. C. (2006). *Self-efficacy beliefs of adolescents*: IAP.

Patton, M. Q. (1990). *Qualitative evaluation and research methods*: SAGE Publications, inc.

Pearson, M., & Brew, A. (2002). Research training and supervision development. *Studies in Higher Education, 27*(2), 135-150.

Phillips, D. C. a. S., Harvey. (2018). *Philosophy of Education*: Metaphysics Research Lab, Stanford University.

Pololi, L. H., Dennis, K., Winn, G.M., Mitchell, J. (2003). A needs assessment of medical school faculty: caring for the caretakers. *Journal of Continuing Education in the Health Professions, 23*(1), 21-29.

Proctor, B. (2008). *Group supervision: A guide to creative practice*: Sage.

QAA. (2004). Code of practice for the assurance of academic quality and standards in higher education *Postgraduate Research Programmes* (Vol. Section 1.). Gloucester, UK: The Quality Assurance Agency for Higher Education

Ramsden, P. (2003). *Learning to teach in higher education*: Routledge.

Rath, J. (2008). AKO AOTEAROA REGIONAL HUB PROJECTS FUNDED SCHEME: FINAL REPORT.

Ratnapalan, S., & Hilliard, R. I. (2002). Needs Assessment in Postgraduate Medical Education: A Review. *Medical Education Online, 7*(8), 1-8.

Readings, B. (1996). *The university in ruins*: Cambridge Mass: Harvard University Press.

Remes, V., Helenius, I., Sinisaari, I. (2000). Research and medical students. *Medical teacher, 22*(2), 164-167.

Roberts, C., Loftus, S.,. (2012). The Development of Health Care Researcher *Educating Health Professionals: Becoming a University Teacher*.

Romberg, T. (1992). Perspectives on scholarship and research methods. In D. A. Grouws (Ed.), *Handbook of Research on Mathematics Teaching and learning* (pp. 49-64): New York Macmillan.

Sandelowski, M. (1995). Sample size in qualitative research. *Research in Nursing and Health, 18*, 179-183.

Scaife, J. (1993). Application of a general supervision framework: Creating a context of co-operation. *Educational and Child Psychology*.

Scaife, J. (2001). *Supervision in Mental Health Professions: a practitioner's guide* Hove: Brunner Routledge.

Schon, D. (1983). *The Reflective Practitioner: how professionals think in action*: Basic Books, New York.

Seagram, B. C., Gould, J., & Pyke, S. W. (1998). An investigation of gender and other variables on time to completion of doctoral degrees. *Research in Higher Education, 39*(3), 319-335.

Severinsson, E. (2012). Research supervision: supervisory style, research related tasks, importance and quality–part 1. *Journal of Nursing Management, 20*(2), 215-223.

Shankar, P. (2007). Mentoring a medical student towards applied research in a developing country. *Medical teacher, 29*(2-3), 253-254.

Shankar, P., Chandrasekhar, T., Mishra, P., & Subish, P. (2006). Initiating and strengthening medical student research: time to take up the gauntlet. *Kathmandu University Medical Journal, 4*(13), 135-138.

Shulman, L. S. (2005). Signature pedagogies in the professions. *Daedalus, 134*(3), 52-59.

Stoltenberg, C. (2005). Enhancing Professional Competence Through Developmental Approaches to Supervision. *American Psychologist, 61*, 643-684.

Stoltenberg, C. D., & Delworth, U. (1987). *Supervising counselors and therapists: A developmental approach*: Jossey-Bass.

Summerall, S., Lopez, S., & Oehlert, M. (2000). Competency-based education and training in psychology: A primer. *Springfield, IL: Charles E. Thomas*.

Supino, P. G., Borer, J.S. (2007). Teaching clinical research methodology to the academic medical community: a fifteen-year retrospective of a comprehensive curriculum. *Medical teacher, 29*(4), 346-352.

Tashakkori, A., & Creswell, J. W. (2007). Editorial: Exploring the nature of research questions in mixed methods research. *Journal of mixed methods research, 1*(3), 207.

Tashakkori, A., & Teddlie, C. (2003). *Handbook of mixed methods in social and behavioural research*. CA: Thousand Oaks: Sage.

Taylor, S. (2006). Thinking of research supervision as a form of teaching. *Lancaster University Supervision Online Journal: 3rd October 2006*.

Todd, M. J., Smith, K., & Bannister, P. (2006). Supervising a social science undergraduate dissertation: staff experiences and perceptions. *Teaching in Higher Education, 11*(2), 161.

Tracey, J., Arroll, B., Barham, P., & Richmond, D. (1997). The validity of general practitioners' self assessment of knowledge: cross sectional study. *BMJ, 315*(7120), 1426-1428.

Van Rensburg, G. H., Mayers, P., & Roets, L. (2016). SUPERVISION OF POST-GRADUATE STUDENTS IN HIGHER EDUCATION. *Trends in Nursing, 3*(1).

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, Massachusetts Harvard University Press.

Walker, D.-M. (2014). *An introduction to health services research: A practical guide*: Sage.

Ward, M., Gruppen, L., Regehr, G. (2002). Measuring self-assessment: Current state of the art. *Advances in Health Sciences Education, 7*(1), 63-80.

Watts, J. H. (2010). Team supervision of the doctorate: Managing roles, relationships and contradictions. *Teaching in Higher Education, 15*(3), 335-339.

Wenger, E. (1999). *Communities of practice: Learning, meaning, and identity*: Cambridge university press.

Wenger, E. (2010). Communities of practice and social learning systems: the career of a concept *Social learning systems and communities of practice* (pp. 179-198): Springer.

White, F. (2012). The Supervisor-student Relationship: Looking Outside the Square: Institute for teaching and learning, the University of Sydney.

Yardley, S., Teunissen, P. W., & Dornan, T. (2012). Experiential learning: AMEE guide No. 63. *Medical teacher, 34*(2), e102-e115.

APPENDICES

APPENDICES

Appendix A

Focus Group Agenda: Research supervision experience

Q1. What are the competencies of good research supervision?

Requirements needed in terms of:

➢ Scientific

➢ Administrative

➢ Support & Resources.

Q2. In your opinion what are the problems (obstacles) facing research supervision?
In relation to:

➢ Supervisors

➢ Students

➢ System (environment)

Q3. Suggested solutions & Recommendations? In relation to:

➢ Supervisors

➢ Students

➢ System (environment)

Checklist presented to focus group participants

Administrative and support requirement(s)
Protected Time
Administrative support
Financial support
Academic recognition
Supervision skills and knowledge areas
Writing research proposals.
Searching the literature.
Constructing the background/ Introduction.
Setting research objectives.
Advising about study design and methodology.
Developing work plan/ Timeline.
Sampling/sample size calculation.
Developing data collection tool/questionnaires.
Applying ethical aspects of research (confidentiality, informed consent, etc.)
Advising on appropriate statistical tests.
Interpreting results (describe & present) in text, tables & graphs.
Summarizing data (discussion and conclusion).
Abstract writing.
Submitting manuscript for publication.

Notes from focus group meeting research supervisory needs

A focus group meeting was held on December 21, 2009, with the specific purpose of exploring three questions:

1. What are the competencies and requirements of good research supervision?

2. What are the obstacles facing research supervision (from the perspectives of focus group participants)?

3. What suggestions and recommendations do focus group participants make for the resolution of obstacles?

Focus group participants: Five faculty members were involved with the focus group meeting.

Three were senior and two junior from Medical Education Department faculty, (who were either currently supervising students or who had supervised students in the past) and three were senior clinician educators, who were currently supervising residents in their specialty research projects.

Focus group process

1. The researcher opened the discussion by thanking participants for attending and outlining the aim of the study and the purpose of the focus group meeting. She addressed each question in turn and at the end of the conversation on each aspect summarized the main discussion points and sought verbal consensus on her interpretation of the main points forthcoming from the group.
2. She sought and received consent by groups for the discussion to be audio-taped.
3. Each question was posed by the researcher and time given for reflection and response on the part of the participants.
4. At the end of the group meeting, the researcher thanked the participants for their input.
5. The audio-tape was transcribed and emerging themes were identified by the researcher.

Responses to queries: Competencies and requirements of good research supervision aspects were identified and sorted under the following headings.

- Knowledge
  o Knowledge not enough
    - Background in research and having been through the research process themselves
    - Patience
    - Encouraging students to do the work themselves
    - Dedicated time
    - Being a good role model

Appendix B

(Delphi Round 1)

Listed below are supervisory needs that facilitate adequate (proper) supervision. Please rate according to importance of each item on a scale of (1-5)

1 = Not important 2 = Fairly important   3 = Important   4 = Very important 5 = Essential component

I. Administrative needs	Scale
Protected Time (research office hours)	
Secretarial support	
Personal financial incentives	
Academic recognition (eg. Promotion)	
Research environment (library facilities, online access, senior members support)	
Others: please specify and rate	
II. Scientific needs (skills and knowledge areas)	
Writing research proposals.	
Searching the literature.	
Constructing Introduction.	
Setting research objectives.	
Advising about study design and methodology.	
Developing work plan.	
Sampling/sample size calculation.	
Developing data collection tool.	
Applying ethical aspects of research (confidentiality, informed consent, etc.)	
Using appropriate statistical tests.	
Interpreting results (describe & present) in text, tables & graphs.	
Summarizing data (discussion and conclusion).	
Abstract writing.	
Submitting manuscript for publication.	
Others: please specify and rate	
III. Interpersonal skills	
Good rapport with students (good working relationship)	
Being able to communicate effectively with students	
Being accessible when needed by students	
Being a facilitator (guiding, supporting, encouraging)	
Being a role model (providing an example as a good researcher)	
Being a networker (knowing who to turn to or refer students to for particular advice/input regarding research issues)	
Having good time management skills	
Treating students with fairness and respect	
Eliciting student's expectations and individual needs	
Encouraging students to reflect on their personal reasons for conducting research	
Discussing with students how to conduct ethical and responsible research	
Encouraging students to reflect on the importance of research for the community/society	
Others: please specify and rate	

(Delphi Round 2)

On a scale of 1-5, with 1 being not important and 5 being essential, please rate the importance of each item.

