SURGEONS’ PERCEPTIONS OF THE EDUCATIONAL OPPORTUNITIES FOR PREVOCATIONAL DOCTORS

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Candidate contribution statement

The ideas, development and writing of all the papers and chapters included in the thesis were the principal responsibility of the candidate, working within the University of Western Australia Health Professional Education program under the supervision of A/Prof Zarrin Siddiqui and Mr. Michael Levitt.

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Abstract

Introduction: The educational experience of Prevocational doctors working in Surgery has been rated poorly by doctors and despite a multitude of various tools it remains difficult to assess how best to improve the educational experience of junior doctors. The increasing number of Prevocational doctors and the need to train more specialists in a limited environment places urgency on determining a better way to improve the surgical educational experience.

Objective: To explore educational opportunities available to Prevocational doctors through a discussion with consultant surgeons.

Method: A qualitative study was undertaken following a literature review. Semi-structured in-depth interviews with ten qualified surgeons to explore perceptions of their own and Prevocational doctors’ surgical education experience were undertaken. Thematic analysis was used to analyse the data, generate categories and cross-tabulate to create themes.

Results/discussion: The resultant six themes identified and developed with the use of thematic analysis were taking responsibility, self-directed learning, changing workload, formal teaching methods (rounds, courses, and meetings), peer support and undertaking research. These themes were interesting in their divergence from current surgical education literature. Whilst encompassing strong and overlapping components of various education theories and frameworks, these six themes serve as more specific umbrella terms through which to consider, recommend and improve surgical Prevocational training and its learning environment.

Conclusion: These six themes are presented as a six point framework through which to enhance surgical education experience at the Prevocational level. These terms, in relation to their comparison tools and frameworks, may be better applied to improve surgical education. More research should be applied in the development of an assessment instrument based on this framework which may assist educators to adequately assess and improve the learning experience of Prevocational doctors in surgical settings.
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**Glossary of terms**

AMA: Australian Medical Association

CanMEDS: In the early 1990s The Canadian Royal College of Physicians and Surgeons developed a competency-based framework that describes the core knowledge, skills and abilities of specialist physician which is commonly known as the CanMEDS Physician Competency Framework.

CME: Continuing Medical Education

CPMEC: Confederation of Postgraduate Medical Councils (Australian)

ED: Emergency Department

EWTD: European Working Time Directive

GP: General Practitioner

MMC: Modernising Medical Careers (MMC) is a programme for postgraduate medical training introduced in the UK in 2005

MOPS: Maintenance of Professional Standards

Prevocational doctor: Prevocational doctors represent the medical workforce prior to specialisation; generally one to three years post graduation from medical school, and including the restricted registration year of internship in Australia.

RACS: Royal Australasian College of Surgeons

Specialist: Specialists in this thesis are defined by their fellowship status with the Royal Australian College of Surgeons. They are also referred to as surgeons or consultants.
UK: United Kingdom

USA – United States of America

WHO: World Health Organisation
Chapter One: Introduction

The Prevocational doctors’ learning experience is generally placed within the context of service provision and the clinical experience provides the bulk of the educational experience in terms of situated learning. Yet, this experience has been described as unstructured, poorly planned, and concerned mainly with the service provision. This research was brought about within the context of developing a surgical Prevocational program in a hospital setting. In development, it was found that there is a deficit of literature suggesting how to structure such an educational program that provides a positive and meaningful experience to the Prevocational doctor.

This introduction will cover briefly the background behind the expanding nature of the Prevocational doctor group and the nature of their numbers and restricted work hours on the learning experience. These issues will be expanded within the literature review in chapter two. This first chapter will begin by outlining the medical workforce in Australia and the Prevocational doctors’ role within this workforce. It will also discuss how identification of educational methods is a matter of immediate concern given the fact that the Australian Prevocational workforce is imminently expanding and working less hours. The research question will then be posed before a discussion and outline for the thesis.

1.1 The medical workforce in Australia

Health care and service provision of medical and surgical services continues to expand in Australia. A number of contributing factors have been identified and
include population growth and ageing, a heightened focus on health prevention by both society and government and an increased burden of disease. While the population continues to grow at approximately 2.7% annually,\(^3\) a noteworthy further quantification of this growth is the ageing population. The Australian population forecast (Figure 1) graphically shows that, while younger age groups are declining in percentage representation, an equal increase in older age groups, who generally represent disease burden, is anticipated. This expansion has a direct correlation on the nations need for health care service providers. As Australia grows and ages, we require more doctors to provide the health care of the population.

![Figure 1: Australian population forecast to 2021 reproduced with permission\(^4\)](image)

A worldwide shortage of medical practitioners to cope with increasing demand was reported by the World Health Organisation (WHO) in 2006,\(^5\) and is mirrored in Australia, with earlier concerns established by the Australian Medical Workforce Advisory Committee. Formed in 1995, it reported to the government concern regarding capped medical school placement numbers.\(^6\) Other studies have attempted
to identify factors contributing towards this shortage which include capped medical school places (removed in Australia after a decade in 2003), feminisation of the medical workforce (increasing to 38% in 2011), decreasing work time, increased demands from health consumers and migration/globalisation of the workforce. These factors are replicated globally in physician projections. A previous reliance on international medical graduates in Australia is anticipated to be inadequate, as other countries increase competition for the decreasing global pool. As a result of population studies and future projections about the workforce characteristics, the already established health care workforce shortage in Australia is anticipated to worsen. To cope with this identified deficiency and with the changing workforce demands, Australia has embarked on more than a doubling in medical graduates entering the workforce in 2013. The projected number of medical school graduates in Australia increased from 1544 in 2007 to 2920 in 2012, resulting in a 90 percent increase in those seeking Prevocational placements. In Western Australia this number was 111 in 2005, 124 in 2007 increasing to 335 by 2015. Increased numbers sharing the same clinical experience is expected to negatively impact the educational experience for the individual. To cope locally with the educational impacts of this, the Postgraduate Medical Council of Western Australia implemented the Junior Doctor Curriculum in 2006. Similarly clinical positions for the expanding numbers of Prevocational doctors have adapted with the increase in numbers and an attempt has been made to ensure that accreditation of these new posts mean that they remain acceptable clinical environments with criteria regarding senior staff support, orientation, provision of feedback, educational access and facilities.
Further to the expanding numbers of doctors, these doctors are now also working fewer hours than their predecessors. Enforcing safer work hours for this expanding number of doctors is a high priority for Australian training associations and national bodies such as the Australian Medical Association (AMA).\textsuperscript{15} Similar modifications to practice are widely being made globally, both in the United States of America (USA) and with the European Working Time Directive (EWTD).\textsuperscript{16} Literature from an Australian model in regards to work hours is lacking with much of the literature available examining parallel changes such as the EWTD. In the USA moves have been made to cap the working week at 80 hours and in the European Union to 48 hours. Much of the opposition to the fully implemented EWTD (cutting doctor work weeks to 48 hours) have been from training bodies, such as the Royal College of Physicians of Ireland, due to the resultant “compromise [of] the quality of professional education and training of specialists”.\textsuperscript{17} In Australia, with more doctors to share in the educational opportunities available, concern of this nature has also been expressed despite the already reduced baseline hours.\textsuperscript{6}

\textbf{1.2 Medical workforce structure}

In Australia, the medical workforce delivers health care services within the public and private healthcare systems. Primary care is usually provided in a practice setting outside of hospital by general practitioners. Secondary and tertiary care is provided in hospitals of both private and public nature with the public sector typically handling more complex and emergency cases.\textsuperscript{18} Within the health care services, the medical workforce is made up of doctors with varying qualifications, skill sets and backgrounds including interns, resident medical officers, career medical officers, registrars in training and consultants (or specialists). (Figure 2)
Figure 2: Medical career progression in Australia with representation of Prevocational doctors.

Interns are first year doctors who work in a range of rotations through clinical areas to experience various situations and environments. After completing the compulsory probationary postgraduate year of internship (in which they work under supervision in an apprenticeship model), most doctors will work for at least one year as a resident medical officer. This year serves to consolidate clinical skills, equip the doctor with procedural skills and expose them to a range of clinical settings in addition to fulfilling service delivery needs. Resident work may be prior to entering into a vocational training program or alternatively prior to leaving the medical workforce, working in research or choosing to continue to work in the hospital setting as a career medical officer. Prevocational doctors include all doctors prior to specialization. In Western Australia, Prevocational doctors consist of interns
(postgraduate year one) and residents (postgraduate year two onwards until vocational training). Resident medical officer is a nationwide recognized term for those in this cohort who are not interns however hospital medical officer (Victoria) and junior medical officer (South Australia) are also terms in use. In Australia, these Prevocational doctors are a large group of doctors attempting to obtain the relevant experience and learning prior to specialisation within the constraints of work hours and peer competition for clinical exposure. Prevocational doctors are therefore a specific group of adult learners requiring support and education. This is often placed within the context of service provision, with the clinical experience providing the bulk of the educational experience in terms of situated learning.

Within this area, much of the relevant published literature comes from the United Kingdom (UK). In the UK the parallel role of “foundation doctor” is a term for the two compulsory bridging years between medical school and specialization and has come about since the system and program review Modernizing Medical Careers (MMC). In one study from the United Kingdom, the group is described as a “lost tribe” because their education, structure and support was largely ad hoc.

In Australia and in the UK research targeted at Prevocational doctors specifically in surgical rotations is lacking, despite poor ratings for the experience on such rotations by Prevocational doctors.

1.3 Research question

Within the context of developing a surgical Prevocational program in a hospital setting, this thesis explores the variety of educational methods used to teach Prevocational doctors undertaking surgical terms as perceived by surgeons. In particular, surgeons are a cohort of individuals who have had many perspectives.
around the Prevocational doctor experience. They have had the experience of being a Prevocational doctor, the retrospective benefit of following a structured training program and the hindsight of supervising the next generation of Prevocational doctors. They were a chosen group for the benefit that this hindsight and prior experience would add to an obvious void in the literature in answering the question about educational opportunities. The research aims to address the following questions:

a. What are the educational opportunities available for Prevocational doctors undertaking surgical rotations?

b. How do surgical consultants in Western Australia perceive their own, current and future educational opportunities?

c. How and what can do done to improve the educational experiences of Prevocational doctors?

This research will discuss concepts which may be used by educationalists and policy makers when planning and directing surgical educational experience of recent medical graduates and trying to improve such learning experiences.

1.4 The structure of the thesis

This thesis began with the background behind Prevocational medical education and the additional challenges facing the group of Prevocational doctors as their numbers and work conditions changes.

Chapter two: a literature review sets to evaluate the current strengths and weaknesses known about various methods of education and educational experiences. It looks from different modalities to different participants’ perspectives evaluated in
the literature. It also looks at a number of education evaluation tools and how they might apply to the Prevocational doctors. The literature review will also consider the impact and approach taken on the global arena such as investigations into the European Working Time Directive and more local initiatives such as the Australian Junior Doctor Curriculum. This background and literature review sets the scene for the research question regarding the paucity of information about available educational experiences for Prevocational doctors in surgical attachments.

Chapter three discusses the research design and methods. Having set the scene for the research question, the qualitative research design, its methods and in particular exploratory interviewing will be discussed. It also looks at the researcher and their integral role within the qualitative research process. It then continues by discussion into the specific research data collection methods, including recruitment and ethics considerations regarding the interview process and the interview tool, coding, transcription and data analysis of the interviews is discussed in further detail in chapter four. These interviews were conducted in two cohorts.

Chapter four: Patterns and themes, follows with a discussion of the demographic breakdown of the interviewees prior to analysis and description of the results of the interviews. It focuses on the analysis results and the groupings of six distinct themes that emerged from the interviews. Quotes and tabulated frequencies of words are discussed within this chapter to showcase the data and verify the quality of information obtained.

Chapter five presents the interesting discrepancies in the surgeons’ era compared to their perception of current day Prevocational doctors. Each of the six identified themes in the results chapter is further developed with a discussion of their
relationship to established education and medical education theories and frameworks, with the proposal for a new and more surgically relevant and simpler model. To conclude, a discussion about a tool using this new framework and the relevance towards policy and practice is presented along with the limitations of this study and its recommendations for future practice and research.

1.5 Conclusion

Western Australia’s medical workforce is expanding in number and decreasing in work hours and is demonstrably similar to the larger Australian, American and European workforce. Many of the factors impacting on this change are variables which are difficult to control such as caring for an increasing aging population and a demand for change in work-life balance. Many studies, institutions, organisations and individuals have expressed concern that these changes in the nature of the workforces experience will compromise future educational experiences available to Prevocational doctors. There is a need to establish what an educational experience is for these doctors so that these experiences can be enhanced such that a Prevocational doctors’ educational opportunities are maximized.
Chapter Two: Literature review

2.1 Introduction

In this chapter a review of the literature is presented. The objective of this review is to evaluate the available literature around the learning experience of Prevocational doctors and more specifically Prevocational doctors in surgical rotations. The review will be focused in terms of curricula, various educational methods (for example bedside teaching), educational environments and different viewpoints (for example the trainee or consultant). It is the goal of the literature review to determine if a particular set of methods or techniques have been noted in the literature as being useful and unique to the group of Prevocational doctors in Surgery so that these may be implemented to improve future Prevocational surgical roles.

2.2 Methodology

This literature review has three purposes. Firstly it situates the study in the context of Prevocational continuing medical education and discusses the foundation of education for these Prevocational doctors. The impact of work hours on learning for Prevocational doctors is also reviewed with a focus on the literature regarding the European Work Time Directive. Secondly this literature review will critique available studies related to continuing medical education methods. It examines the American Agency for Healthcare Research and Quality Report on the effectiveness of continuing medical education, and how a discrete set of methods or practices have not been identified and more so how the literature limits comparison. The educational programs established in Australia for Prevocational doctors are discussed in terms of their implementation and effectiveness. Thirdly the review aims to
demonstrate the breadth of the issues and yet the paucity and non encompassing nature of the tools available. Studies from a variety of participant perspectives will also be evaluated to show the impact this has on the results of studies. A number of educational environment tools and instruments will be examined for perceived limitations in application to the surgical Prevocational population.