1 = Not important   2 = fairly important   3 = Important   4 = Very important   5 = Essential

I. Administrative needs	Rating
Protected time (research office hours)	
Special research support/ research assistants, statistician. Secretarial support etc.	
Availability of financial support/grants	
Academic recognition (eg. promotion)	
Conductive research environment (e.g. adequate library facilities, online access, senior members support)	
Collaboration & Cooperation with other departments & units of the organization	
Institutional support (e.g Dean, Vice Dean)	
Constructive critical peers-good dialogue	
Support from dedicated university research office	
Knowing and managing the specific academic requirements of the University e.g. confirmation of candidature, process for assessing thesis	
Adequate facilities (e.g. wet & dry lab) for conducting experimental research or analyzing the research data as well as supervise the student(s)	
Comments	
II. Scientific needs (skills and knowledge areas)	Rating
Selecting relevant topics for research	
Being expert in the relevant research topic	
Designing valid research projects	
Writing research proposals.	
Searching the literature.	
Organizing and managing collected data (data management)	
Constructing the Introduction.	
Setting research objectives/questions.	
Advising about study design and methodology.	
Advising about Qualitative research methodology	
Developing a work plan.	
Determining sample size and sampling techniques.	
Developing data collection tools.	
Applying ethical aspects of research (confidentiality, informed consent, etc.)	
Seeking ethical clearance	
Selecting & Using appropriate statistical tests.	

Reporting &Interpreting results (describe & present) in text, tables or & graphs.	
Summarizing data (discussion and conclusion).	
Writing abstract.	
Scientific paper Writing Skills	
Identifying limitations of study	
Submitting manuscript for publication.	
Planning the data collection techniques	
Acting as a research advocate	
Being able to meet the guidelines for submission of manuscript	
Editing written reports	
Comments	
III. Interpersonal skills	**Rating**
Establishing a good rapport with students (good working relationship).	
Being able to communicate effectively with students.	
Being accessible when needed by students.	
Being a facilitator (i.e. guiding, supporting, encouraging).	
Being a role model (i.e. providing an example as a good ethical researcher).	
Being able to network (i.e. knowing who to turn to or refer students to for particular advice/input regarding research issues).	
Having good time management skills.	
Treating students with fairness and respect.	
Meeting student's expectations and individual needs.	
Encouraging students to reflect on their reasons for conducting research.	
Discussing with students how to conduct ethical and responsible research.	
Encouraging students to reflect on the importance of research for the profession and community/society.	
Being prepared to encourage and if necessary push students to complete their thesis/dissertation.	
Being able to give constructive feedback to students	
Personal & professional relationship (collaboration) with international centers & expert abroad	
Comments	

Appendix C

Piloting the questionnaire

KING SAUD BIN ABDULAZIZ UNIVERSITY FOR HEALTH SCIENCES

Dear Colleague

Re: Evaluating the research supervision needs and requirements of faculty

Research supervision of undergraduate and postgraduate students is a commonly required function of university academics. However, very little is known about the needs and requirements of faculty who are eligible or are actually supervising research students. Furthermore, few academics receive explicit orientation or training in the skills or requirements of quality research supervision. We need to further our understanding and to make recommendations in this regard.

I am seeking your kind assistance in piloting this important instrument which I believe will assist in designing relevant faculty development programs for research supervisors. If you agree to participate, please complete the attached questionnaire. You are requested to complete Sections A to D. Sections A, B and C ask for background information. D specifically asks that you indicate your current research supervisory needs and requirements on a scale of 1 to 5 where 1 = Not needed and 5 = Highly needed.

In addition to indicating your needs in relation to each item in Section D, I would be grateful if you would also add any other items that you believe are needs or requirements of good research supervisors and comment on the clarity of the questions and items. I would be most grateful if you would return your completed questionnaires.

If you have any queries about this questionnaire, please do not hesitate to contact me on pager 4060 or e-mail me at: muallema@gmail.com.

Thank you in anticipation of your kind cooperation and I look forward to hearing from you.

Best wishes
Amani Al Muallem

Evaluating NGHA Faculty research supervision needs and requirements

A.   Demographics:

1. Age: ☐ <35 ☐ 35-49 ☐ 50-65 ☐ >65

2. Gender: ☐ Male ☐ Female

3. Nationality: _____

5.: Current title: ☐ Assistant Professor ☐ Associate Professo ☐ Professor

☐ Other, please specify _____

6. Specialty (please specify): _____

7. Total number of years involved in educational activities/academia _____ years

8. Level of teaching you have been or are currently involved in?

☐ Undergraduate ☐ Postgraduate ☐ Both

B.   Research training and experience

9. Have you ever received any formal training in research methodology?

☐ Yes ☐ No

10. *If yes* what type?
☐ Courses/seminars & workshops ☐ Diploma ☐ Masters ☐ PhD

☐ Others: Please specify_____

11. What area(s) of research design would you consider you have experience in?
☐ Qualitative ☐ Quantitative ☐ Both ☐ None

For Questions 12- 14 please indicate approximate numbers you can recall?

12.   How many research *proposals* /**grants** have you written or contributed to writing? ☐

13.   How many articles have you ever *published* in peer reviewed Journals? ☐

14.   How many oral or poster ***presentations*** of your research have you presented at national/ international conferences? ☐

C.   Research supervision experience

15.   Have you ever **supervised** student research (**undergraduate or postgraduate**)?

☐ Yes ☐ No

16. *If yes*, how many students have you *supervised*? (*Please indicate an approximate number*)

☐

Undergraduate (Bachelors)				Postgraduate (e.g. Masters and PhD)			
Past		**Current**		**Past**		**Current**	

D.   Research supervisory needs and skill requirements

Below is a list of research supervision skills and requirements. On a scale of 1 to 5 (where
1 = no enhancement needed and 5 = highly in need of enhancement), please indicate in
the box provided, the extent to which you feel you currently need enhancement when
supervising undergraduate and/or postgraduate research students.
1=Not needed; 2 = rarely needed; 3 = Needed a little; 4= Moderately needed; 5=Highly needed

I. Administrative needs	Rated Need (1-5)
1. Protected time (research office hours)	
2. Conducive research environment (e.g. adequate library facilities, online access, senior members support)	
3. Institutional support (e.g financial, Head of Dept, Dean, etc.)	
4. Adequate facilities for conducting research activities including space for supervision	
Other(s): (Please specify)	
II. Scientific needs (skills and knowledge areas)	
5. Selecting relevant topics for research	
6. Being expert in the relevant research topic	
7. Writing research proposals	
8. Searching the literature	
9. Organizing and managing collected data (data management)	
10. Constructing the Introduction	
11. Setting research objectives/questions	
12. Advising about study design and methodology (including qualitative research methods)	
13. Developing a work plan	
14. Determining sample size and sampling techniques	
15. Developing data collection tools	

16. Planning the data collection techniques	
17. Seeking ethical clearance	
18. Applying ethical aspects of research (confidentiality, informed consent, etc)	
19. Reporting & Interpreting research results	
20. Summarizing data (discussion and conclusion)	
21. Scientific paper writing Skills	
22. Identifying limitations of study	
23. Acting as a research advocate	
24. Being able to meet the guidelines for submission of manuscript	
25. Editing written reports	
Other(s): (Please specify)	
III. Interpersonal skills	
26. Establishing a good rapport with students (good working relationship)	
27. Being able to communicate effectively with students	
28. Being accessible when needed by students	
29. Being a facilitator (i.e. guiding, supporting, encouraging)	
30. Being a role model (i.e. providing an example as a good ethical researcher).	
31. Being able to network (i.e. knowing who to turn to or refer students to for particular advice/input regarding research issues)	
32. Having good time management skills	
33. Treating students with fairness and respect	
34. Meeting student's expectations and individual needs	
35. Encouraging students to reflect on their reasons for conducting research	
36. Discussing with students how to conduct ethical and responsible research	
37. Being able to give constructive feedback to students	
38. Personal & professional relationship (collaboration) with international centers & experts abroad	
Others: please specify	
THANK YOU FOR YOUR COOPERATION	

Appendix D

Development and Initial Testing of an Instrument for Evaluating Needs and Inferring Readiness of Research Supervisors: A Mixed Methods Approach

Amani Al-Muallem[a], Margaret Elzubeir[b], Christopher Roberts[c], Mohi Magzoub[a]

[a]Department of Medical Education, College of Medicine, King Saud bin Abdulaziz University for Health Sciences, Mail Code 3118, P.O. Box 22490, Riyadh, Saudi Arabia
[b]United Arab Emirates University, College of Medicine & Health Sciences, United Arab Emirates
[c]University of Sydney, Sydney Medical School-Northern, NSW, Australia

Abstract

Purpose: Skilled supervisors are crucial to the development of new researchers. A variety of institutional perspectives exist regarding prerequisites for effective research supervision, yet little is known about this subject from perspectives of research supervisors themselves. Mixed methods designs offer the potential to integrate various data collection and analyses procedures to rigorously investigate complex social constructs such research supervision and to design tools to evaluate needs and readiness. The present study aimed to develop and initially test an instrument that explores needs and readiness of research supervisors using an integrative mixed methods design. Methods: Drawing on a blend of socio-cognitive theories an integrative exploratory mixed methods approach was adopted. Interviews, focus groups, Delphi technique and survey were utilized. Self-rated needs for effective research supervision were completed by a convenience sample of research supervisors. Qualitative data were analyzed using inductive content analysis. Results: Findings from all data sets indicate that research supervisor needs are multifaceted and indicative of readiness. By widening the range of research methods used to explore the issues,

needs and readiness were subsumed under general thematic headings of cognitive, interpersonal, administrative and scientific domains.