The literature search was conducted during the initial research proposal and planning stage in 2009 and again following the interview phase of the study to identify recently published articles and to follow up on relevant references found in the planning stage and themes identified in the interview phase. The databases PubMed and Embase were searched and cross referenced for the terms postgraduate, Prevocational, junior doctor, intern education, foundation doctor, medical education, and surgical education. Additionally a focused review of medical education literature (specifically the Best Evidence Medical Education collaborative and journals including Medical Teacher, Focus on Health Professional Education, BMC Medical Education, Journal of Surgical Education, Clinical Teacher) were content reviewed over the last 10 years to identify relevant articles that may have been missed in the literature search. Publications were limited to those published in English, though not necessarily those from English speaking countries, for the sake of interpretation of findings.

2.3 Considerations on Prevocational education

Continuing Medical Education (CME) is defined as “educational activities that serve to maintain, develop, or increase the knowledge, skills and professional performance and relationships a physician uses to provide services for patients, the public or the profession”\footnote{This is a specific definition from a reputable source.} and may include many different educational activities.\footnote{For example, workshops, seminars, online courses, and conferences.}
Prevocational medical education can be thought of as a special subset within the spectrum of continuing medical education,\textsuperscript{26} being generalised and less targeted than specialty specific CME and serving mainly to increase rather than maintain knowledge and skills.

Targeting CME at Prevocational doctors is a relatively new concept with Prevocational educational programs having a short history.\textsuperscript{26} When questioned, the junior doctors from many countries felt unprepared for their work and ongoing training after the initial years of practice.\textsuperscript{27-29} In Australia, this indiscriminate group represent a population from various medical schools, all of which have different curricula and different outcome assessments and as such have variable preparedness to work at the Prevocational level and variable requirements from their education based upon their Prevocational experience.\textsuperscript{27} Historically this group was taught through the apprenticeship model of supervision with minimal educational support of any substance or structure. They lacked defined outcomes for the Prevocational experience and often had marked variations in practice exposure being left feeling unprepared and unskilled.\textsuperscript{28} There was a need identified for a balance in these roles of service, training, teaching and research and a link towards vocational training.\textsuperscript{27} The apprenticeship model was noted to be lacking for a number of reasons some of which included competing demands on supervisors, changing patient expectations and reduced length of inpatient stays.\textsuperscript{26}

Other countries addressed these challenges of Prevocational doctor training and support before Australia, in particular the UK and Canada. The programs in these countries are the basis upon which the Australian programs were subsequently developed. In the UK, the Modernising Medical Careers (MMC) program for
postgraduate training was introduced in 2005. Doctors are placed into the foundation programme for the first two years after medical school, with the first year being similar to that in Australia having conditional registration with the governing General Medical Council. The programme consists of rotations, assessments, a nationally standardised curriculum and a learning portfolio. The MMC was critically reviewed in 2008 and found to be unsatisfactory because of among other issues, vagueness and lack of consensus on the educational principles and workplace roles set out in the original program. The author of that review called for a broader, longer early core training program following on from the probationary year that lasted 3-4 years, however this has not been implemented because of political and beauracratic constraints. An internet survey by researchers found that the vast majority (90%) of surveyed Scottish foundation year doctors (n = 1042) felt that incompetent trainees could still obtain satisfactory results from the current assessment methods and that they were currently poorly prepared for practice with the existing foundation program. Semi-structured interviews conducted of foundation doctors, supervisors and nurses felt that rotations, not necessarily the program, contributed to poor experiences and competencies. This was related to some specialties offering insufficient generic experience, varying levels of responsibility, insufficient hours or inadequate night work compared with other rotations.

Much like the UK, Canada has a fundamentals program which lasts 1-3 years and represents Prevocational training providing core and foundation competency acquisition using the CanMEDS model and a summative exam. In Canada, the Royal College of Physicians and Surgeons of Canada initiated the CanMEDS framework in the 1990s. CanMEDS is a derivative from "Canadian Medical Education Directives for Specialist". This was in response to changing community
expectations, practice climate, technology and knowledge. It is a competency based education framework with seven defining and overlapping roles for the doctor i.e. Medical Expert, Communicator, Collaborator, Manager, Health Advocate, Scholar and Professional. These seven roles were first described by the Educating Future Physicians of Ontario Project with input from five medical schools of the region. Key competencies and enabling competencies are defined with a description of skills, knowledge and attitudes required to be achieved whilst being generic enough to apply across specialties. An update to the program, due in 2015, aims to add a milestone component as doctor’s progress through their training and continuing professional development.

The common strengths of both the UK and Canadian systems of Prevocational education are in terms of well structured curricula, and the infrastructure which supports its implementation. In Australia, to address the issues of Australia’s Prevocational doctors and with these programs in mind, the most eminent events have been the ongoing development of the Australian Curriculum Framework for Junior Doctors (ACFJD) and the Prevocational medical accreditation framework. The ACFJD outlines a generic core curriculum for Prevocational doctors, with education goals organized hierarchically in a ‘concept map’ which is further divided and branched. Its aim is to provide a template that identifies competencies and capabilities required. The generic nature allows it to be implemented in many areas of medical practice however some apprehension over its applications remain in terms of assessment, checklist like implementation and competency based training. The framework was revised by the Confederation of Postgraduate Medical Education Councils (CPMEC) in 2009 and again in 2012 and is built around three learning areas of clinical management, professionalism and communication. These are further
divided into eleven categories which were developed in consultation with involved
groups and focused on workplace based learning and assessment built around core
principles of adult education. Much work has taken place in developing this
framework; however each individual educational environment within specialties and
areas of practice is not addressed. Likewise some aspects of training, such as
healthcare management, are still perceived to be lacking.\textsuperscript{39}

An interesting approach to the learning of junior doctors was undertaken in New
Zealand in 2011, which has a similar workforce to Australia. A number of group
interviews led to categorising workplace learning into three themes; concrete tasks,
project management skills and identity formation as a doctor.\textsuperscript{40} It was noted that this
later theme was the most challenging and it was felt that this had implications for
future curriculum development and supervision of junior doctors because it was a
difficult concept to help build and target. Bearman and colleagues also undertook a
qualitative study looking at the experience of internship in Australia and found
internship reflected a natural progression from medical school with a balance of
support and taking independent responsibility in forming the identity of intern.\textsuperscript{41}

Despite evidence supporting various CME activities and the benefit provided by
such Prevocational programs as the Australian Curriculum Framework Junior
Doctors there are many barriers to learning in the Prevocational medical
environment.\textsuperscript{23, 42} Some of these barriers include time, supervision, competing
demands and work balance. Subsequent to these barriers, the nature of the
Prevocational educational experience for each participant, remains varied between
postings. Junior doctor participation in a clinical skill (such as thoracocentesis) was
avoided for such reasons as lack of previous experience, fear, lack of supervision and
lack of time. In an Australian based study, Neate et al found that many barriers existed for Prevocational doctors in regards to participating in education—mainly related to the challenges in balancing patient care, work demands and professional development. Although limited by the response rate of this cross sectional cohort survey (18.1% of surveys returned), the most frequently identified rotations with limited or inadequate provision of education were of a surgical nature for Australian graduates in both postgraduate year one (PGY1) and postgraduate year two (PGY2) (38% and 28% of responses respectively). Neate et al did not discuss significance of the differences between rotations, however graphical illustration showed a large difference between PGY1 surgical (38%), and the nearest ranked PGY1 unit of medical (23%). This is not discussed by the authors however its identification highlights the need to support and enhance Prevocational surgical education.

The most common identified barriers in Neate’s study were workload and time limitations, for which the researchers did not have a solution. However, the more remediable issues such as teaching program problems represented 23% of issues identified within an open ended response section, similar to the identification of workload problems in the same response section (27%). This study is informative about the existence of barriers to Prevocational education (with only 7% of participants identifying no barriers), and its frequency amongst surgical positions; but the small response rate and inability to determine national distribution of responses limits the generalisability of this information and hence the application of its outcomes.

To deliberate upon educational barriers, the motivations for learning need to be considered. Learning incentives such as university or specialty training exams do not
exist for Prevocational doctors and so formal training and participation in learning lacks this external motivation. Another Australian study found that one hospital’s mean attendance rate for interns at mandated teaching was 66%. This was enhanced after the implementation of a flexible CME points system with four professional development domains of education sessions, skills workshops, presentations and research allocated points. This improved participation rates to 92% reaching the mandated 100 points and was attributed to improved flexibility and learning autonomy within the program as incentives to participate. This work however grouped the interns from each year as a cohort and thus does not enable to look specifically at surgical positions or to compare their experience between different rotations.

2.4 Working hours and impact on learning

Concern has been expressed that decreased work hours compromises learning experience for doctors. In 2007, the Impact of the EWTD on Postgraduate Medical Education: Report was commissioned and deals primarily with this concern. Initially it surveyed a sample of 1000 trainees and 500 consultants across a number of hospitals for their perceptions, the study produced simple percentage analysis of a number of factors including that 60% of both trainees and consultants felt that their training needs were met within a 56 hour rota. However, from the same population a year later in 2008, a larger number of 3000 junior doctors were surveyed and contradictory results noted for the further decrease to 48 hours. Thornley found that 64% of respondents felt that the EWTD would have a negative impact on their training and 45% thought it was not possible to train a doctor within 48 hours a week in their specialty. A poor response rate in the initial study (15%) limits the ability
to generalise that the results do in fact represent the opinion of the larger population, however it remains concerning that a decrease in work hours to safer levels appears to negatively impact upon learning experiences.

Denmark is one of the few countries to report compliance with the EWTD. In parallel with a decreased number of work hours, the country has also instigated a reform of postgraduate medical training in 2004 using the CanMEDS framework. This program involved regular appraisal meetings, a new curriculum, regionally based education and the instigation of a number of new training courses. The new program was evaluated with questionnaire surveys of hospital doctors. This was conducted at three (2007) and six (2010) years post implementation to assess the learning experiences. The survey used a 24 question, five point Likert questionnaire which the authors reported as retrospectively corresponding with the high importance items in the tool Postgraduate Educational Environment Measure (PHEEM) which had not been developed at the time of the research. In the survey conducted in 2007 minimal change to the baseline experience in 2003 was observed. Significantly less participants were involved due to difficulty in follow up (2105 – 75% in 2003, and 1888 – 58% in 2007) however the specialty cross sections (divided into cognitive task orientated, technical task orientated and laboratory task orientated) were represented in a similar proportion. Being a “junior trainee” was consistently related to lower ratings in all aspects of the training and learning environment. Similarly cognitive and technical specialties rated their educational experience lower than the laboratory task orientated specialties significantly across all areas except supervising others. It was hypothesised that this was because of smaller laboratory task departments and more stringent accreditation and quality assurance processes in those departments.
Interestingly, at three years (2007) after this program was introduced no significant differences were concluded in meeting the educational needs of the junior doctors, feedback (providing and receiving), supervision or value of appraisal meetings. This failure of demonstrated benefit occurred during the EWTD period of decreased hours to 56 per week. It is possible that the effectiveness of the program was lost through a parallel loss in work time exposure. However, if this were the case follow up in 2010 (occurring after the reported compliance with the 48 hour work week) would expectedly show little benefit or worsening benefit from the reform also. This was not the case. In 2010, 70% of junior doctors were surveyed (686 participants) and compared to the original cohort. An increased rating in experience was noted in participation for research, administration tasks, teaching, prioritisation of education and the educational environment presumably because of increased time outside of work duties.

The main weakness of these studies is that the Danish Standardised Questionnaire (DSQ) although well used throughout the country over this six year period, has never been validated. It also has a number of subjective questions which would be difficult to qualify between participants and in terms of clinical outcome – such as “how do you evaluate/estimate your overall learning outcome during this rotation? Score of 1-9” . In addition, the external factors (such as the consideration of the impact of the EWTD, but also the decreased length in postgraduate training from 18 to 12 months) have not been accounted for in assessing the impact of the new program. The suggestion for the need of a validated tool to assess postgraduate learning as part of the conclusion of this final study is definitely a valid one.
Other reviews have paralleled the Danish studies. A systematic review from the British Medical Journal supports the position that reduced working hours do not adversely affect postgraduate medical training. This review of 72 global studies on reduced hours and outcomes was published in 2011 in the British Medical Journal. The conclusion from this analysis is that reducing working hours to less than 80 per week has not adversely affected outcomes for postgraduate training in the USA. The outcome of reducing hours to within the EWTD hours of 48 hours is not clear from this study. More recent UK only based studies have concluded that traditional models of training and service delivery in the setting of reduced hours dilute the quality and quantity of training. The junior doctors in the UK themselves feel working less hours is detrimental to their training and most (78%) are willing to work more than the mandated 48 hours.

There is conflicting literature, much anecdotal, regarding the impact of decreasing work hours on quality of training and a flow on effect on length of training. It does appear that there is much concern regarding less work hours however, with parallel changes in many countries Prevocational doctor programs simultaneously with decreased work hours, it is difficult to tease out the confounding factors outside of popular opinion.

**2.5 Effectiveness of Continuing Medical Education**

In line with the mandating of medical education, research into the various methods of educational experiences and activities has taken over research into the justification of such education in the last 25 years. Unfortunately the best method or mechanism for providing CME has not been established for any participant group.
Large internal reviews include the 2007 the Agency for Healthcare Research and Quality in USA prepared a report on the Effectiveness of Continuing Medical Education. The conclusion was made that CME was effective, although based upon low level evidence and research. The extensive literature search of 68,000 citations in this report yielded an overall poor quality of literature with the generalised conclusion that live media was more effective than print and that multimedia and repeat exposure were better than single modality and single exposure educational sessions. The challenges identified in comparing studies of various methods and media of continuing medical education lied in the heterogeneity of the studies, their endpoints, their assessment tools and the target populations. Terms used in the variety of studies also continue to evolve and a comparison of computer assisted learning from 2001 to current day would represent two quite different experiences. Also many of these studies failed to provide control rather than comparison groups and very few were randomised to reduce bias. Blinding whilst virtually impossible on an implementation approach in an educational study, would have been feasible from an outcome evaluation analysis however was seldom undertaken. End points such as improving knowledge, attitudes, skills and clinical outcomes are difficult to assess and compare across studies and also to standardise in terms of effectiveness. Furthermore few studies in this collective review measured long term retention or duration of the education concept or reinforcement and ongoing educational requirements. In practical application this review detailed that whilst CME should be a live, continuous interactive education process; identifying the best methods for undertaking this was not possible within the constraints of the literature provided.
2.6 Single modality studies of methods

For Prevocational doctors, a number of learning experiences and opportunities within the clinical environment have been identified. Each of these various experiences and opportunities are single modalities. These include for example; bedside teaching, educational culture of the institution, handovers, the quality of supervision from a clinical teacher, workload, hospital or unit meetings, self reflections and teaching students, and in addition to the clinical role, the adjuncts of block curriculums, portfolios, simulation, mentoring, journal club, logbooks and hybrid online environments. There are a multitude of these educational methods and environmental features that have been described in Medicine, many studies into these methods have focused and targeted on the use of one particular method (a single modality study) and it is these studies we turn our focus towards now.