Discussion: Research supervision can be conceptualized as being embedded in a comprehensive theoretical framework in which components of perceived cognitive skills, personal beliefs, behaviors, administrative and environmental factors work together to determine needs and readiness. Utilizing rigorous data collection and analyses methods that integrate quantitative and qualitative data is recommended to develop an instrument to determine needs and readiness. To achieve optimal practice in research supervision, development should be based on well-specified basic requirements and needs of supervisors built on a methodology rooted within the mixed methods paradigm. Further data and analyses are needed to ascertain whether the identified thematic variables can be replicated in a second sample drawn from other populations and subcultural groups.

*Corresponding author.

E-mail addresses: muallema@gmail.com (A. Al-Muallem), m.elzubeir@uaeu.ac.ae (M. Elzubeir), Christopher.roberts@sydney.edu.au (C. Roberts), magzoubm@ksau-hs.edu.sa (M. Magzoub).

1. Background

Supervising students undertaking research projects at levels from undergraduate projects to doctorates is a significant part of the work of academics. Supervision at any level is widely recognized as complex and multidimensional. Fostering research capability in students requires high quality supervision.[1,2]

However, although there have been notable developments in research training, supervision and funding in recent years, high attrition and less than ideal completion rates have been attributed to poor quality supervision.[3,4] To improve completion times, reduce attrition and generally improve levels of satisfaction, many higher education institutions have published lists of supervisory responsibilities, tasks and activities which are typically disseminated in related policies and procedures.

According to Pearson and Brew[5] however, the difficulty with such lists is that "…they range from the general to the particular and mix technical research skills with those supposed to enhance employability more generally" (p.137), making it difficult to identify priorities and appropriate professional development strategies. Furthermore, although there are many opinions regarding roles and responsibilities of research supervisors, there is little published literature in the area of needs or readiness assessment of research supervisors from their own perspectives.

As revealed in the different dimensions of the topic adopted by researchers, supervision generally has various definitions, functions and forms of delivery.[5,6]

Most definitions are related to practice-based super- vision in teaching, social work, psychology, counseling and clinical healthcare contexts. In healthcare contexts, the emphasis is on the promotion of professional development and maintenance of patient/client safety. Nevertheless, a definition that is reflective across professions and which has most relevance to research supervision is that of Proctor (cited in Kilminster and Jolly[6] who outlined three basic functions of supervision – normative (administrative), formative (educational) and restorative (supportive). Research supervision can therefore be defined as a pedagogical, administrative and facilitative process.

Indeed, some authors see supervision as in part or wholly, a form of teaching and consider that important roles of a good educator is to be a research supervisor, role model, mentor and facilitator in meeting students' needs to fulfill their research projects effectively.[7]

Pearson and Kayrooz[8] also conceptualize research supervision as a facilitative process requiring challenge and support. In contrast, others maintain that the emphasis in research supervision is less on teaching or mentoring and more on overseeing, evaluating performance and directing.[9]

Undoubtedly, there are often overlaps and as Ford and Jones[9] point out, this means that in some situations supervisors may also fulfill the role of a mentor when promoting the professional development of their research students or switch into an instructional mode where necessary.

In practice, application of the three above mentioned components will be dependent on a number of variables including personal style, socio-cultural environment, intellectual level and characteristics of supervisor and supervisees, etc. Furthermore, tasks and activities at undergraduate and postgraduate supervision levels will include varying degrees of teaching, mentoring and coaching the research process, supporting and progressing students.

A definition focusing more on the evaluative/monitoring aspects of supervision provided by Bernard and Goodyear[10] states that supervision is: "An intervention provided by a more senior member of a profession to more junior member or members of that same profession. This relationship is evaluative, extends over time, and has the simultaneous purposes of enhancing the professional functioning of the more junior person(s)…"(p.8).

Both research supervisors and students may have different preconceptions of what the supervisor role should entail and the ideal characteristics of each side of the equation. Similar to the old teaching adage'see one, do one, teach one' being active in research is no longer seen as a sufficient pre-requisite for effective supervision of research. According to Remes et al.[11] the most appreciated qualities of the supervisor from students' perspectives were scientific competence, sufficient amount of time for supervision, encouragement, social skills and good interpersonal relationships. Supervisors therefore not only need professional expertise generally and in specific discipline areas of the students' research, but also personal qualities which enable them to communicate effectively and establish rapport with their students.[12]

Most universities are now quite explicit in their descriptions about quality research supervision and the roles and responsibilities of both students and super- visors.[13] Most organizations also now recognize that the development of skills and understanding in this area is potentially a long-term investment in the institutional culture and provide induction and training for this important role.[14]

These include a range of programs ranging from half a day to a longitudinal series of educational activities lasting up to a year.

Against a backdrop of varying definitions and understandings about the functions and purpose of research supervision, personal perspectives of what it means to be a research supervisor and whether one has prerequisite knowledge, skills and attitudes are important considerations.

In planning or designing any professional improvement activity a critical first step is a needs assessment. This involves the systematic collection, review and analysis of data or information that identifies the knowledge and skills required for staff to perform their designated roles. Learners, whether health professionals or students, are expected to identify their own learning needs through a process of on-going self- assessment and reflection.[15] Educationalists strongly emphasize the importance of needs assessments to ensure that learning outcomes are related to the needs of participants and are realistically achievable.[16]

The purpose of this paper is therefore to outline the process and outcomes of developing a quantitative instrument using an integrative mixed methods design to explore the needs and readiness of research super- visors to effectively fulfil perceived supervisory roles and responsibilities. We hope it will provide a basis for continuing research and discussion about the nature and assessment of research supervision competencies. Specific primary questions that guided the study included: first, What are the perceived prerequisite needs of research supervisors? second, Can we safely infer research supervision readiness by interpreting supervisors perceived needs? The study draws on data acquired through a mixed methods approach, conducted as part of a case study in Saudi Arabia.

2. Methods

2.1. Theoretical framework

This study utilizes many educational theories including orientations of socio-cognitive learning, self-efficacy, experiential, reflective and communities of practice theories. There is little explication of theoretical frameworks or orientations in the literature regarding research supervision. If however, as indicated above, research supervision shares similar normative, formative and restorative functions with other disciplines, it is reasonable to borrow from theories

applied in other helping professions such as counseling psychology. An underlying characteristic and assumption of the following theories is that learning involves social participation.

Since academic competencies and achievements depend not only on abilities and aptitudes but also experience; at its simplest, research supervision can be seen as a form of experiential learning.[21] Before Kolb, Dewey was perhaps the most famous proponent of experiential learning, proposing that experience should be a central component of the educational process. Experiential learning is based on the importance of personal experience and reflecting on and in learning from the experience can also be transformative. The Experiential Learning Model is thus based on the existence of four learning modes – concrete experience, reflective observation, abstract conceptualization and active experimentation. The knowledge of practitioners is an accumulation of experience, reflection, actions, conversations with peers, etc. Typically, in research supervision the work of the supervisee is reviewed, questioned, considered and critically reflected upon, supervisors additionally consider their own experience, experience of others, actions, beliefs and assumptions in order to integrate learning into future practice.

Individuals may possess much knowledge and experience but may feel unable to engage in tasks productively because of doubts about capabilities or competencies. Since experiential learning is based on the importance of personal experience in the learning process, it should also be based on reflection and self- efficacy. Perceived self-efficacy is a prominent feature of socio-cognitive theory. The theory includes both cognitive and behavioral aspect because it covers attention, memory, and motivation. Bandura[17] suggests that we learn by observing each other and that our personality develops through interaction between environment, behavior and psychological processes.

In contrast to Kolb, Bandura[18,17] believed that modeling can have more influence than direct experience. The four variables that are involved in modeling are attention, retention, reproduction, and motivation. For example, in the context of research supervision, supervisors' attention to the role and motivation may affect their interaction with students.

Self-efficacy is also associated with reflection and evaluation of ones competencies in communities of practice. Wenger[19] asserts that communities of practice "are groups of people who share concern

or a passion for something they do and learn how to do it better as they interact regularly". We are all involved in multiple communities of practice either as members or at the periphery.

2.2. Study design

The present study focuses on exploration of needs and readiness of research supervisors. The perspectives of research supervisors themselves are therefore crucial for such an assessment; hence a mixed method approach was adopted as an exploratory case study approach. Mixed methods research is an approach to knowledge (theory and practice) that attempts to consider multiple viewpoints, perspectives, positions and standpoints.[20]

The research design utilized in this study consists of four distinct approaches including seeking expert opinion, focus group discussion, Delphi study and quantitative survey. The approaches are described as follows:

2.2.1. Seeking expert opinions

Seeking expert opinion as a starting point for generating information about the determinants of effective research supervision. Preliminary draft questionnaire outlining background information skills required of supervisors of undergraduate and postgraduate research was presented to participants. They were invited to identify important aspects/the key roles of research supervisors as well as relevant domains that could form sections or subsections of a questionnaire. Notes were taken and checked by the researcher.

The content analysis method[21] was used in analyzing data. The aim was to identify variations in perspectives. Following analysis of outcomes, comments and domains were reviewed by the first and second authors and the preliminary draft questionnaire was modified. A focus group session was planned with the agenda of "Exploring Research Supervision Experiences and Needs".

2.2.2. Focus groups

A set of three main trigger questions were identified by the first authors to facilitate the group discussion and to assist future questionnaire development. The meeting was held during the 2009/10 academic year at the College of Medicine, King Saud bin Abdul Aziz University for Health Sciences (KASU-HS). A group of five medical educators and faculty members who were involved actively in research supervision of undergraduate and/or postgraduate students were invited to participate.

Questions guiding focus group meetings included: What in your view are the competencies of a good research supervisor? What in your view are the problems facing research supervision? What suggestions, solutions or recommendations would you make?

The focus group meeting was audiotaped and lasted 1.5 h. The audiotape was transcribed and analyzed using thematic analysis independently by the first and second authors. Transcriptions were compared with hand-written notes. Themes were identified, suggestions for questionnaire improvement studied and modifications made accordingly. Independently, a second transcriber confirmed the emerging themes.

2.2.3. Delphi technique

A modified Delphi technique was carried out over a series of two rounds and conducted with a panel of 37 participants; 25 local and 12 international medical education experts of different backgrounds from USA, Europe, Australia and the Middle East. In this study," expert" was defined as a local or external individual who had relevant research supervision knowledge and experience and whose opinion is respected by their peers. External participants were e- mailed via the chairman of the Department of Medical Education at King Saud bin Abdulaziz University for Health Sciences (Riyadh). All participants were asked to rate a pre-determined list of research supervision activities and tasks as on a scale of 1–5, where 1 ¼ Not important and 5 ¼ Essential requirement for effective supervision. Additional items were requested and suggestions were invited. Items were checked for duplications or repetitions and grouped under relevant headings.

The first round commenced whereby the questionnaires were sent via individual e-mails together with a covering letter explaining the task requirements to all respondents (i.e. critiquing the contents of the questionnaire and adding items). In the second round, focus was on rating the items. The questionnaire was sent electronically to panel members who responded to items individually and independently and returned electronically or in person to the first author. Due to the small number of Delphi participants and the ordinal nature of the data, median ratings were calculated.

2.2.4. Survey questionnaire

Following analysis of interview, focus group and Delphi outcomes, contents of the questionnaire were formulated and modified. A convenience sample of 60 eligible research supervisors including faculty members and hospital consultants was identified from the College and Hospital records. All participants were communicated with, and sent questionnaires via e-mail or personal delivery. Quantitative data from the pilot study were entered in SPSS version 16 for descriptive statistics and Cronbach's Alpha was calculated to determine the internal consistency of the questionnaire.

3. Results

This section describes findings from each of the four study approaches. Italics indicate quotations from the qualitative data.

3.1. Seeking expert opinions

During the planned meeting three main categories were identified (Demographics, Research Experience, Research Supervisory Needs). Under the broad heading of Research Supervisory Needs 18 items were generated under the subsection of administrative and scientific needs. Participant comments regarding Research Supervisory Needs included: supervisors needs time to do it, they have to have the basics of research steps; supervisor personal abilities.

3.2. Focus group

Five participants constituted the focus group. Using thematic analysis of the semi-structured interviews confirmation of the three main categories of the questionnaire and their subsections

(themes) (i.e. administrative and scientific needs) were achieved. In addition, identification of a new (theme) subsection of the interpersonal skills and requirement resulted. Hence, a total of 31 checklist items were identified (18 þ1 additional in the administrative section and 12 items under the interpersonal skills).

Examples of comments from individuals in the group include:

> *"Supervisors need competencies and personality traits (particular attitudes)"*
> *"Research supervisor needs to be a role model" "Students' Rights … it is a learning opportunity" "Research supervision requires (protected) time and efforts outside (normal duties)"*
> *"FD is doing a great job for faculty except for research supervision" (FD ¼ faculty development)*
> *"Lack of administrative support e.g. statisticians, recognition…..etc".*

3.3. Delphi rounds

Round I: A total of 37 questionnaires were distributed. Of these 30 were returned, (83% reply rate). Ten out of 12 international experts responded; of these eight completed the Questionnaire with some additional items and two only critiqued and commented on it.

Of the local group 20 out of 25 responded (80% response). 18 returned completed questionnaires and two out of 20 gave only comments without answering or rating the items. This resulted in 25 additional items, (nine items in the administrative, 12 in the scientific and four in the interpersonal sub-categories). This resulted in a total of 52 items in the Questionnaire.

Round II: Following refinement in round I, the Questionnaire was sent back to the same 37 participants, responded (62% response rate). A few additional comments were taken into consideration and item ratings were entered in SPSS version 16. Frequencies and percentages were calculated and a cut-off level (75%) of the items rated very important and essential was included. This resulted in a reduction of questionnaire items (i.e. a total of 38 items).

3.4. Survey questionnaire results

The final questionnaire consisted of four main sections: Demographics (participant characteristics), research training experience, supervision experience and Research Supervisory Needs.

In the pilot 52 completed questionnaires were returned (response rate 87%). Males accounted for 2/3 of the sample and more than 88% were Saudi. Out of the total sample 94% were consultants and 77% had academic titles. The median of their academic involvement was 7.5 years range (1–30 years) and majority were involved in both under and postgraduate education (85%). 61.5% had some research training experience in the form of courses, attending seminars or workshops (55.8%), some as part of postgraduate education and training (5.7%). On the other hand, 38.5% of the total sample had no research training. The median number of proposal writing and publications were 3 and the range was between 0 and 25 and 0 and 42 respectively.

59.6% had some experience with research supervision and 40.4% have never supervised. Twenty-four items rated as moderately needed were in the scientific section and were more highly rated than items in the interpersonal section. The 10 remaining items rated 3–3.5 in the interpersonal section, were considered of some or little need. Items in the administrative and support section of the questionnaire were very highly rated whereas needs in the knowledge and interpersonal skills sections were perceived as moderate to high. Analysis of the internal consistency of the survey yielded a Cronbach alpha of 0.98.

4. Discussion

The present study reports on the process and outcomes of developing an instrument to assess needs and readiness of research supervisors using a mixed methods approach.

Findings are discussed under headings related to the research questions as follows:

4.1. What are the perceived prerequisite needs of research supervisors?

Results of this study revealed that needs of research supervisors in our context are numerous and includes personal and contextual factors. Of the 52 survey participants, most (85%) were involved in both undergraduate and postgraduate education, had formal training in research (mostly via courses or workshops). Approximately a third had supervised students' research projects and a quarter had no publications. As several authors have indicated[5,22,23] research training and education has attracted more scrutiny in the Western world in the last two decades. Explicit examination of what supervision actually means in practice and effectiveness and efficiency of research supervision have led to introduction and extension of research supervision development initiatives internationally.

Although these initiatives currently appear lacking in our context, as more emphasis is placed on accountability and quality assurance measures in all aspects of higher education activities, we can look forward to imperatives to clarify the nature of scope of research supervision and a more structured training of research supervisors.

As a starting point, provision of opportunities to elaborate the complex role of supervisors can be useful in discussion and development of practice and policy. Similar to other studies, 23 participants testified to the complexity of their work, identified roles and responsibilities and described it as primarily an intellectual and social undertaking. They spoke of supervisors needing competencies and personality traits, role modeling, ethical practice and institutional support. Indeed, it was a consensus of participants in semi-structured interviews, focus group discussion and two Delphi rounds that in addition to cognitive and behavioral aspects of the role, administrative needs, time and institutional support were important factors. Supporting evidence came from pilot study participants who gave high ratings to being accessible for students and having good time management skills.

These findings are in accordance with those of other investigators who indicate that supervisors and students are often concerned about time and priorities.[22–26] It was noteworthy however that expert Delphi participant rated supervisor behaviors and interpersonal skills as more important than administrative support. A potential reason for this could be their assumption, particularly in

the case of international external experts, that administrative support exists in all institutions and this may come from a background of positive experiences of support for development of expertise as researchers and research supervisors. Interpersonal skills, inadequate knowledge and giving dubious advice were factors leading to discontent in a recent study describing the experience of disagreements between Ph.D. students and supervisors.[24] Supervisors and supervisees from UK and Sweden were also aware that relationships affected the process of Ph.D. education and that diversity in supervisee personalities demanded different approaches. Where there is substantial, unresolved misalignment between supervisors and students on needs and expectations both parties are likely to experience difficulties.[27] Exploration of students' perspectives regarding supervisory practices in this regard should lend an important dimension to our understanding and warrants future study.

Other authors have highlighted that there is more to research supervision than technical knowledge and that interpersonal skills are especially important.[25]

Coordinating with other mentors, setting clear relationship expectations and understanding impact as role model were among 26 skills identified in a US study of competencies of research mentors.[24]

Such studies however, indicate that focus on roles alone may erroneously concentrate efforts on development of personal dyadic relationships[5] and we would concur with these and other authors[25,28] that development programs attempting to fix the technical aspects of the supervisor role within an administrative framework alone "…deny the genuine difficulties and complexities involved in supervision relationships".

4.2. Can we safely infer research supervision readiness by interpreting supervisors perceived needs?

The literature indicates that 'readiness' has a substantial history in modern education theory and practice. For example, a first step in the process of teaching and learning is evaluating learner needs and readiness.[29] Readiness also generally infers a necessary precondition for a person or an organization to succeed in facing a change or a challenge.

It is often assumed that research supervisors from the outset will be adept in all aspects of the task. The assumption is often that since they have achieved a certain level of proficiency in individual academic roles including completion of a research thesis progression into a supervisory role will be effective.

In this study we aimed to explore what prior cognitive, behavioral and environmental competencies and resources research supervisors perceived they did or did not possess in order to effectively function in their roles. We assumed that research supervisors perceived needs are related to both self-efficacy and readiness. However, as Bruner[30] suggested, the idea of readiness is a "mischievous half-truth … largely because it … provides opportunities for its nurture, one does not simply wait for it" (p. 29). Further, like Bruner, we reject the view that readiness for supervisory practice is something that resides only within the supervisor. Unless the conditions for learning and improvement are favorable, both will be frustrated. Readiness is thus, not an end in itself, it is the beginning of an active teaching and learning engagement.[29,31]

When developing the pilot instrument, an implicit intent was to provide participants an opportunity to self-assess and learn something about themselves; not merely to check off the skills they felt they had acquired. We anticipated that participants would see supervision as a set of behaviors, attitudes and skills for which one may have varying degrees of confidence regarding readiness to undertake. Readiness is hence an ethical responsibility that both the institution and the individual have to their supervisees. We therefore believe that the pilot survey reveals something about the state of supervisor readiness which will be helpful to those developing and appointing research supervisors.