Bedside Teaching

Bedside teaching and experiential learning is the traditional method of learning occurring during rounds or within work tasks. Many studies reflect this mentality of immersion learning in Medicine. The method of clinical supervision in this learning has been described as either service orientated (as an apprenticeship) or humanistic (reflective practice and nurturing) in surgical experiences. In the UK Foundation doctors felt up to 18% of their learning occurred on ward rounds. This was limited however by lack of time, high patient numbers and decreased team consistency. Whilst multiple factors including location, teacher personality and workload impact upon these experiences the need to integrate both service orientation and humanistic experience is important for optimising the learning within the role. It is suggested that the educational nature of the experience cannot be
separated from the particular teacher providing it or the background and context in which the experience is taught.

The link between educational experience and teacher is further supported by the work of Boor who found that the qualities of the clinical teacher are subjectively associated by the resident with the learning experience; what they were like as a person, physician, teacher, supervisor the relative importance of these being associated with the individual learner.\textsuperscript{58,47,55} Likewise, the educational culture of the institution impacts on the learning experience, competencies, perceived behaviours and support of the staff.\textsuperscript{40,56} Other components of clinical duties that are suggested to improve learning include supervised handovers, which enhance problem solving, presentation and leadership skills.\textsuperscript{59} Mandated monthly reflection on achievement of objectives within an obstetrics and gynaecology rotation was associated with increased numbers of log book procedures and improved achievement of unit learning goals compared to didactic lessons and outlines.\textsuperscript{60} Teaching itself (for example to medical students) is suggested to correspond with a perception of clinical competency \textsuperscript{61}, but the causality of this is not demonstrated.

Within surgical terms, not all rotations have been assessed as similar, with studies on medical students experience on surgical terms highly variable between rotations at different sites and different teams at the same sites.\textsuperscript{62} This reflects the variable and experiential nature of bedside clinical teaching and its opportunistic character. This experience would benefit from supportive structure in such situation to ensure the attainment of educational endpoints and it can be extrapolated that similar structure would impact on Prevocational doctors experience as well.
**Block curriculum and workshops**

Block curriculum (protected one week non clinical blocks of lectures, case discussions, cadaver and skills laboratories) has been suggested to improve knowledge scores in surgical residents compared to a non participant group \(^6^3\) although the very small numbers of participants in this study \((8,8)\) and the focused intervention at one venue limit the generalisability of this research. Intense skills workshops to improve resident confidence in performing bedside tasks or relevant clinical duties are limited in terms of follow up for duration of this confidence and its translation to clinical accuracy.\(^6^4,6^5\) Some studies have demonstrated poor participant satisfaction with the amount of available learning in environments separate to the clinical workplace.\(^6^6\) In this study which assessed skills courses, teaching seminars, printed material and research opportunities; surgical training junior staff significantly rated a poor satisfaction with what was provided by the hospital environment in comparison than medical specialty junior staff had and a corresponding request for more teaching required. This suggests not all Prevocational experiences are the same and may be associated with the particular placement specialty.

The role of the journal club in increasing a resident’s ability to read critically and understand statistics was evident, but did not correlate with increased pursuit of journal reading when compared with those residents who did not attend such events.\(^4^4,4^8\) Much like research however, it may encourage an exploring and questioning nature towards other aspects of work.

**Mentoring**

Mentoring (as distinct from assessment) has been suggested to provide the benefits of role modeling, networking, coaching, ‘sounding board’ and supportive
challenge.\textsuperscript{67} Despite this theory one study which randomised 45 surgical trainees to learn in a self-directed role or from a mentor failed to show a difference in skill acquisition. There was however a difference in the trainees’ perception of the experience even if that did not correlate with acquired skill.\textsuperscript{68} Although small numbers, this may suggest the importance of the cognitive interaction and mentoring which may only be shown over longer time periods or with more complex tasks.

\textit{Online learning}

Hybrid online environment was also evaluated and resident involvement was found to be highly dependent on faculty encouragement.\textsuperscript{69} Other uses of online supplements included a trainee logbook, where analysis of admission diagnostic accuracy was found useful for generating data regarding individual resident knowledge deficiencies and encouraging self-assessment and targeted learning.\textsuperscript{70} Portfolio is another educational activity that may be based online. The use of portfolio was thought to have theoretical educational merit by trainees and trainers in one UK study however the educational value was actually consistently rated “low” and described as burden by participants.\textsuperscript{71} Although satisfactory survey participation rates of 60\% were achieved for this study, the gender distribution of participants of 40\% male is not clarified as representative of the population that was surveyed and hence may be a significant confounder.

The main issue in terms of analysing various single education method studies is, as found by the Agency for Healthcare Research and Quality in USA,\textsuperscript{52} is the difficulty in comparison between studies with varied end points assessing such different aspects such as professionalism, communication or technical skills of what is a multi-faceted profession rather than a simple trade. Whilst many of the articles
and research discussed above show benefits it is difficult to make direct comparisons or rankings. Furthermore research into these methods often report case series data only or data without randomisation or blinding. These issues put into question the reliability and reproducibility of these studies and their representation of the actual experience of learning in continuing medical education.

Another significant concern of these studies is that the follow up for the educational impact of such interventions is seldom longer than 6-12 months making the application and outcome of such interventions tenuous at best extrapolation. Although it is understandable that there would be many difficulties and confounding variables in prospective long term or career long impact studies of one educational experience, longer term studies looking back retrospectively have also not been undertaken.

2.7 Multi modality studies of methods

As demonstrated within the discussion of single educational method studies, comparison of the outcomes and endpoints of different methods is obviously challenging and a limiting factor in their application. A few studies have looked at a multitude of various experiences simultaneously (Multi-modal studies) to attempt to qualify the experiences, including two Australian studies and one regional local study from Malaysia.\textsuperscript{2,72,73} Studies into educational experiences in the medical workforce tend to take place from one of the three perspectives, the cohorts of consultants, those in specialist training programs and Prevocational doctors as noted within the multi-modal studies. It is likely this represents the different educational mandates for each group in addition to the various educational mandates and goals
such groups may have, such as a new skill acquisition for those in specialist training programs compared to knowledge maintenance for consultants.

Two Australian studies have looked at a multitude of opportunities and methods for learning in the medical environment. Examining Prevocational doctors and Emergency Department (ED) physicians respectively, these studies used Likert scales of perceived adequacy of exposure and usefulness, future desirability and participation rate for a list of methods. Participation rates in both surveys were markedly different for similar questionnaires, with 18% in the Prevocational study and 58% in the ED physician study. Whilst some of this discrepancy may have arisen from motivation to participate (ED consultants were provided College training credit for completing the survey), it is possible that the distribution of the questionnaire to Prevocational doctors through an intermediary may have limited the number of surveys that reached the target audience.

Each study however developed such a questionnaire and list by single group work based upon a concept of “common” methods. The Prevocational study identified fourteen different methods, whilst the Emergency Physician study looked at seventeen methods. Whilst some overlap exists between the two tools (such as hospital grand rounds and the College meetings), other methods are either specialty specific (including the Australian College of Emergency Medicine Maintenance of Professional Standards (MOPS)) or training level specific (for example contact with registrars by Prevocational doctors) and some incongruencies in the number of options arose from the separation of such methods as the more general “on the job” learning in one study to the specific registrar or consultant informal teaching in Dent et al. With the difference in participation rates and demographics of participants in
the two studies there was variation in perception of similar education methods. While both groups rated such methods as informal on the job learning as very useful on a four point Likert scale (70% Prevocational and 72.8% ED), simulation was rated as very useful by 65% of Prevocational doctors but by only 32.6% of ED consultants.

The lack of uniformity in the lists of opportunities provided in these multimodality studies are a limitation in identifying an applicable list of methods for ongoing studies. In addition, the variation in response priority for different opportunities noted in the works of Dent and Weiland also highlights the need to establish a particular set of methods for use for the target population of the study, be they specialists or Prevocational doctors.2,73

A 2007 Malaysian study72 of a variety of clinicians (50% General Practice, 14% Surgeons, 12% Physician and 2% Prevocational with the remainder unspecified) showed a much shorter list of CME opportunities which included local conferences, pharmaceutical talks, overseas conferences, conferences organised by pharmaceutical firms, internet-based medical education, sales representatives and advertisement or announcements. This list of opportunities was validated by five clinical practitioners for clarity and appropriateness however the gaps are evident when compared to the opportunities listed within other studies,25 and hence appears to be a major limiting factor in analysing this study as an encompassing multi modal evaluation. In terms of outcomes the authors tried to look at what the clinicians felt impacted their practice however identified the limitation of not evaluating what took place in actual practice in their conclusion. This study, like those of Dent and Weiland, found discrepancies in just the few experiences listed based upon the demographics of the participants with statistical significance in the number of GPs ranking medical society newsletter
articles higher in importance than non-GPs, while non-GPs ranked overseas conferences more highly.

These three studies from the local region highlight the difference in the relative rankings of educational activities between qualification level of participant and also between different medical specialties, supporting the need for a targeted list for the particular interest cohort that is being studied.

The following section of the literature review now looks specifically at studies targeting the qualification subpopulations to determine the strengths and identify deficits in using these three groups (consultant, specialist trainee and Prevocational doctor) as study participants. One important consideration is the mechanism of provision of education; at the very different targets of Prevocational, specialist training and the vocational level. While participating as an examiner for postgraduate courses is appropriate for specialists, it is perhaps not the best educational activity for a Prevocational doctor.

2.8 Studies from perspectives of consultants

Consultants are those doctors who have completed their specialist training and in Australia are registered with a Fellowship of an associated College of Practitioners (such as the Royal Australasian College of Surgeons). These Colleges within Australia universally have programs of continuing medical education mandated and as such have ready populations, enforced to participate, which can be examined and evaluated in studies.

Studies looking at continuing medical education from a specialist level tend to evaluate the individuals ongoing participation, what is enjoyed or holds interest and
perceived benefit of continuing medical education. Such studies are often undertaken by specialist Colleges to provide information on services they can provide and areas to develop. The potential for extrapolating such studies to Prevocational doctors however is limited. A consultant is at a different point in skill and knowledge development. They have already acquired the basics and instead the focus for them is at refining and expanding such skills and knowledge, instead of obtaining the same skills and knowledge as a Prevocational doctor.

2.9 Studies from perspective of trainees within programs

A trainee within a program, much like a consultant, has a group of educational activities, often a much more specific and predetermined set than that of the consultants, mandated by the Colleges. They are difficult to compare to Prevocational doctors for a number of reasons. This may be because their educational programs are often more defined and controlled, the participants have external loci for motivation, such as specialty exams, exams which also serve as ready end point measures of their educational experience in training. All of these factors are missing in the Prevocational cohort because they do not have the same mechanisms in place.

A number of studies exist looking at various educational experiences for surgical trainees with a particular focus on simulation and the learning of craft skills such as suturing or laparoscopic skills and on the role of mentorship and supervision. These studies are difficult to extrapolate to the Prevocational doctor as the skill set they are evaluating are usually not required of the Prevocational doctor on the team. Despite this the outcome of these studies suggest benefit to skill acquisition rates with the use of simulation in comparison to often more restricted and potentially slower skill acquisition on patients. There are little long term outcome measures to
compare these craft skills and any differences between those acquired by simulation or in traditional practice. This is understandably difficult to quantify given the confounding variables around the particular skill acquisition such as variable case exposure both in number and complexity.

2.10 Studies from the perspective of Prevocational doctors

Prevocational doctors, unlike doctors affiliated with Colleges, have less stringent medical educational activities requirements in Australia. These are broadly policed by the national registration board and also by employing hospitals to varying degrees and in the last few years tend to follow, the Australian Curriculum Framework for Junior Doctors.

This group of doctors is a popular focus in recent years in Australian medical literature as they expand in the workforce as a result of increased medical student numbers. The educational exposure of this group is unique in that motivational factors are often required to be more intrinsic, without the motivation of Fellowship examinations or the College mandate. The group have most recently completed more structured formal learning in medical school than either trainees or consultants by virtue of specialization pathways. It is these unique factors that make the study of their educational experience interesting, and compounding that interest is the political nature of their expanding numbers and voice for their own education and future careers. This also provides clear justification for the viewpoint taken and significance of this current study.

2.11 Education evaluation tools

Many studies that evaluate educational experiences use survey tools and specially designed environment questionnaires to evaluate the educational experience. The use
of such tools and surveys is limited however in terms of outcome measurements. This may include various end points. A number of attempts have been made to establish tools to measure the educational climate of the workplace. There are a number of such tools that have been developed in the last fifteen years. These tools allow assessment of the learning environment and various opportunities in a particular role so that deficiencies and barriers may be overcome.