Many faculty developers and leaders fail to take the time to assess needs/readiness. They act without first determining the specific needs of those they are attempting to influence. For instance, they delegate tasks for which people are not ready, or they may continue to provide the basics for those who already know what to do.

The key to effective faculty development is matching offerings to the needs of participants. Although instinct and intuition can help in determining these needs, there is no substitute for doing preliminary evaluations of needs.

Assessing research supervisor readiness has a number of advantages. First, expectations of research students and the institutions they enroll with are growing; understanding readiness of supervisors clarifies the strengths and weaknesses. Second, it provides the information needed to develop others. This will include careful consideration of specific roles and responsibilities and the specific tasks needed to achieve them. Third, it helps define potential gaps in meeting expectations before they occur.

We nevertheless, acknowledge that a supplementary guide to readiness is observation of behavior. This may not be easily accessible in the traditionally private situations of research supervision[25] but peer review and conversations about training, experience, current priorities, etc. with research supervisors promises valuable additional insight into readiness. Such conversations in communities of practice are vital for gaining mutual understanding of task-specific readiness. Using a quantitative readiness assessment framework as part of the process should put his on the agenda and make it an acceptable topic for discussion. Hence readiness assessment provides a useful baseline for helping others achieve their full potential.

This study is therefore, an important preliminary contribution to both instrument development, and provision of baseline data regarding needs of research supervisors within a Middle Eastern educational context.

4.3. Implications for research

Based on the results of this study, there appears to be several details that will be important for research supervisors and the organizations in which they function, to consider when preparing for this important activity. Important skills and characteristics identified include being enthusiastic for the role, having cognitive and interpersonal skills, being readily accessible to students and having organizational support mechanisms in place to assist supervisors.

Supervising students undertaking research projects at levels from pre-degree to doctorates is a significant part of the work of academics. Balancing multiple responsibilities within the role of research supervisor in addition to responsibilities teaching, administration and other activities of academics is challenging. To the best of the researcher's knowledge, only in recent years has there been an emerging literature addressing the specific requirements for supervision of both under-

and postgraduate students internationally. Furthermore, most literature and research initiatives relating to research supervision make reference to varying styles and are aimed at postgraduate level students. More focus on both pre-degree and postgraduate research supervision is called for.

The construction and utilization of self-report instruments is often considered a 'quantitative' endeavor. However, the process and outcomes described in this study highlights how using mixed methods can enhance the development and validation of research instruments.[32] Social science knowledge must be based on valid measurements and the main goal of using mixed methods is usually to increase confidence in validity by minimizing the amount of error.[33] The fact that the study instrument achieved high internal consistency as demonstrated by the Cronbach's alpha (0.98) may indicate the presence of some redundant items. Conducting a careful analysis of interrelated items is therefore called for in a future study. Adding qualitative approaches to instrument design and development should enable instrument developers to build stronger validity. Although the process is resource intensive, validation of a newly developed instrument is almost never accomplished through one study or one researcher.

It requires numerous research efforts and should be considered an ongoing process.[34] The sequential mixed method techniques used in this study is therefore recommended in whole or in part, depending on time and resources available to the researcher.

Final items of the developed questionnaire were in congruence with characteristics of good supervisors identified in protocols reviewed. This highlights the need for guidance as without protocols or guidelines supervisors might be confused about their roles and responsibilities. However, the author supports Cryer's[35] advice that even when codes of practices exist, they need to be tailored to individual specific needs and day to day practice. Indeed, the pilot study findings indicate a general need for comprehensive faculty enhancement programs in this important area. The following section therefore outlines implications of the study for research supervisors' professional development.

4.4. Implications for research supervisors' professional development

Outcomes of the study clearly point to the need for the institution to provide opportunities for supervisors to acquire and expand upon their knowledge and skills. Such developments should

target both novice and experienced supervisors seeking to enhance and share their skills and experiences. This should be in collaboration with all units concerned with research development. Of the studies reviewed, most recommend providing professional development for supervision with printed materials such as handbooks for students and supervisors, training sessions and mentoring programs were also among the most frequently utilized. In addition to advice, guidance books and websites there is a growing international literature that explores the supervisor–student relationship, effective practices and the perceptions of postgraduate supervisors. Indeed, in recent years there have been more efforts internationally to understand more about supervision at the postgraduate level (e.g. doctorate completion). However, the research literature relating to experiences, perceptions and practices at undergraduate level is less well developed and there remains relatively little advice available for supervisors of research at this level.

Future research is needed which combines quantitative and qualitative methods, explores supervisors' actual experience with research supervision and determines students' perspectives of characteristics of good research supervision.

4.5. Limitations

This study has several limitations including use of cross-sectional data with a small sample; without further construct validation of the instrument utilizing a larger sample it would not be appropriate to generalize the findings broadly. Further, the instrument involved self-assessment which is difficult and therefore subject to bias.[15,34] These and other authors[35,36] have suggested that self-assessment of competencies; knowledge and skills should be supplemented with researcher/expert observation. Despite these limitations the instrument can help medical educators to move forward in their efforts to enhance the quality of research supervision. Additional work is however needed to confirm the applicability and utility of the instrument in samples in other higher education contexts, from different disciplines and cultural contexts. In Western universities, where there are increasing numbers of international students, an added dimension to the supervisory role is dealing with diversity. It may be easy to unwittingly make assumptions about super- vision roles applicable to all students. A further question might therefore be what are the needs of research supervisors in responding to the challenges of supervising international students.

5. Conclusions

The current study has described the process of developing a useful instrument to determine the research supervision needs and requirements of faculty. The study has important implications for instrument development and research supervisors' professional development. A comprehensive approach to development of a needs assessment tool is crucial as this helps develop a clearer understanding of needs and guides the content of relevant future supervisor development activities. Research supervision is however, multifaceted. The outcomes of the pilot study indicate that the identified cognitive and behavioral needs may represent a lack of readiness or a limitation in the effectiveness of faculty in fulfilling their current roles as research supervisors and therefore the university should aim to foster development mainly in these areas whilst providing appropriate administrative support and protected time for research supervision. In its current state the instrument could be used as a preliminary diagnostic tool to assess the needs of research supervisors for individual assessments and faculty development interventions. However, an important next step will be to conduct exploratory and confirmatory factor analysis on item inter-correlations to further determine construct validity of the questionnaire.

6. Competing interests

The authors declare that they have no competing interests.

7. Authors' contributions

AM wrote the research proposal, conducted inter- views, analyzed data and contributed to the draft of manuscript, ME contributed to writing the proposal, coding of data and analysis of results and contributed to writing the final manuscript. CR reviewed results, edited and contributed to writing the manuscript. MM contributed to the study design, recruiting participants and helped in manuscript draft and submission.

References

1. Shankar P, Chandrasekhar T, Mishra P, Subish P. Initiating and strengthening medical student research: time to take up the gauntlet. *Kathmandu Univ Med J*. 2006;4(13):135–138.
2. Shankar P. Mentoring a medical student towards applied research in a developing country. *Med Teach*. 2007;29(2–3):253–254.

3. Kiley M. Developments in research supervisor training: causes and responses. *Stud High Educ.* 2011;36(5):585–599.
4. Abiddin N, Hassan A, Ahmad A. Research student supervision: an approach to good supervisory pratice. *Open Educ J.* 2009;2:11–16.
5. Pearson M, Brew A. Research training and supervision development. *Stud High Educ.* 2002;27(2):135–150.
6. Kilminster S, Jolly B. Effective supervision in clinical practice settings: a literature review. *Med. Educ.* 2000;34(10):827–840.
7. Severinsson E. Research supervision: supervisory style, research- related tasks, importance and quality – Part 1. *J Nurs Manag.*2012;20(2):215–223.
8. Pearson M, Kayrooz C. Enabling critical reflection on research supervisory practice. *Int J Acad Dev*. 9(1):99–116.
9. Ford K, Jones A. *Student Supervision.* London: Macmillan Education Ltd.
10. Bernard JM, Goodyear RK. *Fundamentals of Clinical Supervision.* Upper Saddle River, NJ: Pearson Education Inc.
11. Remes V, Helenius I, Sinisaari I. Research and medical students. *Med Teach.* 2000;22(2):164–167.
12. Armstrong M, Shanker V. The supervision of undergraduate research: student perceptions of the supervisory role. *Stud High Educ.* 8(2):177–183.
13. Cryer P. Beyond codes of practice: dilemmas in supervising postgraduate research students. *Qual High Educ.* 1998;4(3):229–234.
14. Grant B, Graham A. Naming the game: reconstructing graduate supervision. *Teach High Educ.* 1999;4(1):77–89.
15. Colthart I, Bagnall G, Evans A, Allbutt H, Haig A, Illing, J, et al. The effectiveness of self-assessment on the identification of learner needs, learner activity, and impact on clinical practice: BEME Guide no. 10. *Med Teach.* 2008;30(2):124–145.
16. DaRosa DA, Roland Folse J, Sachdeva AK, Dunnington GL, Reznick R. Description and results of a needs assessment in preparation for the. *Am J Surg.* 1995;169(4):410–413.
17. Bandura A. *Social Learning Theory.* Englewood Cliffs, N.J.: Prentice-Hall; 21–57.
18. Kolb DA. Experiential Learning: *Experience as the Source of Learning and Development. New Jersey*: Prentice-Hall; 1984.
19. Wenger E. *Communities of Practice*: Learning, Meaning and Identity. Cambridge University Press; 1998.
20. Lave J, Wenger E. Communities of practice. Retrieved September. 1991;16:2008.
21. Flick U. Qualitative research-state of the art. *Soc Sci Inf.* 2002; 41(1):5–24.
22. Delamont S, Atkinson P, Parry O. *Supervising the PhD: a Guide to Success.* Buckingham. Open University Press; 1997.
23. Halse C, Malfroy J. Retheorizing doctoral supervision. *Stud High Educ.* 35(1); 79–92.
24. Gunnarsson R, Jonasson G, Billhut A. The experience of disagreement between students and supervisors in PhD education: a qualitative study. BMC Med Educ. 2013;13: 134 http://dx.doi.org/10.1186/1472-6920-13-134.
    Article URL 〈http://www.biomedcentral.com/1472-6920/13/134〉.
25. Manathunga C. The development of research supervision: "turning the light on a private space". *Int J Acad Dev* 2005;10: 17–30.
26. Brew A, Peseta T. Changing postgraduate supervision practice: a programme to encourage learning through reflection and feedback. *Innov Educ Teach Int.* 2004;41:1.