In Medicine, these tools include the 2005 Postgraduate Hospital Educational Environment Measure or PHEEM. This 40 point instrument was developed using Delphi process and grounded theory to quality assess training provision for the target population of junior doctors. The original data set of 180 points was reduced twice through the use of literature review and a focus group to create the final 40 point instrument which were to characterise three subscales of the clinical environment which were perceptions of role autonomy, perceptions of social support, and perceptions of teaching. The Delphi process described in the original work of Roff in 1997 in developing the Dundee Ready Education Environment Measure or DREEM was however a series of expert meetings rather than the originally described Delphi method of repeated rounds of conversation and analysis. Further to this the work of Boor calls into question the use of the three subscales with their repeat implementation of the PHEEM and analysis showing construct validity for one dimension only, not three, using two different statistical methods. Nevertheless, PHEEM has been widely used and validated in a number of clinical settings and languages and further modified by other authors to create other tools such as the STEEM (Surgical Theatre Educational Environment Measure).
STEEM aimed to assess the operative theatre learning environment for surgical trainees, a different group of participants that the Prevocational doctor. STEEM was developed based upon the Clinical Learning environment inventory, PHEEM, an anaesthetic theatre education environment measure and through semi-structured interviews conducted with seven surgeons and four surgical trainees. This was then validated by a group of respondent participation of surgical trainees in the local training program at that time (25/26 participants) and through comparison with other tools available at the time, giving content and internal validity. However, the relationship to other variables and the outcome and consequences of the learning environment are not discussed, and hence limit the outcome analysis of STEEM, in terms of external validity and reproducibility.

In an attempt to better characterise postgraduate learning environments in the shadow of PHEEM, Boor created D-RECT a measurement tool based upon the interacting domains of work, training and individual resident needs that contribute to the learning environment. This is a 50 item questionnaire with 11 subscales which was tested with doctors within specialty training programs in the Netherlands. Admitted short falls were the low participation rate (26%) and the overrepresentation of residents input over the specialist panel input, however the generalisability studies undertaken and the reliability between components were thoroughly assessed to a much greater degree than the other tools discussed earlier.

It would appear that a balance between the postgraduate doctor targeted D-RECT and PHEEM and the surgical targeted STEEM would be necessary to assess the target population of this current research, however the target populations are not the only variance between the available tools in the published literature. Additionally
the question format and scale structures are variable between tools from a five scale agree to disagree on “enjoyment out of my job” to the five scale do not participate to always participate in various CPD methods. The disparity in the variables these scales assess; varying degrees of agreement, participation, desired availability and usefulness, suggests it is not clear in the literature which variable should actually be measured. Additionally while some tools appear to measure simultaneous job support, workload and mentorship (as in STEEM) other tools measure these variables separately. It is not clear if a question on workload represents autonomy or mentor support in combined tools. D-RECT did attempt to counteract this with the development of subscales (supervision, coaching and assessment, observation forms, teamwork, peer collaboration, professional relations between consultants, work to resident’s competence, consultant role, formal education, role of the tutor and patient sign out). The relevance of all such subscales outside of the Netherlands is not as clear; for example the use of miniCEX (Mini Clinical Exercises) were the only points included under observation forms, a section which may be rendered redundant in some venues. Likewise the separation of consultants’ role and tutors’ role which are often one and the same in Australia, would be confusing should this tool be implemented in Australia.

**2.12 Frameworks for tools**

When this research began no specific conceptual framework upon which to base a study of the educational methods and environment existed. The many tools described above form a heterogenous group of instruments, proposed in Schoen-Adams study to be so heterogenous because of a lack of framework upon which the tools were based. Schöen-Adams and colleagues have examined published medical
education environment measures and mapped them back through other instruments to two existing frameworks of Moos and Murray. Moos’ framework defines three domains as the key elements of human environments: personal development or goal direction, relationship and system maintenance - system change dimensions. The variables from nine medical education environment instruments were able to be mapped onto the proposed framework either directly or as a combination of these three domains. The link was also made between this framework and the respected notion of communities of practice within the medical field of work. The suggestion is made in Schõen-Adams’ paper that the application of three separate domains when trying to understand and measure educational outcome is the most encompassing method and should be considered when designing new tools.

2.13 General Limitations of literature

One important limitation that the researcher has noted through the literature review is an inherent inability of these studies to assess the long term consequences or outcomes of the learning environment beyond the participants’ perceptions at that time using many of these tools. The tools generally assess the participants’ (for example postgraduate doctor) needs, feelings and experiences at the current point of time, without reflection on the consequence from a learning point of view of such an experience. Specifically, no studies appear to have been undertaken examining the consequential validity of the instrument, and none has reported of resultant improved educational environments or unintended positive or negative effects. Consequently this current research attempts to move away from the participants’ point of view encouraged by the use of instruments such as PHEEM and STEEM. Instead, it aims to look at those who have already completed the experience in full and may be better
able to comment upon the educational experience using the proverbial “retrospectoscope” which best led to their own end point of a Prevocational education.

2.14 Conclusion

Prevocational doctors have a poor experience traditionally in a service provision role and ongoing in surgical terms specifically. Although lacking evidence, the general consensus is one of concern regarding the impact working hours has on the educational opportunities of Prevocational doctors. The scene is now set of an urgent and impending need to describe and enhance education for an increasing number of Prevocational doctors working in surgical attachments. While evidence exists regarding various educational opportunities for Prevocational doctors, the literature search has demonstrated that little/no discussion has taken place from either a surgical point of view or from the point of view of a supervisor/practical expert. Although there is support for many different educational methods and tools, the literature also fails to demonstrate one method or educational opportunity as superior to another, and furthermore, what combination or balance is required. Even how to best assess the opportunities against each other and in what balance they should exist to support established curriculums is not clear. This provides clear justification for this research and to address the research questions.
Chapter Three: Research design and methods

3.1 Introduction

This chapter describes the design of the research and briefly the background of qualitative research. It discusses the framework for the research study and importantly the context of the research and positioning of the researcher within the work. This chapter then describes the methods used in conducting this qualitative research. It describes in detail the method and guide used for interviewing and the details of recruitment. This is followed by a description of the method of analysis and coding used to generate categories and themes for answering the research question.

3.2 Research question and design

Planning a methodology requires initial consideration of the research question to be answered. It is the objective of this research to explore the opportunities available to Prevocational doctors in Surgery, hence the thesis will address the following questions:

a. What are the educational opportunities available for Prevocational doctors undertaking surgical rotations?

b. How do surgical consultants in Western Australia perceive their own, current and future educational opportunities?

c. How and what can do done to improve educational experiences?

The research question and purpose described encompasses two main components: new concept generation and then subsequent discussion of a surgical specific educational opportunity tool or methods list based upon this concept generation, using a qualitative approach.
3.3 Qualitative research

Qualitative research “…is the study of things in their natural settings, attempting to make sense of, or interpret, phenomena, in terms of the meaning people bring to them”. In this case it is the study of a set of educational experiences from the perspective of a particular group. The group of surgeons are unique as they have previously been Prevocational doctors and now supervise (mentor) Prevocational doctors during their surgical attachments. Qualitative research was chosen because of the exploratory nature of the questions to be asked. A paucity of related literature meant that targeted quantitative research may miss some under researched contextual factors or fail to detect subtle yet important keys identified by the use of qualitative research methods.

The most commonly used qualitative methods include participant observation, in-depth interviews, life stories, archival studies and focus groups. The data from qualitative research generated include field notes, audio (and sometimes video) recordings, and, as in this study from interview transcripts.

In-depth interviews

An in depth interview is a method for obtaining rich qualitative data. While sometimes used in conjunction with observation it is more often used in isolation. Literature suggests there are twelve features of qualitative in depth interviews. These are described as; reflective of the life world, focused on meaning, qualitative in nature, descriptive, specific, deliberatively open and explorative, targeted, open to ambiguity and change, sensitive, aware of the interpersonal situation and a positive experience. There are many examples of in depth interviews used in medical education literature. The limitations of in depth interviews include the lack of generalisability of results, difficulty of replication and interviewer bias.
Additionally the occasional spontaneous question makes the answers difficult to quantify and analyse, particularly in any attempts at quantitative analysis.

**Current Study design**

When planning this methodology it was important for this research to bring the perspective of the surgeons to the fore. This voice was one that had not been considered previously and could add potentially varied and rich insight to the bank of information already held in the medical education literature. In depth interviews often use open-ended questions which have the ability to evoke responses that are both meaningful to the participant, unanticipated by the researcher and explanatory in nature. Another advantage of in depth interview methods is that they allow the researcher the flexibility to probe the initial participant responses for further information and details.

There are a number of other studies which have used qualitative interviews in similar medical education research.\(^\text{32, 90}\)

Wakeling et al has looked at the experience of nurses, consultants and foundation doctors in Scotland in their foundation years program.\(^\text{32}\) These interviews were conducted face to face (predominately although exact numbers were not available and some interviews were conducted by telephone). Two researchers coded a sample of transcripts separately and a coding framework was jointly agreed to ensure consistency. However, while one researcher coded nurse and consultant interviews, the other coded foundation year doctor interviews. The different groups were also asked questions from different interview frameworks and as such it may be that the codes generated and information gained may have been partially distorted to fit codes from the alternate interview population. With this in mind it is important to
attempt to have some uniformity in coding approach which was achieved in this current research through the use of one initial coder.

Sharma et al investigated the decision process around introducing new surgical techniques and technologies with semi-structured interviews of six participants, including surgeons. Using a preexisting conceptual framework, the transcribed interviews were analysed using a modified thematic analysis of the data in three steps; open, axial (using software Nvivo), and then selective coding related back to the original framework. Using the initial framework as the final themes however limits the exploratory nature of the research. Coding is not just labeling, it is linking to an idea and then a category. Predetermining the categories for discussion limits the exploratory nature of the research to the pre-existing conceptual framework. In this study this is acceptable, however, in other studies pre existing conceptual frameworks may not exist.

**3.4 Framework**

As described earlier educational tools and frameworks are generally applicable but lack specificity and equivalency. Rather than to begin with these frameworks, this research based its development upon the information discovered in parallel analysis of the literature and interviews. This allowed for improved discovery and less constraints. The framework that this method was based on was founded in maximising exploratory discovery in the interview process. The use of time variables in the interview outline was key in enabling maximisation. Asking about past, present and future methods and experiences was thought to maximise the data obtained from the interview participants without the risk of constraining the information within a pre-established framework.
3.5 Method approach

The first component of this research searches to establish a list of educational opportunities for Prevocational doctors in Surgery. Many studies, have generated similar lists, as discussed, however with inconsistent groupings, specialty specific inclusions and variable endpoints (i.e. enjoyment).\textsuperscript{18,61,68,73} A list generated from a surgical point of view however is lacking in the literature. It was also noted that most lists do not take into consideration the views of those who have passed through the experience, in particular consultants’ views of their own personal Prevocational training.

It was considered that incorporating information from practical experts (a specialist having experience in the field, rather than largely academic knowledge), with research papers and publications, would enable the generation of an encompassing list of opportunities to evaluate. The methods chosen to develop such a list were in depth semi-structured interviews and literature review. As well as providing multiple sources of evidence,\textsuperscript{91} these methods of data collection are in line with the qualitative nature of the data source and the exploratory nature of the research question. It was felt that in depth interviews would garner the most information from the consultants who would appear to be an untapped resource as to the educational experience of Prevocational doctors. The researcher felt that the consultants’ learning experience is still valid and that the historical background of considering the experience of those in the preceding 10-40 years is worthwhile for the variety of information it could provide. The surgeons’ experiences have been validated in terms of outcomes, in that the surgeons interviewed obviously managed to progress through the Prevocational period, albeit during a different era.
To maximize the information obtained, a model of questioning had to be developed which was encompassing as well as specific to the research questions. The time model (asking about “when you were a Prevocational doctor” “current Prevocational doctors” and “in the future”) was intentionally generated by the researcher in an attempt to garner the most encompassing possible list that could be created by these participants. It provides a basis through which to explore past, present and future educational experiences because of this unique questioning format in the interviews. The data set was maximised by the temporal sequence of topic discovery.

3.6 **Context of research and the researcher**

In qualitative research in particular, the setting of the research, its participants and the researcher are all variables which impact upon the outcome of the study.\(^{83,84}\) It is important that the context is clearly and adequately described so that the research is properly understood in regard to the phenomenon being studied. Likewise, qualitative theory questions the researchers’ objectivity, arguing instead that researchers have their own reasons for choosing the type of research and they also have a level of involvement rather than impartiality with the research and the research subjects.\(^92\) Because the details of the researcher (and the participants and setting of the study) have this impact on understanding and indeed influence the collection and analysis of data it is imperative to provide some context behind all of these components. Whilst the participants will be discussed separately the principal researcher’s positionality will be briefly discussed.

The principal researcher already exists as part of both groups within this research. As a surgical specialist trainee, she had recently been a Prevocational doctor and is
working towards becoming a surgical consultant. This allows a unique perspective, upon both groups. Whilst no longer being a Prevocational doctor allows some impartiality and hence openness when discussing Prevocational doctors with surgeons, being a trainee is familiar and close enough to both the surgeon and the Prevocational doctor’s role to encourage a sense of shared experience and detail in the interviews. Many of the participating surgeons had worked with or were familiar with the researcher within a surgical context prior to the interviews. This rapport and openness was an asset to collecting rich data and obtaining and encouraging deeper responses from the interview participants.

The researcher does need to acknowledge the impact they have on the study and interpretation of the same and it is foolish to believe that someone integral in data collection, data analysis and data interpretation does not have an impact on the research, particularly when so closely associated with the target populations. An important technique for the identification and separation of this impact is bracketing. This relates to the separation of self and previously held ideas and assumptions from the research at hand. In this research this was achieved through an early and ongoing mind map creation of “post –it” notes. This was used to map the researcher’s own ideas on learning as a Prevocational doctor prior to commencing the study and also to challenge interpretations of connections. A second tool was a challenge worksheet created whenever developing new ideas and patterns. Based upon a cognitive behavioural therapy worksheet this allows identification of possible alternate answers and explanations from alternate view points and forces separation of a researchers own opinions from what is being developed from the research.
The researcher’s interest in educational research came about from an enjoyment in teaching medical students and Prevocational doctors. This led to an attempt to develop a surgical portfolio for Prevocational doctors at one hospital site, who were lacking direction in their study paths. However, upon investigating the components to include in the portfolio, it became apparent that there is a lack of literature as to which educational experiences were the most valuable. This bore the current research to light.

3.7 Participants and recruitment

Participants were recruited by email invitation through two sources; one at a private hospital and also through the University of Western Australia affiliated School of Surgery (Perth public hospitals). Participants were provided with an information sheet, consent form and data collection form (see Appendix 2) prior to embarking on the interview. Recruitment was in two phases with a second recruitment phase performed to expand and validate the analysis of the first five interviews. The initial five interviews were conducted in a three month window and the following five interviews in a three month window a year later. Sample size was determined by saturation, with parallel transcription and analysis taking place to identify completeness of themes identified.

The target population for this study were active surgical specialists practicing within Western Australia (approx 350 individuals from 2010 practice data). This population is approximately 92% male, work predominately in the metropolitan
region (>90%) and has the age and subspecialty distributions as indicated. (Figure 3)

**Age profile**

**Western Australia**

Table 3.1: Age profile of Active Western Australia Surgeons by Specialty

<table>
<thead>
<tr>
<th>Age Group</th>
<th>CLR</th>
<th>GEN</th>
<th>NEU</th>
<th>ORT</th>
<th>OTO</th>
<th>P.A.E.</th>
<th>PL.A.</th>
<th>URO.</th>
<th>V.A.S.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;45</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>3</td>
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<td>0</td>
<td>3</td>
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<td>1</td>
<td>13</td>
</tr>
<tr>
<td>45-64</td>
<td>1</td>
<td>11</td>
<td>2</td>
<td>14</td>
<td>4</td>
<td>1</td>
<td>7</td>
<td>2</td>
<td>2</td>
<td>46</td>
</tr>
<tr>
<td>65-74</td>
<td>1</td>
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<td>2</td>
<td>8</td>
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<td>10</td>
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<td>7</td>
<td>70</td>
</tr>
<tr>
<td>75+</td>
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<td>10</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>6</td>
<td>1</td>
<td>6</td>
<td>62</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>105</td>
<td>17</td>
<td>36</td>
<td>12</td>
<td>8</td>
<td>34</td>
<td>22</td>
<td>20</td>
<td>246</td>
</tr>
</tbody>
</table>

*Active Practitioners - Data from 2010 College MBS report*

**Figure 3: Demographic representation of surgical population by age and specialty in WA**

The full demographic details of this population are available through the Royal Australian College of Surgeons and the recruitment was wide to attempt to achieve a representative sample population. Recruitment involved:

1. Email recruitment to the surgeons at the UWA School of Surgery and St John of God Hospital (SJOG)
2. Flyer recruitment through theatres at SJOG Subiaco (private hospital) and Osborne Park Hospital (Public Hospital)

**3.8 Interview instrumentation**

Interviewing is a popular method in both qualitative and health related research. In depth semi structured interviews were undertaken in this research, allowing detailed answers to be obtained. In depth interviews are closely associated with the inductive methodology and allow flexibility, response to and clarification with the participants. They also were supported by the characteristics and access to the
participant subjects in this research. The interview settings were framed within the surgeons own work day (in offices or theatre tea rooms) to facilitate attendance. The information to be gained did not have a personal or private context and so was suitable to be obtained in such a public forum.

Semi structured interviews have been used successfully in other studies within both the health and educational fields. This includes studies on nurses’ workplace experience and studies on patients and doctors views on health education and management. As described by Hansen, the semi structured interviews conducted within this research did often include response or interest from the interviewer, long pauses, varying lengths and a natural flow conversation style. The questioning was flexible to the participant with specific questioning about personal experiences of Prevocational education (past, present and future) using open questioning techniques. The primary researcher undertook the interviewing and transcription process for the primary purposes of subject immersion, however, the benefit of language and social connection (being a surgical trainee interviewing surgeons) also allowed more open discourse and engagement.

The questions were developed within an interview guide which was printed and taken to each interview. (Appendix 2) The decision to ask participants about past, present and future methods was to ensure that all possible methods the participants could think of would be discussed rather than the participants focusing on what the participant currently offered or what they had been exposed to in the past. This chronological or temporal method for discovery was developed as the most encompassing and inclusive for methods of identification of educational experiences.
The questions were intentionally open ended such as “tell me about...” to encourage a discussion of the topic and also to subsequently probe answers given.

3.9 Procedure and recording

Interviews were conducted by one interviewer using a printed interview guideline and personal tape recorder for recording after consent was obtained. Reliability was improved by audio recording the interviews. Audio recording provides not only an accurate narrative but also intonation and nuance meanings. A small personal tape recorder was used for ease of transport and the advantage of size on the obtrusive nature of being recorded. Full transcription of these recordings were undertaken within 24 hours of the interviews thus maximising the recall of the information gathered.

3.10 Processing and analysis

Content Analysis “attempts to characterise the meanings in a given body of discourse in a systematic and qualitative fashion” and was thought to be too tightly constrained for the exploratory nature of the research question. In light of this, coding was undertaken in an iterative and inductive manner using qualitative coding software Atlas.ti version 6.0 (ATLAS.ti was developed as part of the ATLAS Project (1989-1992) at the Technical University of Berlin). The transcripts were read multiple times prior to coding and a word frequency analysis was also concurrently performed to identify patterns which may have been missed in the reading. This technique is as suggested by LeCompte where a word count is used to provide evidence for categories created and to determine contamination of observations. The process of coding and identification of categories was based upon the method
described by Grbich\textsuperscript{98} and advocated by Hansen.\textsuperscript{82} To reduce individual bias and assumption the researcher chose to read widely. In addition a second coder reviewed the interview transcripts to enhance inter rater reliability. This was decided given the contested nature of using sole inter rater reliability in qualitative research.\textsuperscript{101,102} Saturation was determined when two consecutive interview transcripts failed to generate any new concepts or ideas although these further interviews encouraged a richness of the data source.

Coding analysis was undertaken after multiple readings of the interviews to identify repetitive concepts. Coding was undertaken in parallel with the interview process. A content analysis word frequency analysis was also undertaken (excluding pronouns and conjunctions) and words presented on more than fifteen occasions (i.e. an average of three times per interview) were qualitatively examined by the primary researcher. The produced coding was combined with the word frequency analysis and was further cross tabulated to generate themes. Theme is a term sometimes used to describe an integrating, relational idea from the data.\textsuperscript{103} For these categories to become themes of useful analysis rather than simple categories, a number of criteria need to be addressed.\textsuperscript{104} Firstly they need to communicate meaning to the reader, without considerable explanation, a meaningful summary or model. They should also be examined comparatively in relation to variables. In this study’s example such variables as age, gender and speciality of practice, looking at both use and absence of each theme are required. An analysis of themes should also be related to other similar measures, scales and frameworks. The ensuing results and discussion sections will address these points.
3.11 Rigor

Qualitative research, because of its nature of analysis of the spoken or written word, lends itself to issues with reliability and validity because of the ambiguity of word meanings and variable definitions. Instead, qualitative research evaluates such features as credibility, fittingness and confirmability.\(^{105}\) It is important to address these issues as much as possible to support the value of the research.\(^{93}\)

Reliability in coding is enhanced by factors such as stability, inter-coder reproducibility and accuracy.\(^{106}\) Stability refers to the consistent coding of the same text reproduced over time. In this study, stability was noted. This was undertaken as the primary coder reflected back over the initial five interviews after the second set of interviews were undertaken 18 months later. Stability is however thought to be a relatively weak reliability factor as it relates to a solitary coder only. Reproducibility was noted with a second coder reviewing the first five interviews and agreeing on the coding and classifications that ensued. Coding may be considered more accurate if automated, however automated thematic coding has problems with disambiguation; with automated syntactic coding often producing errors on complex sentences or needing new reference dictionaries established.\(^{106}\) For this reason, despite the labor issues of manual coding, this was chosen for the relatively specialized field and hence specialized language, used in the interviews.

Semantic validity exists when others who are familiar with the language examine lists of words placed in the same category and agree that these words have similar meanings or connotations. This form of validity was addressed by reflecting back with the initial five participants. This group reviewed a list of educational
opportunities and agreed on the encompassing nature of the list. This also imparts credibility to the study in terms of this accurate reflection with the participants.

Auditability is demonstrated by the accurate and detailed description of the process, interviews, and analysis so that replication if desired and auditing may take place by an external party. Additionally, fittingness, a measure of quality in qualitative research is shown by demonstrating acceptance of the findings by the medical education community through successful peer reviewed publication (Appendix 3). The application to areas outside of Western Australian surgeons however may be lacking given the targeted nature of participants involved in this research on Prevocational doctors.

3.12 Ethical consideration

Applications to and approval from ethics committees were undertaken via the University of Western Australia (UWA), National Ethics Application Form (NEAF) for the Royal Australasian College of Surgeons (RACS) and National Health and Medical Research Council (NHMRC) for recruitment. A modification to ethics at UWA and RACS recruitment and time extension were both approved. The research itself impacted on participants’ time only without negative psychological or personal impact and confidentiality was maintained through the use of secure storage of transcripted interviews and coded transcription and individual consent was obtained for participation (see Appendix 2).

3.13 Conclusion

Qualitative research is well suited to exploratory questions about health, medical practice and education such as the research question about educational opportunities
for Prevocational doctors in Surgery. Exploring questions and issues directly with participants and tying this data source back with the literature allows the development of a rich and new field of information. The researcher, immersed in both the studied population (surgeons) and the studied topic (Prevocational doctors) is in an ideal situation to comment, integrate and explore these issues, adding to the trustworthiness of the research.

This chapter has clearly described the method and process of research around the interviews conducted. It covers the recruitment, interview process and technique and transcription. This chapter also describes the coding used and method of generating such codes and addresses issues of validity and reliability around these methods.
Chapter four: Patterns and themes – a dialogue of the results

4.1 Introduction

Ten interviews were conducted with surgeons and the resulting analysis is discussed in this chapter. The participants themselves are described in terms of demographics and representation of the larger surgical population in WA. The results are then discussed. Initially the coding and grouping is explained and then the six themes generated from this coding are reviewed at depth with examples from the interviews.

4.2 The participants

Ten interviews in total were conducted of participants representing the surgical population in Western Australia. The recruited population was targeted to ensure a degree of representation of the larger population. Specifically, the group were 90% male and 100% metropolitan practicing. The collected age ranges were broadened in comparison to the bracketing published by the Royal Australian College of Surgeons within their surgical workforce data from five year brackets to ten year brackets in the data collection form (Appendix 2). This was undertaken in the data collection to improve participant anonymity in a relatively small population base, given that many of the breakdown components within the workforce publication data have five or fewer members. The age range of the group was matched with the surgical population at large (8 participants across the peak age groups that represent >80% of the surgical population and 2 from the older 55-65 age groups representing 20% of the larger population). Furthermore, the specialty of practice represented the population at large with the two most populated specialties of General Surgery and
Orthopaedic Surgery representing 70% of the interviews. Subsequent participants were targeted in recruitment to broaden the representation of various surgical subspecialties (including Urology, Gynaecology and Plastic Surgery), however the age of the further recruited population remained static and similar to the surgical population in WA and the age brackets between 35-44 and 45-54 being the most frequently represented. The region of practice was 100% metropolitan due to issues with accessing rural and remote surgeons for interviewing.

In tabulated fashion below is demonstrated the age, sex and specialty of practice of the ten interview participants (Table 1). Due to the small representative populations these participants have not been further stratified to include the specialty of practice for risk of compromising anonymous participation.

Table 1: Interview participant demographics

<table>
<thead>
<tr>
<th>Participant code</th>
<th>Participant age range (taken from data collection form)</th>
<th>Participant sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>DJ</td>
<td>45-54</td>
<td>M</td>
</tr>
<tr>
<td>IO</td>
<td>55-64</td>
<td>M</td>
</tr>
<tr>
<td>CR</td>
<td>45-54</td>
<td>M</td>
</tr>
<tr>
<td>QW</td>
<td>35-44</td>
<td>F</td>
</tr>
<tr>
<td>MS</td>
<td>45-54</td>
<td>M</td>
</tr>
<tr>
<td>SM</td>
<td>35-44</td>
<td>M</td>
</tr>
<tr>
<td>TM</td>
<td>35-44</td>
<td>M</td>
</tr>
<tr>
<td>AV</td>
<td>45-54</td>
<td>M</td>
</tr>
<tr>
<td>JK</td>
<td>55-64</td>
<td>M</td>
</tr>
<tr>
<td>FW</td>
<td>45-54</td>
<td>M</td>
</tr>
</tbody>
</table>
4.3 Frequencies and grouping

Coding analysis was undertaken after multiple readings of the interviews to identify repetitive concepts. Subsequently, a content analysis word frequency analysis was also undertaken (excluding pronouns and conjunctions) and words presented on more than fifteen occasions (i.e. an average of three times per interview) were qualitatively examined. These frequent words were cross tabulated (Table 2) with the coding analysis of concepts within the interviews and further developed into six overriding themes which served to encompass all concepts and ideas expressed. The six main themes identified were taking responsibility, self directed learning, changing workload and hours, formal teaching methods (rounds, courses, and meetings), peer support and undertaking research.
### Table 2: Coding and category mapping

<table>
<thead>
<tr>
<th>CODES</th>
<th>Ownership Rounds</th>
<th>Online learning Solo Motivation</th>
<th>Shift hours Workload</th>
<th>Courses Hospital Objectives Meetings</th>
<th>Feedback Mentorship One on one Peer support</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Frequent WORDS analysis</strong></td>
<td>Management Patients Our Responsible Involved</td>
<td>Know Interested Competency</td>
<td>Hours Working Years Theatre Time Practical Opportunities Hard</td>
<td>Education Exam Formal Program Students Tutorial Training Teaching</td>
<td>Culture Talking Discussion Feel Feedback Mentor Consultant</td>
<td>Research Article</td>
</tr>
<tr>
<td></td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>=</td>
<td>=</td>
</tr>
<tr>
<td><strong>Category</strong></td>
<td>Personal responsibility</td>
<td>Self directed learning</td>
<td>Workload and hours</td>
<td>Formal teaching methods</td>
<td>Peer and mentor support</td>
<td>Research</td>
</tr>
</tbody>
</table>
4.4 Themes

In this section each theme is discussed separately and illustrated with quotes from interviews.

4.4.1 Taking Responsibility

A common theme identified by all participants was that of learning through taking responsibility from autonomous practice and participation.

“... and I don’t think that any amount of tutorials or lectures or watching videos is going to make up for seeing patients, having to be responsible, having to make decisions” (DJ:5)

“...that really surgery is a sport and learning about the theory?... you need to actually do the drills” (IO:7)

Ranging from responsibility for phlebotomy and results to the initiative of reviewing patients twice daily on wards a feeling of achievement in having that burden of responsibility was identified as being a major learning experience for the consultants when they were junior doctors. This was the identifying trait that made them part of the medical profession.