27. Kiley M, Mullins G. *Scand J Educ Res.* 2005;49(3):245.
28. Bills D. Supervisors conceptions of research and the implications for supervisor development. *Int J Acad Dev*. 2004;9(1):85–97.
29. Tyler F. Issues related to readiness to learn. In: Hilgard E, editor. *Theories of Learning and Instruction: the Sixty-third Yearbook of the National Society for the Study of Education*. Chicago: University of Chicago Press; 1964. p. 210–239.
30. Bruner JS. *Toward a Theory of Instruction*. Cambridge, Mass: Belkapp Press; 1966.
31. Boud D, Falchikov N. Quantitative studies of student self-assessment in higher education: a critical analysis of findings. *High Educ*. 1989;18(5):529–549.
32. Tashakkori A, Teddlie C. *Handbook of Mixed Methods in Social and Behavioural Research*. CA: Thousand Oaks: Sage; 2003.
33. Benson J, Clark F. A guide for instrument development and validation. *Am J Occup Ther*. 1982;36(12):789–800.
34. Eva KW, Cunnington JPW, Reiter HI, Keane DR, Norman GR. How can I know what I don't know? Poor self-assessment in a well-defined domain. *Adv Health Sci Educ*. 2004;9(3):211–224.
35. Fleming M, House S, Hanson V, Yu L, Garbutt J, Gee, R, et al. The mentoring competency assessment: validation of new instrument to evaluate skills of research mentors. *Acad Med*. 2013;88(7).
36. O'Cathain A, Murphy E, Nicholl J. Why, and how, mixed methods research is undertaken in health services research in England: a mixed methods study. *BMC Health Serv Res*. 2007;7(85):1–11.

Appendix E

Qualitative (semi-structured interview)

Questions guiding interviews with probing questions

"Research Supervision perspectives/experience"

- Tell me broadly about your experience of research supervision?
  - o How long have you supervised for?
  - o What level have you supervised at?
  - o What kinds of projects/research have you supervised?
  - o How many of your students have completed?
  - o What is your current research student load?
  - o Joint publications?
  - o How do you recruit/select students for supervision

- What does it mean to you to be a research supervisor?
  - o Supervision style /supervision approach
  - o Values of supervision
  - o Supervision roles/responsibilities
  - o Friendship/pastoral care
  - o Provision of facilities eg computer/room/laboratory/seed funding/materials/equipment
  - o Impact of time for competitive grant applications (good/bad?)
  - o Impact on publication record (good/bad?)
  - o Impact on teaching load or administrative work?

- What skills & expertise do you think are important for supervising? skills, attitudes, knowledge, behavior, experience, scientific expertise

- What keeps you going as a research supervisor, what motivates you?
  - What do you enjoy about research supervision?
  - What do you find challenging about research supervision?

- What kind of training or support or professional development have you had for supervising?
  - o If none, what do you think supervisors need in terms of training? Where could you access this training?
  - o If yes, how has this helped in /influenced your supervision?

- o What was the most helpful training you had?

- o Are there other things you feel you need more training on?

- o Or are there aspects of supervision that you would like more training in?

- How do you think your school, department values your supervision of students?

- What do you do to maintain or improve your supervision practice?

  - o Do you attend regular formal training?

  - o Mentoring by senior colleagues?

  - o Challenges in accessing training or professional development?

  - o Read academic articles about research supervision

- Can you give an example of a challenging or difficult supervision experience? Why was it challenging? How did it affect you? What was the outcome?

- How do you deal with the student at risk of not progressing?

- Are there any particular issues in dealing with international students?

- How do you keep track of the progress of your students eg record keeping of substantive contact/emails /phone calls?

- What is your view about the amount of research training students should have undertaken prior to undertaking a research degree?

- Is there anything else you would like to add that we haven't covered?

Code frame

Code (idea)	Description
Likes research	Participant expressed interest and enthusiasm in research generally
Start of supervision	How supervision process started
Supervision difficulties	Obstacles facing supervisor
Primary vs secondary supervision	Assignment of supervisor to 1ry or 2ry level of supervision
Influence of institution	Influence of the rules and regulation on supervision choice
Feeling of responsibility	Supervisors expressing their feelings of responsibility
Institutional expectations	Supervisor expressed the influence of institutional expectation in their choice of supervision
Student selection	This describes the supervisor criteria for selecting their student including their training
Students interest	Influence of student interest on supervisor
Student level	Influence of student level on acceptance of supervision by the supervisors
Supervisor expectations	What supervisors expect from students (committed initiative.......etc.)
Supervisors' autonomy	Choice of supervisors to accept or reject students
Co-supervision issues	Reflects differences bet 1ry and co-supervisor
Meaning of supervision	Supervisor def of supervision, explanation
Two ways learning experience	Supervisors description of their research supervision experience
Supervisor feeling	Feelings expressed by supervisors about their experience
Rewards	Any factors mentioned that are rewarding to supervisors
Supervision structure	Reflects a structure of supervision, provided by institution
Supervision setting	Where supervision located; clinical, educational
Supervision process	Description of the process of supervision as seen by supervisor from the beginning till the end
Supervision journey	Supervisor expression as journey
Supervision outcome	From supervisor perspectives such as publication
Supervisor skills	What supervisor think of the skills needed for supervision (KSA)
Supervisors awareness	Supervisor expression of various needs for the continuity of supervision: patience, understanding of students.....etc.
Supervisor motivation	What motivates supervisor?
Rose blooming	Description of the enjoyable side of supervision
Supervision challenges +ve	+ve challenges faced by supervisors

Code (idea)	Description
Supervision challenges -ve	-ve challenges faced by supervisors (e.g. time Management)
Information transfer	Ease and difficulties of transferring information bet supervisor and student
Students factors	Student factors that affect supervision/supervisor
Supervision requirement	Training, qualification required from supervisors
Supervisor morals	Their sense of respect, values, appreciation of themselves as supervisors
Institutional interference	Institutional interference In the process/supervision/research
Being supervisor/supervised	Supervisor expression of their past experience when they were supervised
Valuing supervision	Supervisors' expressions about the lack of being valued/recognized by institution….
Sharing goals	Supervisors sharing common goals with their students (such as: finishing project, publication)
Supervision monitoring progress	Supervisor's ways and means to monitor progress of their students.
Research environment/culture	Supervisors views about factors influencing research environment, facilitation of supervision…etc.
Being good supervisor	Supervisors satisfaction with supervision experiences over time
Student performance	The effect of students performance on continuity, motivation of supervisors
Supervisors personal growth	Supervisors expressing some sort of self-growth while supervising students
Supervisors self esteem	Supervisors expressing increase in self-esteem if recognized by external organization……
Monitoring and evaluation	Supervisors describing their basic aspect of their roles towards research students
Resources availability	Supervisors describing the importance of resources availability for the students
Time management	Supervisors concerns about balancing their time between supervision and other commitments
Supervisor as teacher	Supervisors explaining the relation between being good teacher and supervisor
Supervisor as reader	Supervisors explaining the relation between being knowledgeable/reader and supervisor
Lack of supervisors training	Lack of training/skills development observed by supervisors
Supervisory activities	Supervisor's views about ongoing activities for e.g. courses, workshops as needed………
Doing something different	Supervisors expression describing the dynamics and interesting side of research supervision
Supervisor tolerance	Supervisors' response none progressing students
International students	Supervisors views and experiences with international students
Supervisor-students relationship	The extent and depth of relationship between supervisor and student
Research students requirements	This describes what supervisors think about necessary skills required by research students
Guide students scholarly	Supervisor describing their role in developing scholarly part of research students
Team supervision	Who is doing what?

Code (idea)	Description
Senior vs junior faculty members	Supervisors views about different level of supervision
Enjoying Learning my self	Supervisors enjoying experience
Intrinsic vs extrinsic motivators	Supervisors views about factors affecting motivation
Standardization of supervision	Supervisors importance of standardizing supervisors experience
Supervision feedback	Supervisors expressing the importance of feedback to their supervision
Supervision evaluation	Importance of evaluation of supervisors, supervisory process by students, committee……
Supervisor background/position	Effect of supervisor background/position on interest
Institutional support	Supervisors expressing the important role of institution support (e.g. research unit)
Students issues	Supervisors describing students other commitments (busy with blocks, exams….)
Supervisor's types?	Clinical vs educational type of research
Team supervision	Supervisor expressing the importance of team supervision
Being fair to students	
Student needs	

A. Demographics

1. **Gender**:   ○ Male   ○ Female

2. **Age (years)**:   ○ < 30   ○30-39   ○40-49   ○ 50-59   ○60-69

             ○ 70 & above

3. Nationality:_____

4. Location of Institution**:**   ○Saudi Arabia ○ Australia

                       ○Others, Please Specify_____

5. Highest level of **qualification**: ○Bachelor   ○Master   ○PhD

                       ○ Others, please specify _____

6. Current **work type**: (Please *tick all that applies*)

                       ○ Clinical   ○Administrative   ○Educator

                       ○Researcher   ○Other, Please specify_____

7. Current **academic position**:   ○ Lecturer   ○ Senior lecturer   ○ Assistant Professor

    ○ Associate Professor   ○ Professor   ○ None

    ○ Other, please specify _____

8. Clinical/Scientific **Discipline**:   ○ Medicine   ○ Surgery   ○ FamilyMedicine

    ○ Pediatrics   ○ Ob/Gyn   ○ Basic sciences   ○ Public health

    ○ Other please specify_____

9. Years of experience in **teaching** students _____ years

10. What level of **teaching** you have been or are currently involved in *(please tick one)*?

    ○ Undergraduate (Including graduate entry)   ○ Postgraduate (Including Masters & PhD)