.... that there was the sense of achievement that you had really done something extraordinary ... it was very very strong, and that empowers people, makes them feel good.

“.......the one thing that separates doctors from everybody else in the hospital, anybody can have their opinion, nurses can have their opinion about what is
going on, but you have to make the decision about what you’re going to do, so you know, it’s not always fun, but it’s rewarding” (DJ:5)

The same accountability however was felt by many to be lacking in today’s Prevocational practice with a shift in focus to lifestyle priorities and a decreased priority placed on responsibility and duties.

“........they get wined and dined, taken out ... for various slap up dinners, for god sakes and having BMW promoters come around and let them test drive cars, its extraordinary. And they say this is all so much fun, you know, why isn’t it as much fun here [in the hospital] and its like this is reality.” (DJ:5)

4.4.2 Changing Workload

Another shared theme from the interviews was the importance of workload on the learning experience.

“...You need to see lots of patients, and you just can’t get past that, you know?” (DJ:5)

“...I mean my niece is starting as a junior doctor and she is going to work a 37 hr week, and so she has all these other things she can do like she has a part time job and she does triathlons because she has just so much free time, and when she is working as an intern she is going to have so much free time that she is still going to do all these things” (MS:8)

The anecdotal reports from the consultants in these interviews suggested working long hours was an integral part of how they learned through saturation – immersion method, including working hundred hour weeks.
“The workload was exhausting, but having said that, the continuous exposure to the amount of work was something you can’t replace, there wasn’t a lot of teaching going on I am afraid, but just by virtue of having to look after a ward of twenty thirty patients, all the time and being given responsibility, being expected to know the patients and the results and that was it, and you knew it.” (CR:4)

“...we don’t tend to do that now, because [middle of the night cases] it’s not so good for patients.” (QW:6)

“I had my own minor operation list, so I did that myself, I was trained they showed me how to do it, once and that was it, I got on with It” (IO:7)

Despite acknowledging the patient safety concerns of this sort of work, all consultants reported learning in this manner; over cases done in the middle of the night and by “deep end swimming”. Additionally despite their concerns about patient safety from overwork of Prevocational doctors, an undercurrent of concern about patient safety from lack of experience was also noted.

“...I think there is not enough clinical work around for them to be honest, I think we are in a bit of a bind now that we have, for political reasons, produced too many students too quickly” (DJ:5)

### 4.4.3 Peer support and mentoring

Learning from peers and the supportive mentorship environment was also discussed as beneficial in the Prevocational role. Interestingly the relative position of the colleagues determined the nature of support provided. Mentorship from specialists
within the field was decidedly important in career planning and motivation to join training programs,

“it’s really important to fire up people imagination, people might be undecided about where they want to go and they think a career is beyond them almost, and people who might want to go down a pathway that you find exciting yourself, you can get them fired up by dragging them along to something you are doing.” (CR:4)

Peer support was mainly valuable in knowledge acquisition rather than motivation:

“We need to educate them about how to educate one another, generating a more pyramidal program, and I mean that is the way I learn, I don’t really learn from reading journals and evidence based medicine, but from discussing things with colleagues.” (SM:2),

“We all learnt together on the wards at work, helping each other out” (FW:10)

Consultants educating Prevocational doctors informally, for example on the wards and in theatre at opportunistic times; was also discussed both in regard to knowledge acquisition but also in regard to interpersonal skills and teamwork,

“I think you can give a good example and to actually be told what is expected of you [as a resident], and I think often you aren’t told- I think it would be really useful.” (CR:4)

“...often that sort of sit down, you know, one to one teaching which was done officially in discussing cases, do happen at strange hours of the day and night. “ (QW:6)
Consultants also identified however that this mentoring could potentially place a burden upon them when teaching and mentoring junior staff in the skills required, and that choosing a mentor with sufficient skill and experience was necessary to enable learning

“the surgeons that are the trainer, you know, people like me, at the other end of my career, I am pretty happy to let anybody do just about anything because I know that I can recover that or observe what is going on and fix that” (IO:7)

4.4.4 Self directed learning

All consultants discussed the role of motivation and self direction in their own education whilst pursuing a surgical career from the Prevocational level, with reports of seeking mentorship, undertaking independent research and studying for basic science exam cited as examples of self direction. The large in-work commitment was cited as justification for doing a lot of self directed learning out of hours;

“I do most of my learning between like 10:30 and 12 o’clock at night when you have got time, it would be difficult to organise meetings at that time” (QW:6)

But in addition to this necessity of time management consultants felt the self motivated and directed Prevocational doctor was generally taught more readily by consultants during work hours than were uninterested junior staff,

“I think the reality is that, if you have got to give personal tuition to somebody, which I think is fine, you are more likely to do it willingly for people who are going to use it in the future or who want to use it rather than the people who are going to take up your time and never use it.”(CR:4)
This was implied suggesting a significant component of the interaction between parties contributing to the motivation to teach. Thought was also given to the impact of forcing uninterested participants through training and the concern that decreasing levels of self motivation and direction would not result in a satisfactory performance in the end despite educational opportunities:

“.... [The first part exam]... was an interesting screening technique, pretty tough, but a really interesting screening technique to really find people who were motivated, and it is very easy to take unmotivated people through very highly structures courses and spit them out at the other end and end up with a product which perhaps is not ideal.” (DJ:5)

This was acknowledged despite the consultants themselves being aware they were not always driven as Prevocational doctors themselves. Having just completed medical school and yet to commit to a training program, a degree of complacency and lack of motivation was recognised, but poorly managed.

“there may have been tutes that I just wasn’t aware of, I was pretty complacent as a junior doctor, I have lots of empathy for the poorly motivated”. (SM: 2)

However, the juxtaposition between acknowledging the existence of the poorly motivated and the stronger desire to teach those who were motivated left an obvious gap for which a solution was not proposed.

4.4.5 Formal teaching

The use of traditional and didactic teaching methods was also discussed. This included such things as scheduled intern teaching and tutorials. Generally the view of
the educational benefit of these sessions for doctors as opposed to medical students was quite poor, with far greater value placed on workplace learning and experience.

“I think with all the numbers there is a risk of just really large tutorials and think that is one of the worst ways of learning ... we need to involve the more junior levels in teaching each other, so we have one on one or one on two ratios that’s when learning really happens.” (SM:2).

The exception of intensive training courses such as Care of the Critically Ill Surgical Patient (CCrISP –a course originally designed by the Royal College of Surgeons of England in 1996) was noted. These sessions were more valued as imparting skills and knowledge,

“they are useful because they give you an in depth, feeling for what is going on, particularly that sort of cases, you know, you get knowledge acquisition, you’ve then got to run through scenarios, you get to practice it, a couple of times informally then you get a mock exam, and you feel pretty empowered at the end of all that to specifically deal with problems”. (TM:1)

The importance of such sessions, including simulation, especially as training hours decrease, was also noted:

“And I just don’t think we have explored that well enough, nobody wants to fund it, it’s expensive, but, it’s going to have to come because with everybody working so few hours they will never acquire the skills that will require them to be performing at a really high level in very difficult areas.” (DJ:5)
It was suggested that the balance between the clinical experience from the consultants own time and current Prevocational doctors would have to be augmented with the use of simulation sessions.

4.4.6 Undertaking Research

An important component of specialty training, research was discussed by a number of the consultants in regard to its educational value both as a tool to moving up the training ladder and as a way to encourage deeper thinking, learning and application of knowledge. For one participant, this led to an opportunity to be part of research,

“......so I ended up with a project that I ended up presenting in Melbourne, as an intern and that then turned into a publication which was ultimately published in BJS so it was quite a good publication ... So I suppose in some respects that was probably almost a better education than lots of other stuff that I could have been doing.” (AV:3)

“...once you have been involved in the science of things you see, it’s not black and white, it’s all amazing shades of grey and you have to try and make important decisions out of that” (MS:8)

One consultant felt that they had undertaken research which was an

“...extraordinary opportunity to study and broaden my mind and educational capabilities” (DJ:5)

And that it was this experience from which they had learnt the most in terms of the details behind their practice. Some consultants felt frustrated in that many residents were now paying “lip service” (DJ:5) to such research tasks and not benefiting from
the learning possibilities of research. There was an obvious concern that this was why many consultants were now opting out of supervising research and that some research was being conducted on a superficial level – not to gain educational benefit but instead for resume padding.

4.5 Conclusion

The importance of Prevocational education was acknowledged in these interviews:

“I think it’s the key to our future isn’t it? the more knowledge they [Prevocational doctors] have early on the more you can build on that and the more they can contribute to hospital management and to work as part of the team” (TM:1)

In the interviews, many divergent concepts about specific experiences were identified in regard to how consultants felt they had learnt during their own Prevocational terms as opposed to how they felt current Prevocational doctors were learning. It is evident that the participants were interpreting current and future opportunities through their own lens and grounded in their own experiences. This included such experiences as patient volume and workload, shift hours, mentorship and autonomous patient responsibility which the surgeons placed a greater priority upon during their own training than that which was available currently. Consultants felt some of these concepts were otherwise seldom identified learning experiences for other non technical specialties.

These six themes are well described and illustrated within these results. They are interesting for their uniqueness and application. These themes will further be developed and analysed in depth in the following chapter and used to construct a new framework.
Chapter Five: Discussion: An application of themes to literature, learning theories and frameworks

5.1 Introduction

This chapter begins with the observation on how different the surgeons’ experience of Prevocational learning was compared to how they perceived the current Prevocational doctor learns. It is then divided based upon the six themes established within the results section: taking responsibility, self directed learning, changing workload and hours, formal teaching methods (rounds, courses, and meetings), peer support and undertaking research. Each theme is discussed in terms of its established educational background (or lack thereof) and its application in Surgery. Thereafter, a discussion relating these themes collectively to established theories and frameworks takes place prior to the recommendation of a new Surgery specific model of educational opportunities based upon these themes.

5.2 Era differences

Many divergent concepts about specific experiences were identified in the interviews. This was particularly so in regards to how consultants felt they had learnt during their own resident terms as opposed to how they felt current residents were choosing to learn. This included such experiences as patient volume and workload, shift hours, mentorship and autonomous patient responsibilities. These factors are not routinely identified in single modality learning opportunity studies within the medical education literature reviewed, but are listed in surgical tools such as STEEM so may be Surgery specific.
This research suggests that the consultants’ learning experience is still valid and that the historical background of considering the experience of those in the preceding 10-40 years is worthwhile for the variety of information and suggestion obtained in this study. The surgeons’ experiences have been validated in terms of outcomes, in that the surgeons produced obviously managed to progress through the Prevocational period. However the efficiency of such progress and the optimisation in terms of their experience compared to current Prevocational doctors is difficult to quantify given the changing cultural and social nature of practice and knowledge in that time.

Nevertheless, it provides a basis through which to explore past, present and future educational experiences because of the questioning format in the interviews being this temporal component. The data set was enhanced by the temporal sequence of topic discovery. This was intentional in terms of maximising the possible information gathered from the participants. The scope of experience of Prevocational learning (past, present and future) was used to enable identification of defunct methods from a consultants’ past (such as the 100 hour work week) and also to encourage creative thinking of the future (such as an online social environment for doctors). This has allowed the creation of the themes which seem to lie outside of the domain of much of the current medical education literature allowing an alternative approach to education solutions for Prevocational doctors.

It is central to note that the implementation of educational models will need to change from how these surgeons themselves learnt in order to accommodate the cultural and social changes of both the current Prevocational doctors themselves but also the society and work environment they are exposed to. It is simply not socially acceptable or perceived as safe to expose this cohort to 100 hour working weeks to
provide an immersive learning environment. Identification of the other aspects which were felt to be the most educationally valuable should help to modify the current available frameworks.

5.3 Congruencies and deficiencies with the literature by theme

5.3.1 Taking Responsibility

Responsibility is not often cited as an educational method or tool. In all of the interviews however it has been promoted as helping the consultants to learn the skills of their profession. The mechanism of responsibility in Medicine and clinical duties providing an educational experience is neither well described or is it characterised in terms of specific attributes in any of the interviews. The universal features of responsibility are either being accountable or having a duty to deal with an outcome. Being responsible imparts a sense of conscientiousness, reliability and dependability for a duty whilst also laying foundation for blame and liability for consequences.41, 107

One possible explanation is that learning through responsibility is a form of operant conditioning. Operant conditioning, originally described by Skinner, is where behaviour is modified by consequences of a positive or negative reinforcement or a punishment,108 such as failure to check and remedy a potassium level leading to an episode of atrial fibrillation (a negative impact upon the patient), or conversely detecting a drop in haemoglobin preoperatively and organising a transfusion so as not to delay the scheduled operation (a positive impact upon the junior doctor after the list is not delayed). Responsibility as operant conditioning implies that the outcome is repeatable, modifiable and desirable by the Prevocational doctor in terms of
altruistically improving patient outcomes and experiences or alternatively performing well in the workplace or in the face of peers or assessments.

A further explanation may be that the sense of conscientiousness, reliability and dependability demonstrated by being responsible results in a positive outward perception of the Prevocational doctor by their colleagues and supervising staff. This may foster the Prevocational doctor being incorporated into the community of practice within the workplace and hence enhance learning much as described by Wenger. Wenger attributes this type of learning (process of sharing experiences within a group) as a collective social process which he terms building “communities of practice”.

With both these explanations it is likely that the experience of learning by responsibility occurs in other disciplines and professions. The noted appearance of this experience in these surgical interviews is perhaps related to the greater weight to the consequence of such responsibility noted within such professions as Medicine and that surgeons, as a community of practice, exist as a cohesive group who maintain great expectations of professionalism from their peers.

What is difficult to quantify is determining the right amount of responsibility and its gradual progression. It is evident that the participants in these interviews felt they had a much greater level of responsibility than the current Prevocational doctors. They participated in the long heralded “see one, do one, teach one” culture in what many recognised was an experience that may have put patients at risk. It is likely that the right degree of responsibility, which is not established within these interviews, short of the acceptance that previously the degree was perhaps too much and now too little, requires more research and discussion to quantify. It will also require these same
surgeons who were interviewed to entrust the current Prevocational doctor with more responsibilities, even if in a closely supervised manner.

5.3.2 Changing Workload

In addition to responsibility, the other feature determined in these interviews which significantly impacts upon the educational experience, despite it not being a well noted educational opportunity, was workload. The term relates to the activities or tasks required to be completed by an individual. What an adequate workload was, was not addressed in the interviews but it appeared to be related to the experience of a balance of a busy job with clinical exposure and activities.

This finding parallels Jarvis and Kolb’s explanation of experiential learning. At face value, this is the underlying educational experience of what the Prevocational doctor undertakes daily in their workplace – the experience of the hospital situation, the workload of patient volume and clinical care that the surgeons who were interviewed identified. The continuous spiral of a particular incident that flows onto the observation and experience of that incident to forming new concepts about it, to the testing of this learning in a new situation is one which the Prevocational doctor may enter at any particular point to either facilitate learning or, as Jarvis suggests, to remain unchanged. This is a complex experience. It is not a linear experience but rather a spiral learning around the opportunity for feedback and reflective observation. This is schematically represented in Figure 4.
It is this researcher’s proposal that this reflects what the surgeons meant when they discussed the impact of workload on learning. Their expanded workload in terms of patients and hours simply meant a greater number of opportunities for practice, experimentation and experiences in their clinical practice, through which thought, reflection and evaluation could take place based upon these situations and from which subsequently learning arose.

While for the consultants interviewed, sheer volume of time and exposure may have eventuated the required learning and skills, it is evident by the changing workforce and pressures of such that these experiences can no longer be hit or miss affairs for learning. Experiential learning has been historically the way of learning in Surgery however it is identified that this experience is being restricted through limited clinical exposure and decreased work hours. Correspondingly, the consultants did express this concern in the reduced workload and time exposure at work for current junior doctors.
Research does suggest that a situation in which the reflective learning path is encouraged, enhanced or maximised would improve the learning from any experiential triggers. Methods for enhancing this learning needs to be identified to maintain this value for various clinical experiences. This enhancement needs to be in preference to so called “magpie learning” in which a learner may haphazardly acquire knowledge from their hospital working day but without the ability to share and check the meaning and the order of such knowledge with their teachers. This sort of learning leads to a lack of structure and connection with their other understandings. De Cossart and Fish proposed a scaffolding support system which is possible through the use of structured feedback, reviews and debrief sessions and setting identifiable goals for the junior doctor to achieve. It is likely that although the theory of experiential learning was the framework which matched the surgeons’ perception of workload learning most closely, modifications are needed to optimise the learning experience for the current Prevocational cohort.

5.3.3 Peer support and mentoring

Mentorship and peer support are both aspects of co-operative or collaborative learning. This interactive learning experience can be defined as small mixed working groups of learners working toward a common goal or task. The main features required of such learning are positive interdependence, participant accountability, interactions and group skills. A mentor is someone who provides a continuum of support and education, the balance of which depends upon the needs and aims of both the mentee, the mentor and the program. In healthcare specifically this role has been identified as a mentor, preceptor, facilitator or educational supervisor in an attempt to encompass this role and its variable balances of objectives between inspiration, support and
Whilst much of the literature focuses upon providing educational guidance, supervision and assessment, the interviews also brought up ideas of providing career support, debriefing and ‘sounding board’ listening.

The value of mentorship in nursing education is well published. Generally the presence of a mentor meant that learning was more likely to be planned and was an important influence on how the student perceived the learning experience. In Medicine, this experiential learning has been found to be improved in clinical environments where the consultant took enough interest in trainees both to challenge them academically and to be involved for their pastoral care. The difficulty expressed however in much literature is the separation of assessment from mentorship and to what extent the same individual may provide these quite different roles.

In addition to the mentorship role, one interviewee was particularly emphatic on the role of peer support in learning. Like mentorship, this is a form of cooperative learning in which groups with similar aims and objectives support and facilitate each other’s educational experience. One study of resident level doctors in the UK found that this sort of learning networking strengthens the acquisition of knowledge. It has been found that this experience enhances trainee achievement and can improve self esteem and cooperative work environments. It can occur as groups or within the team environment.

In this study the practice and application of both mentoring and peer support learning were informal and haphazard. In terms of mentorship, the participants reported identifying with a particular senior colleague who then may have provided guidance or encouragement. There was however no established mechanism for this process to occur and it is likely many junior doctors who would have benefited from
such exchange were not provided the opportunities. This may be because the role was not formally established, however, as the role of inspirer is a component of mentoring, it would be difficult to formalise and assign this role arbitrarily without first establishing which potential mentor does inspire the Prevocational doctor.

When discussing peer support, most participants suggested a positive experience without elaborating on the particulars of such an interaction. Whilst a sit down planned discussion would be difficult to integrate into an already busy clinical service provision experience, the day to day banter between co workers has been suggested to have educational value.\textsuperscript{121} The challenge in accepting this is how to best maximise the exposure and use of this opportunity. This may be enhanced by encouraging use of shared spaces such as common rooms or lunch rooms, by providing colleagues in the same level a communal space or time (such as a doctors’ office for the orthopaedic interns) or providing time within the work day for debrief or discussion sessions.\textsuperscript{121}

\textbf{5.3.4 Self directed learning}

Slotnick describes self directed learning as coming about from the identification of a problem with either a specific or general nature, which results in the pursuit of answers and change of understanding or practice.\textsuperscript{122} Research suggests that care delivery is most likely to be positively influenced when individuals conduct self directed learning based on work-related problems.\textsuperscript{123} Self directed learning encompassed that learning and self motivation that the interviewees participated in during their Prevocational years and for many was a major persisting educational experience, either because of personal constraints or because the experience of this learning previously was both beneficial and found to be relevant.
For Prevocational doctors, self-directed learning provides knowledge in the clinical setting and out of hours. It may be used to answer questions about clinical cases, expand a generic knowledge base (such as journal or textbook reading), or to help prepare for a course or specialty exam. The amount of self-directed learning that is adequate is not determined in the literature and, although restricted work hours is purported to facilitate more time for self-directed learning, the actual benefit of this has yet to be shown. Obviously a balance between this learning and the clinical workplace learning of responsibility and workload must be explored.

Self-directed learning has the benefit of time flexibility, and of relevance as it particularly relates to an issue the clinician is asking about a case or a personal end point (such as an exam). A significant limitation requiring self-identification of any deficits of knowledge is self-directed learning’s main weakness and indeed other studies discuss this conundrum of ‘we don’t know what we don’t know’ and how to best deal with it using guided proformas in a means of enhancing self-directed learning. Additional barriers such as participants with little time or those without the system resources (such as library, web or peer discussion access) may not be able to participate in self-directed learning and in particular not be able to partake in the learning at a time critical to the patient encounter. These individual and system barriers would need to be addressed to facilitate the adequate support of self-directed learning for Prevocational doctors.

5.3.5 Formal teaching methods
Formal teaching methods that were put forward by the participant surgeons included journal clubs, simulation, courses, lectures, tutorials, conferences and portfolios with variable feelings about success, relevance and use of these methods.

The feature that groups these experiences is the directed, structured and organised manner in which the educational experiences are implemented. The experience was often separated from the direct clinical environment and often took greater time commitment such as block days or weekends. These methods were those with the greatest documented research and publications, despite that generally the surgeons felt that this sort of educational experience was more suited to those at student level rather than the Prevocational doctor. The interviewees however they made exceptions for specific experiences they had participated in such as journal clubs and Royal Australasian College of Surgeon courses like Care of the Critically Ill Surgical Patient (CCrISP) which imparted knowledge or confidence in the clinical setting. This difference in literature is perhaps because of the relative ease that such a formal intervention may be analysed or instigated in research in comparison to the complex variation in work hours or case load.

The educational benefit and background for many of these experiences are documented within the literature review as discussed earlier. Generally the evidence lacks long term outcomes and application to other cohorts outside the published studies. Despite this, they remain with the test of time as options to educate regarding specific issues and skill sets (such as a course to teach a particular operative technique) which may help to change practice or educate regarding an unfamiliar topic.

Much like self directed learning, formal teaching methods are separated from the clinical learning environmental features of workload and responsibility. They require
time away from these clinical situations and hence need to be balanced so as not to negatively impact upon the other. This is perhaps why the surgeons felt that such formal teaching methods were less important for Prevocational doctors, because they took the junior doctor away from the clinical exposure of responsibility and workload, features that the surgeons felt were important and a much greater feature of their own experience compared with the experience of current Prevocational doctors.

5.3.6 Undertaking Research

The consultants in the interviews who had partaken in research during their training all felt that it had been a worthwhile educational experience. Some had published research, others had presented at conferences the results of their work. The level of research, or volume required for this to be of educational value was not described, however one participant surgeon cautioned against “lip service” research where the Prevocational doctor was not undertaking the research for educational or research value but instead as a superficial and resume adding activity. This is understandable given that any educational benefit from the experience must lie in a deeper understanding and involvement in the task at hand.

Evidence on the benefits of research from a medical education point of view exists mainly in studies about medical students. The students in such studies felt that the experience of performing research taught them to ask questions, critically review literature and analyse data. A study on US residents provided with protected research block terms found a high rate of publications and presentations and in fact 84% of the residents involved felt it enhanced their training experience. This is what the surgeons in the interview expressed, that the research experience during training had led them to ask more questions and better understand the grey area of Medicine as
opposed to the often black and white understanding expressed in didactic teaching. This modified their approach to learning and teaching at a deeper level.

Again, a balance must be sought between the direct clinical educational experiences and such experiences as research. Perhaps, as is suggested in the US study\(^{127}\) a block three month attachment to focus on a research task at the level of Prevocational doctor would enhance their experience of research. This would also provide protected time in a culture where Prevocational doctors currently feel they do not have the time to commit to additional duties beyond their busy clinical role within hospitals.

5.4 Discussion in relation to theories and frameworks

A theoretical framework for learning is to be considered when examining these six identified educational themes from the interviews. Individual theories are discussed including those proposed by Knowles, Moos, Jarvis, Kolb and Wenger\(^{79,105-107,124,125}\) and the historical apprenticeship of Surgery. The following discussion attempts to link a variety of these discussed and published theories and frameworks as a basis for understanding and integration with the suggested six themes of surgical learning identified in these interviews to better inform the environment of surgical learning.

The concept of self motivation, an essential component of the traditional adult learning andragogy (as proposed by Knowles)\(^{128}\) was prioritised by these surgeons as important in the self directed learning, research and responsibility concepts associated with their own learning experience. Knowles proposed that adult learners have a self concept, experience, a readiness to learn, a problem centred orientation to learning and self motivation.\(^{129}\) These characteristics of adult learners and hence application of such
theories however are questionable for today’s Prevocational, generation Y doctors. Members of generation Y (individuals born in the 1980-1990s) have been suggested to be “overscheduled, dependent children who require constant feedback and struggle with independent decisions” and hence do not behave as independent adult learners.\textsuperscript{130}

The implication of the participants’ views, was that, unlike an application of Knowles theory, we cannot rely on the junior doctors to identify their learning styles, take a self directed learning initiative, to be ready to learn or to necessarily shift from a subject centred to immediate problem centred learning method. Instead, we need to take a grounded approach and discover how to best teach new doctors. Identifying and exploring how the previous Prevocational doctors (surgeons) learnt best provides an important starting point in developing a successful educational framework for current Prevocational doctor undertaking surgical training.

\textbf{5.6 Apprenticeship}

At this point, it is also important to consider the historical foundations of education in Surgery. Surgery is traditionally considered an apprenticeship of learning when those learning the craft do so by observing those already practicing it.\textsuperscript{131} Much akin to the experiential theory of adult learning, this should also be considered when embarking upon an exploration of the learning experience of the group of Prevocational doctors. As examined within the discussion on workload, Jarvis suggests that each new experience or situation becomes a learning opportunity for the participant for which they may then proceed along three main paths: non learning (presumption, non consideration or rejection), non reflective learning (preconscious, practice and memorisation) or reflective learning (contemplation, reflective practice or experiential learning).\textsuperscript{110} This is one theory which reflects upon the workload
component of the educational opportunities described adequately however it does not encompass other components such as research and formal teaching methods.

The proposed concept of Moos, ties in with the three interacting factors at the foreground of experiential learning- the learner, the situation, the experience but with varying degrees of overlap. Moos’ proposes that the elements of the human environment are personal development and goal directed dimensions (aims of education and its content), relationship dimensions (extent of support and involvement) and system maintenance (that the environment is clear and controlled). Whilst a learner feature such as motivation may correspond with the first component of the environment Moos proposes, another learner feature such as workload fatigue falls outside of Moos descriptions. Furthermore, Moos description of relationship dimensions and system maintenance appear to provide a wider scope for description of workplace factors than the more simple situation and experience proposed within Jarvis’ work. Despite this further encompassing nature of Moos concept compared with Jarvis, it still falls short of adequately describing all features discovered in these interviews.

\section*{5.7 Learning community}

Another theory to consider is Wenger’s communities of practice. As discussed within responsibility, it is possible that the traditional apprenticeship model of surgical training may contribute to this perception of learning through participation (workload, responsibility, shift work and mentorship) rather than just from the experiential model. Wenger details a social learning theory where by participants are always learning by being involved in and practicing tasks (such as ward rounds or operations), by becoming a part of the community and adopting an identity (such as being a surgeon
and spending time with surgeons). The more the Prevocational doctor becomes absorbed in the clinical environment the more a part of the learning community they become. Subsequently the learning experience of the Prevocational doctor for both skills and knowledge is improved. However, improvement is noted for less tangible concepts such as behaviour and professionalism. These later concepts were identified in the interviews and emphasised through the subsequent priorities placed upon mentorship.

Combing these theories of experiential learning and participating communities of practice appear to be highly valued in Surgery specific education when comparison is given to the other education literature and tools previously developed. The priority placed upon these concepts by the practicing surgeons would essentially have been overlooked had this component of the exploration not been undertaken in preference for purely literature driven research. Taking into account the theoretical backgrounds behind the features identified by the surgeons it would appear that a modified framework based upon Kolb’s experiential learning,\textsuperscript{111} optimised by a component of reflective learning and Wegner’s communities of practice create the ideal surgical learning environment. Linking this with other theories and frameworks of learning, such as the human environment proposed by Moos and providing a set of domains to encompass the medical education environment would propose a more comprehensive surgical education model.