    ○ Both   ○ None

B. Research training and experience

11. Have you undertaken any **research training** before? *(If No, please go to Q.13)*

    ○ Yes   ○ No

12. If yes what type? (Please <u>Tick all types</u> of research training you have undertaken):

    ○ Courses   ○ Seminars   ○ Workshops

    Other, Please specify _____

Method: ○ Online   ○ Self-study   ○ Face to face

13. Which of the following best describes your main area of **research method** expertise?

    ○ Qualitative   ○ Quantitative   ○ Both (qualitative & quantitative)

    ○ Other, please specify _____

14. What is your main area(s) of **research interest?**

      ○ Clinical   ○ Basic Sciences   ○ Epidemiological   ○ Educational

      ○ Psycho-social ○ Other, Please specify _____

For Questions 15-18 please estimate approximate numbers in the last FIVE (5) years:

15. How many research *proposals* have you submitted*?* _____

16. How many articles resulting from your research have you *published* in peer reviewed journals? _____

17. How many **oral and or poster presentations** of your research have you presented at national/International Conference? _____

18. How many book chapters related to your research have you published? _____

C. Research supervision experience

19. Have you undertaken any research supervisory training? *(If No, please go to Q. 21)*

      ○ Yes   ○ No

20. If yes, please indicate from the following, what type of training in the *last FIVE(5) years* (Please tick all that apply)

      ○ Courses   ○ Seminars   ○ Workshop

      ○ Other, please specify_____

      Method: ○ Online   ○ Self-study   ○ Face to face

21. Have you supervised research students (undergraduate and/ or postgraduate) *in the last 5 years?*

      ○ Yes   ○ No

21. If yes,

      A) How many students have you supervised in the last 5 years? (Please indicate an approximate number)

            Undergraduate level

            No. of **Past** students supervised (completed) _____

            No. of **Current** students under supervision_____

            Postgraduate level

            No. of **Past** students supervised (completed) _____

            No. of **Current** students under supervision_____

      B) For **how many** of the total students were you a**:**

            Primary supervisor? _____

            Associate supervisor? _____

D. Research supervisory readiness

Below is a list of factors involved in research supervision. On a scale of 1 to 5 (where 1= Disagree 5 = Agree), indicate in the box provided, the extent to which you agree or disagree with EACH of the following statements.

1 = Disagree   2 = Somewhat Disagree; 3 = Neutral;   4 = Somewhat Agree;   5= Agree

List of factors involved in research supervision	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree
	1	2	3	4	5
1. I am able to provide protected time for regular supervision					
2. The research environment in which I work is conducive to research training					
3. Appropriate facilities for students to conduct research is available					
4. My institution provides a variety of experts' research support services, eg. Laboratory services, qualitative assistance, etc….					
5. I am able to collaborate with colleagues within my institution on research projects					
6. My research supervision is poorly recognized by my institution					
7. I personally have a choice in accepting or rejecting research students					
8. My institution provides assistance to students with academic writing skills and editing services					
9. I am familiar with the required standards for the awarding different levels of research based degrees					
10. My institution provides staff development opportunities for supervisors to enhance relevant research knowledge and skills					
11. My institution provides clear written guidance for both supervisors and supervisee					
12.My institution has an independent peer review process for standard research supervision					
13. I should be an expert in the student's proposed project research topic					
14. I am confident of my ability to help students in preparing research proposals					
15. I have the necessary skills to guide my students to carry out literature search					
16. I am able to help in managing and analyzing research data in my field					
17. I am confident in my knowledge of principles for research ethics					
18. I am supportive of writing scientific papers in collaboration with students					
19. I expect supervision to result in publication					
20. I believe a good supervisor, should be a researcher as well as an educator					
21. I able to provide constructive feedback to research students on their project					
22. I believe that rewarding supervisors is essential in maintaining the process of supervision					
23. I believe that working with bright students is motivating					
24. I find difficulty in communicating effectively with my research students					
25. I believe it is important to be a role model for research students					

List of factors involved in research supervision	Disagree 1	Somewhat Disagree 2	Neutral 3	Somewhat Agree 4	Agree 5
26. I am able to facilitate the student research through guidance, support and encouragement					
27. I find it hard to help students who face difficulty throughout their research					
28. I understand without prejudice special needs of students in term of gender, culture and language					
29. I feel appreciated as a research supervisor by my institution					
30. I believe that Commitment is important for successful supervision					
31. I find it hard to balance academic workload with supervision of students					
32. I perceive myself as providing good supervision					

Please rate yourself of how much you think you are good supervisor on a scale of 1 to 5, were 1 is Poor and 5 is Excellent (circle)

1	2	3	4	5
Poor		Average		Excellent

Appendix F

Invitation to participate in the RSARS survey

Research Supervision & Academic Readiness Scale Survey

Subject: You are invited to a research survey – (Research Supervision: Faculty Perspectives)

Dear Colleagues:

My name is Dr. Amani Al-Muallem, a PhD student at the Faculty of Medicine, University of Sydney. I am conducting research study Evaluating research supervision readiness, skills and practice among faculties from King Saud Bin Abdul Aziz University for Health Sciences in Saudi Arabia and the University of Sydney in Australia.

This study aims to assess the quality of research supervision practice among medical faculty members. It will explore factors that are related to research supervision preparedness from faculty perspectives and experiences. This is an area that has not been investigated in detail.

I have already received Ethics approval for this study and I am in the process of validating a research supervision readiness scale. The results of this study will help in illuminating both personal and organizational implications for change required for effective supervision.

You are kindly requested to complete an electronic version of the survey by clicking the **link below and your early response will be highly appreciated**. By completing and submitting this survey, you are indicating your consent to participate in the study. It will take around 10-15 minutes to fill the questionnaire and all the information gathered will be kept in a safe place and will only be used for research purposes.

https://www.surveymonkey.com/s/SCH6JDJ

If you have any questions regarding the survey or this research project in general, please contact **Amani Al-Muallem, E-mail (aalm3366@uni.sydney.edu.au)**

Your participation is highly appreciated.
Dr. Amani Al-Muallem, MBBS, SBFM, ABFM, MHPE
Department of Medical Education
College of Medicine
King Saud Bin Abdul Aziz University
PhD student
Sydney Medical School
University of Sydney
aalm3366@uni.sydney.edu.au

Appendix G

Example of Electronic Version of the Survey

Welcome

You are invited to participate in a study to investigate the quality of the research supervision experience among faculty members. It is intended as a tool to promote self-reflection on supervisor's professional development and support needs. This is an area that has not been investigated in detail

Participant Information Statement

(1) What is the study about?

The study aims to validate a newly developed instrument to assess Academic readiness to supervise students' research projects at the University of Sydney.

(2) Who is carrying out the study?

The study is being conducted by Dr. Amani Al-Muallem, and will form the basis for the degree of PhD at The University of Sydney under the supervision of Chris Roberts, Associate Professor in Medical Education and Primary Care based at Sydney Medical School - Northern.

(3) What does the study involve?

You will be invited to participate and complete a self administered questionnaire and return of questionnaires via e-mail.

You will be invited to participate in an interview/ focus group and will be audio taped with your consent.

(4) How much time will the study take?

Completion of the questionnaire will take approximately 10 minutes.

(5) Can I withdraw from the study?

Being in this study is completely voluntary - you are not under any obligation to consent and - if you do consent - you can withdraw at any time without affecting your relationship with The University of Sydney.

Being in this study is completely voluntary and you are not under any obligation to consent to complete the questionnaire/survey. Submitting a completed questionnaire/survey is an indication of your consent to participate in the study. You can withdraw any time prior to submitting your completed questionnaire/survey. Once you have submitted your questionnaire/survey anonymously, your responses cannot be withdrawn.

(6) Will anyone else know the results?

All aspects of the study, including results, will be strictly confidential and only the researchers will have access to information on participants

A report of the study may be submitted for publication, but individual participants will not be identifiable in such a report.

(7) Will the study benefit me?

The main aim of this study is to help validating an instrument to assess academic supervisory readiness. However you may benefit from reflecting on your own needs for professional development in supervision

(8) Can I tell other people about the study? Yes you can tell others about this study.

(9) What if I require further information?

When you have read this information, Amani Al-Muallem will discuss it with you further and answer any questions you may have. If you would like to know more at any stage, please feel free to contact [Amani Al-Muallems and phone number: +966505480203, E-mail: aalm3366@uni.sydney.edu.au]

(10) What if I have a complaint or concerns?

Any person with concerns or complaints about the conduct of a research study can contact The Manager, Human Ethics Administration, University of Sydney on +61 2 8627 8176 (Telephone); +61 2 8627 8177 (Facsimile) or ro.humanethics@sydney.edu.au (Email).

Participant Consent

In giving my consent I acknowledge that:

1. The procedures required for the project and the time involved have been explained to me, and any questions I have about the project have been answered to my satisfaction.

2. I have read the Participant Information Statement and have been given the opportunity to discuss the information and my involvement in the project with the researcher/s.

3. I understand that being in this study is completely voluntary – I am not under any obligation to consent.

4. I understand that I can withdraw any time prior to submitting my completed survey. I understand that once I have submitted my survey, my responses cannot be withdrawn.

5. I understand that my involvement is strictly confidential and anonymous. I understand that any research data gathered from the results of the study may be published however no information about me can be identified as the survey is anonymous.

6. I understand that I can withdraw from the study at any time prior to submitting my survey responses, without affecting my relationship with the researcher(s) or the Sydney Medical School now or in the future.

Please click "Continue" to complete the survey

✲1. (A) Below is a list of factors involved in research supervision.
Please indicate in the circles provided, the extent to which you Agree or Disagree with EACH of the following statements.

	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree
(1) I have been given protected time from the institution to supervise students	○	○	○	○	○
(2) The research environment in which I work is conducive (promotes, encourages) for research training	○	○	○	○	○
(3) Appropriate facilities (space, equipment etc) are available to conduct research	○	○	○	○	○
(4) My institution provides a variety of research support services e.g. Specialist laboratory assistance, qualitative data analysis, etc.	○	○	○	○	○
(5) I am able to collaborate with research colleagues on research projects	○	○	○	○	○
(6) My student supervision is considered for promotion by my institution	○	○	○	○	○
(7) I personally have a choice in selecting research students I supervise	○	○	○	○	○
(8) My institution provides assistance to students, in academic writing skills and editing services of research manuscripts	○	○	○	○	○
(9) I am familiar with the research standards and policies for the different levels of research student (under-graduate, post-graduate, etc) at our institution	○	○	○	○	○
(10) My institution provides staff development opportunities for supervisors to enhance relevant research knowledge and skills	○	○	○	○	○
(11) My institution provides clear written guidance about research training for both supervisors and research students	○	○	○	○	○
(12) My institution has an independent review process for overseeing research supervision process and practices	○	○	○	○	○
(13) I believe I should be an expert in the student's research topic area	○	○	○	○	○
(14) I am confident of my ability to help students in preparing research proposals	○	○	○	○	○
(15) I have the necessary skills to guide my students to carry out literature searches	○	○	○	○	○

*2. (B) Below is a list of factors involved in research supervision.
Please indicate in the circles provided, the extent to which you Agree or Disagree with
EACH of the following statements.

	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree
(16) I am able to help students in analyzing research data	○	○	○	○	○
(17) I have enough knowledge of the principles of research ethics	○	○	○	○	○
(18) I am supportive of writing scientific papers with students	○	○	○	○	○
(19) I expect my supervision to result in publication	○	○	○	○	○
(20) I believe a good supervisor, should be a researcher as well as an educator	○	○	○	○	○
(21) I am able to provide constructive feedback to students on their research	○	○	○	○	○
(22) I believe that rewarding supervisors is essential in maintaining the process of supervision	○	○	○	○	○
(23) I believe that working with enthusiastic students is motivating for supervisors	○	○	○	○	○
(24) I find difficulty in communicating effectively with my research students	○	○	○	○	○
(25) I believe it is important to be a role model for research students	○	○	○	○	○
(26) I find it hard to help students who face difficulties throughout their research	○	○	○	○	○
(27) I understand and respect my students in terms of gender, culture and language issues	○	○	○	○	○
(28) I feel appreciated as a research supervisor by my institution	○	○	○	○	○
(29) I believe that commitment by the supervisor is important for the success of the student's research project	○	○	○	○	○
(30) I find it hard to balance academic workload with supervision of students	○	○	○	○	○

Demographics

*3. Gender

○ Female   ○ Male

*4. Age

○ <30   ○ 50-59

○ 30-39   ○ 60-69

○ 40-49   ○ >70

*5. Nationality

[   ]

*6. Location of your institution

○ Saudi Arabia

○ Australia

Other (please specify)

[   ]

*7. Highest level of qualification

☐ Bachelor   ☐ PhD

☐ Master   ☐ Fellowship

Other (please specify)

[   ]

✱8. Current work type (Please tick all that applies)

☐ Clinical ☐ Administrative ☐ Academic ☐ Researcher

Other (please specify)

✱9. Current academic position

☐ None ☐ Senior Lecturer ☐ Associate Professor

☐ Lecturer ☐ Assistant Professor ☐ Professor

Other (please specify)

10. Clinical/ Scientific Discipline

☐ Medicine

☐ Surgery

☐ Paediatrics

☐ Obs/Gyn

☐ Medical Education

☐ Family Med/General Practice

☐ Public Health

☐ Basic Sciences

Other (please specify)

✱11. Are you currently teaching students?

◯ Yes ◯ No

✱12. Number of years you have been involved in teaching students

✱13. What level of teaching you have been or are currently involved in (please tick one) ?

◯ Undergraduate (including graduate entry) ◯ Both

◯ Postgraduate (including Masters & PhD) ◯ None

Research Training and Experience

*14. . Have you undertaken any research training before?

○ Yes   ○ No

15. Form of training (Please Tick all that applies):

☐ Courses   ☐ Seminars   ☐ Workshops

Other (please specify)

16. Training delivery method: (Please Tick all that applies)

☐ Online   ☐ Self Study   ☐ Classroom based

Other (please specify)

17. Type of Research Training: (Please Tick all that applies)

☐ Qualitative   ☐ Quantitative   ☐ Statistics

Other (please specify)

＊18. What is your main area(s) of Research Interest? (Please tick that all applies)

☐ Clinical

☐ Educational

☐ Basic Sciences

☐ Psycho-social

☐ Epidemiological

☐ Public Health

☐ Health Services

Other (please specify)

＊19. Which of the following best describes your main area of Research Method Expertise? (please tick all that apply)

☐ Qualitative

☐ Quantitative

☐ Both

Other (please specify)

For questions below, please estimate approximate numbers in the last FIVE years.

*20. How many research proposal submissions for funding have you been involved in?

*21. How many articles resulting from your research have you published in peer reviewed journals?

*22. How many oral and or poster presentations of your research have you presented at National / International conference?

*23. How many book / book chapters related to your research have you published?

Research Supervision Experience

---

24. Have you been accepted as an MD supervisor for the medical program?

◯ Yes

◯ No

◯ Unsure

◯ Not applicable

*25. Have you undertaken any research supervision training?

◯ Yes　　　　　　　　　◯ No

*26. Have you supervised research students (undergraduate and/ or postgraduate) in the last FIVE years?

◯ Yes　　　　　　　　　◯ No

*27. If yes, A) How many students have you supervised in the last 5 years? (Please indicate an approximate number)

Undergraduate (including Honors): Number of Past students supervised (completed)

Undergraduate(including Honors): Number of Current students under supervision

Postgraduate (Masters by research): Number of Past students supervised (completed)

Postgraduate (Masters by research): Number of Current students under supervision

Postgraduate (PhD): Number of Past students supervised (completed)

Postgraduate (PhD): Number of Current students under supervision

*28. B) For how many of the total students were you a:

•Primary supervisor?

•Associate supervisor?

✱29. Please Provide an overall rating of how good a supervisor you are on a scale of 1 to 5, where 1 is POOR and 5 is EXCELLENT

	Poor		Average		Excellent
Rating	○	○	○	○	○

30. Can you specify any factors that has facilitated/ enhanced your preparedness for research supervision?

31. Can you specify any factors that has constrained/hindered your preparedness for research supervision?

32. Please specify below any other research skills you may need to develop your supervisory skills

Thank you

We are most grateful for your time.

Appendix H

Preliminary 30 items of the RSARS

SN	Items
1	I have been given protected time from the institution to supervise students
2	The research environment in which I work is conducive (promotes, encourages) for research training
3	Appropriate facilities (space, equipment etc.) are available to conduct research
4	My institution provides a variety of research support services e.g. specialist laboratory assistance, qualitative data analysis, etc.
5	I am able to collaborate with researchers/colleagues on research projects
6	My student supervision is considered for promotion by my institution
7	I personally have a choice in selecting research students I supervise
8	My institution provides assistance to students, in academic writing skills and editing services of research manuscripts
9	I am familiar with the research standards and policies for the different levels (under-graduate, post-graduate, etc.) at our institution
10	My institution provides staff development opportunities for supervisors to enhance relevant research knowledge and skills
11	My institution provides clear written guidance for supervisors and research students
12	My institution has a review board overseeing research supervision process and practices
13	I believe I should be an expert in the student's research topic area
14	I am confident of my ability to help students in preparing research proposals
15	I have the necessary skills to guide my students to carry out literature search
16	I am able to help students in analyzing research data
17	I have enough knowledge of the principles of research ethics
18	I am supportive of writing scientific papers with students
19	I expect my supervision to result in publication
20	I believe a good supervisor, should be a researcher as well as an educator
21	I am able to provide constructive feedback to students on their research
22	I believe rewarding supervisors is essential in maintaining the process of supervision
23	I believe that working with enthusiastic students is motivating for supervisors
24	I find difficulty in communicating effectively with my research students
25	I believe it is important to be a role model for research students
26	I find it hard to help students who face difficulties throughout their research
27	I understand and respect my students in terms of gender, culture and language issues
28	I feel appreciated as a research supervisor by my institution
29	I believe that commitment by the supervisor is important for the success of the student's research project
30	I find it hard to balance academic workload with supervision of student

Appendix I

Final 15 items of the RSARS instrument

SN	Items
1	I have been given protected time from the institution to supervise students
3	Appropriate facilities (space, equipment etc.) are available to conduct research
4	My institution provides a variety of research support services e.g. Specialist laboratory assistance, qualitative data analysis, etc. ….
8	My institution provides assistance to students, in academic writing skills and editing services of research manuscript
10	My institution provides staff development opportunities for supervisors to enhance relevant research knowledge and skills
14	I am confident of my ability to help students in preparing research proposals
15	I have the necessary skills to guide my students to carry out literature search
16	I am able to help students in analysing research data
17	I have enough knowledge of the principles of research ethics
18	I am supportive of writing scientific papers with students
20	I believe a good supervisor, should be a researcher as well as an educator
21	I am able to provide constructive feedback to students on their research
23	I believe that working with enthusiastic students is motivating for supervisors
25	I believe it is important to be a role model for research students
29	I believe that commitment by the supervisor is important for the success of the student's research project