In identifying that no educational model or framework exists to singularly describe surgical education for Prevocational doctors other models were examined. Models can be considered from broader workplace education models such as that by Ostroff. Ostroff proposed a set of domains to cover the workplace environment as cognitive,
affective and instrumental and assessed these in correlation with workplace satisfaction, commitment, stress and performance. The finding that both participant factors and environmental (workplace factors) contributed to the environment and experience of the environment when congruent is echoed in the educational literature, with the difficulty of assessing these factors in isolation. A continuation of this research was conducted with newly graduated employees in large management and engineering firms, looking at the role of socialisation as learning process. Although performed outside of Medicine and Surgery, it provides insight into how various aspects of a new role are learnt within an organisation, much as the Prevocational doctor is embarking upon a new role within the healthcare system. Learning and knowledge acquisition was measured based upon interpersonal sources (supervisors, coworkers, mentors etc) or non interpersonal sources (experimentation, observation, documents etc) and measured task, role, group and organisation learning outcomes. Although self reported in terms of learning outcomes, the findings were that both direct observation and experimentation, in combination with interaction with coworkers and supervisors were associated the most with new knowledge acquisition about job task and role. Additionally interaction with coworkers and supervisors was associated with job satisfaction, enjoyment and lower stress levels creating a positive learning environment. Reflecting this work back to Prevocational doctors in Surgery and the interviews conducted, the priority placed upon mentorship and also role immersion (workload and responsibility) by the consultant surgeons can be seen to be reflected in other workplaces and by other junior staff and associated with a positive learning environment.

This discussion demonstrates the ill fitting non specific nature of generic educational frameworks by the limitations identified in representing all six identified
themes from the interviews within a single or particular framework. Schematically represented, the theories of Wenger’s communities of practice, experiential learning and reflective learning appear to encompass the same themes – those of personal responsibility, workload, mentorship and research but fall short of covering self directed learning and formal teaching methods. Conversely Knowles theory of adult learning encompasses the self directed learning component but has no scope for acknowledging the contribution of workload or peer support and mentorship in learning. Overlaying these four theories identifies research and personal responsibility as the only themes included in all of the theories, and demonstrating that no one theory appears to be fully inclusive for the mechanisms of surgical learning.

The application of generalised environmental frameworks as described by Moos or Ostroff and advocated by Schonrock-Adama whilst all encompassing, do need clarification and refinement for accurate representation in the particularly described educational domain, for useful data collection and thereafter application. Moos developed the environmental framework based upon an analysis of nine different groups and social environments (psychiatric wards, psychiatric treatment programs, correctional institutions, military training companies, university dormitories, high school classrooms, social groups, workplaces and families) in the 1970s. It is the very generalisability of this framework that impedes its specific use for quality data gathering.

It is not feasible to seek information on a learning environment by simply asking what the focus, the relationships and the environment are. Such generic questions are likely to generate generic answers which are harder to act upon and provide greater challenge to instigate change from. Instead it is important to seek what particular
components of each of these facets are required. Some of these components are
demonstrated in previously developed tools with markedly different foci of
questioning and inclusion categories. It is clearly evident from this research that the
six identified themes from the interviews represent the specific facets of these
components which are required in Prevocational doctors’ education in Surgery. Whilst
able to be further expanded (such as formal teaching methods expanded to simulation,
tutorials, lectures) by using the six themes as subheadings; the more broad overview of
these terms will mean that all potential aspects of the learning experience (such as
workload and responsibility) will not be lost by simply creating lists of continuing
medical education methods. It is also theorised that these themes represent quite
separate entities reducing repetition within potential tool development.

5.8 A new framework

It appears that these identified six themes lie partially outside of the previously
developed theories and frameworks discussed. Whilst encompassing strong and
overlapping components of various education theories, these six themes serve as more
specific umbrella terms through which to consider surgical Prevocational training and
its learning environment. This creates a new model to consider (figure 5). This model
gives them better application than other theories and frameworks in implementation,
assessment and in evaluation of Surgery specific education experiences.
**5.9 Strength and limitations of study**

The strengths of this research lies in the repeated and extensive review of literature and educational tools as a basis for this broad qualitative exploration of educational experiences of Prevocational doctor, which had not previously been undertaken. The variations in end point measures in medical education literature and the impact of this on comparison and replication is well published. Despite widespread awareness that endpoint measures from other tools are lacking, the process of excluding the current participants of Prevocational experience has not been attempted before. This study does this in favour of examining those who have already had and completed the Prevocational experience. It is theorised that, although reliant on the participants’ retrospective and self assessed experience, this has provided this data set with a
component of outcome based endpoints without having to undertake corresponding quantitative analysis purely based on the surgeons successful passage through Prevocational doctor level. It may be that this outcome endpoint is in its nature a bias factor of this study, with those going on to pursue a surgical consultant career more likely to have had a positive Prevocational surgical learning experience. The open ended broad qualitative interviewing techniques added depth and richness to the obtained data, although the limited number of participants reached the restricted nature of their reciprocal representation of the surgical population does impede ongoing generalisation of these results, despite the perceived saturation of issues identified. It is also prudent to note that for logistical reasons ruraly based surgeons were not included in this study. This cohort may identify quite separate learning needs and issues which would be an important examination of future research or in further assessing the external validity of this research.

Potential sources of bias in qualitative research, such as false interpretations and disproportionate influence of one researcher on the outcomes are obvious limitations of this research. Further research would be necessary with other, more varied surgical communities to determine if the findings are consistent and transferable to other populations. However, these limitations are inherent and unavoidable in qualitative research, and any potential bias was balanced in multiple strategies including regular debriefing with my supervisors, describing researcher’s positionality, and documenting research decisions in the methodological audit train in the methods section.

5.10 Recommendations
The strength of this study lies in the expansion of our understanding around the educational experiences of Prevocational doctors and hence its possibility for application in designing new learning tools for assessing and evaluating the Prevocational environment in Surgery. It would be recommended that future tools may subsequently be much simpler and with less components than previously designed 40-80 component questionnaires and consequently more readily instituted. It is also recommended to take the study’s six core themes into consideration when creating new Prevocational doctor education environment, particularly in light of the expanding ‘tribe’ of junior doctors in Australia. It is hard to conceptualise a role which takes into account factors of workload, patient responsibility, peer support and mentorship, self directed learning, formal teaching methods and undertaking research without promoting a good learning environment for even a reluctant Prevocational participant. The balance of these six themes is an important step towards what now needs to be investigated and optimised in future studies. A paradigm shift towards providing additional trainers or coordinators who encompass and balance these educational factors and optimize the learning environments in Surgery may be required by working beside the consultant surgeons whose role is to teach through their practice. It is clear that the previous balance of consultants’ experience which was weighted significantly towards workload and patient responsibility needs to be acknowledged and somehow respected despite a new wave of safer, more socio-culturally sensitive work patterns and learning environment conditions.

It is possible that the length of training in Prevocational roles needs to be explored and expanded to cope with changing workloads. It is also clear that to optimise the experience of these themes (such as workload without increasing work hours) adjuncts to learning such as reflective practice which is already being published in the medical
education literature, and should be encouraged within the Prevocational environment. It is a recommendation of this research that a new tool for evaluating surgical Prevocational terms needs to be established around these six themes. More research into the relevant weighting of these themes in terms of the relative educational value of each is an important new research direction for the future. At that point in time, it is more achievable to assess surgical terms in comparison to each other, in order to maximise and improve surgical terms that currently exist and to create new educational roles and terms for the influx of Prevocational doctors that Australia is currently experiencing.

5.11 Implementation and future direction

The proposed model as a result of this research has yet to be implemented and tested. The author however sees great application in the improvement and design of surgical attachments for Prevocational doctors.

The proposed model for Prevocational Education in Surgery would have applications in creating new Prevocational roles within Surgery for an increasing number of new medical graduates in the workforce. It could also be used to improve and assess current Prevocational attachments in surgical rotations for educational opportunities. Outcome measurement for such implementation is difficult to assess. As discussed earlier the multitude of both impacting factors and variable methods of evaluation make a uniform outcome measure difficult. Despite this, it may be possible to make comparisons at the individual hospital level after a change is instigated in a surgical attachment based upon this model. Ongoing comparisons and discussions could assist in informing the balance of these six concepts in the educational environment. The interaction between these six points and synergistic nature of
various components is also an avenue for future research. It would be hoped that such a model could be used in surgical rotations to scaffold such programs as the Australian Junior Doctor Curriculum and support their implementation.

5.12 Conclusion

This research has looked at surgical education opportunities and environment for Prevocational doctors from the perspective of surgeons in Western Australia. Interestingly it has noted the paucity of information in the literature about the education of Prevocational doctors in surgical rotations and provided new insights from surgeons into the ways Prevocational doctors have, did and may in the future learn in the clinical environment. The analysis of ten interviews has generated a six concept model that may be used as an adjunct to develop, assess and improve surgical attachments for Prevocational doctors in Western Australia. The benefit of this for the surgical education community and the Prevocational doctor community will mean a better educational experience for Prevocational doctors in Surgery.
References


Appendices

1. Appendix 1: Interview Framework

Interview questionnaire framework

1. Talk about current opportunities and define Prevocational doctor for the interviewee:
   – I would like to start if you could just talk to me about what you know about current opportunities for Prevocational doctors to facilitate their learning, looking at interns and residents before they start their specialty training.

2. Talk about their own experience and how they learnt:
   – Next I just want you to talk about the educational opportunities that were available to you when you were a Prevocational doctor that helped you to learn.

3. Discuss future opportunities and methods:

   - can you talk about other educational aspects opportunities that you forsee being used or available in the future.

4. Allow further elaboration or discussion as required:

   - Last question, are there any other comments you want to make about educating Prevocational doctors?
2. Appendix 2: Interview information sheet, consent and data collection

(see attached)
Surgeons Perceptions

WHAT MAKES A GOOD EDUCATIONAL EXPERIENCE FOR SURGICAL RESIDENTS?

What has been your own experience? Where do we go from here?

As you will be aware, the increasing numbers of local graduates in WA (three fold in the last five years) and the enforcement of safe working hours has a great impact on the learning opportunities of residents (prevocational doctors).

As part of the first phase of this study, we are conducting short individual interview discussions with surgical consultants from various practice backgrounds to establish the variety of educational opportunities that lead to a positive educational experience for prevocational doctors, be they job components like workload or handover– or other experiences such as journal club or simulations.

If you are interested in participating in an interview please contact Dr Jacinta Hatch as below to obtain a further information sheet and to arrange a personally convenient time and location.

This research has the ethics approval of University of Western Australia (Approval RA/4/1/2498).

Dr Jacinta Hatch MBBS, (RACS Trainee)

(Thesis: Surgical consultant perceptions of the educational opportunities offered to prevocational doctors in Western Australia)

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Surgical consultant perceptions of the educational opportunities offered to prevocational doctors in Western Australia

This research is being conducted to examine the educational opportunities available for prevocational doctor roles as identified by surgical consultants within the Western Australian health system and will examine how these corresponds with the published literature. Subsequently a hierarchy of these features will be established with follow up questionnaires to a wider audience of consultants to further validate these results.

This study is being undertaken with the view to enhance the future learning opportunities provided to the increasing number of local graduates who will be working within restricted programs of ‘safe hours’ of practice, and changing societal expectations of supervision. It is also likely to be of benefit to the participants through increasing awareness of educational enhancement within individual’s practice.

Individual interviews will be conducted with surgeons practicing either within private, public or mixed (both) settings. These consultant interviews will be audio-taped and transcribed subsequently for identification of core themes. It is likely that these sessions will require up to an hour of participants’ time. Data regarding participants’ demographics and specialty practice area will be collected to ensure equal representation of all sub groups. The ideas generated from these interviews will then be used to develop an online questionnaire to the surgical community.

The results of this study will be presented to the Royal Australasian College of Surgeons as part of the researcher’s Masters Program and aspects may be fed back to the local Postgraduate Medical Education bodies for future use to enhance the development of further prevocational training positions.

Please note that your participation in this study does not prejudice any right to compensation, which you may have under statute or common law.

Any questions may be directed to Dr Jacinta Hatch (researcher), Assistant Professor Zarrin S Siddiqui(supervisor) via mobile 0416 247878 or email coverj01@student.uwa.edu.au
Surgical consultant perceptions of the educational opportunities offered to prevocational doctors in Western Australia

I ________________________________ have read the information provided and any questions I have asked have been answered to my satisfaction. I agree to participate in this research activity, realizing that I may withdraw at any time without reason and with prejudice. If I withdraw my participation, my record will be destroyed.

I understand that all information provided is treated as strictly confidential (with recorded data kept in a secure manner) and will not be released by the investigator. I have been advised what data is being collected, the purpose of such and what will be done with the data upon completion of the research.

I agree that the data gathered may be published provided my name or identifying data has been removed.

___________________________________
______________________________________
PARTICIPANT DATE

This research has the ethics approval of University of Western Australia (Approval RA/4/1/2498). The Human Research Ethics Committee at the University of Western Australia requires that all participants are informed that, if they have any complaint regarding the manner in which a research project is conducted, it may be given to the project supervisor, (Dr. Zarrin Siddiqui, Education Centre, Faculty of Medicine, Dentistry and Health Sciences, 9346 4864, zarrin.siddiqui@uwa.edu.au) or, alternatively to the Secretary, Human Research Ethics Committee, Registrar’s Office, University of Western Australia, 35 Stirling Highway, Crawley, WA 6009 (telephone number 6488-3703). All study participants will be provided with a copy of the Information Sheet and Consent Form for their personal records.
DATA COLLECTION FORM

Surgical consultant perceptions of the educational opportunities offered to prevocational doctors in Western Australia

Date of session:________________________________

Age (please circle): 25-34 35-44 45-54 55-64 >65

Sex (please circle): male female

Surgical Specialty: ____________________________________________

Practice Distribution (please allocate percentage of time):

Private: ________________ Public: ________________ Other: ________________

(For other please specify i.e. university lecturing/college activities)

________________________________________________________________________
________________________________________________________________________
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3. Appendix 3: Publication

(see attached)

NOTE: Removed due to copyright restrictions.