

“There’s no doubt that one learns through it all”: A qualitative exploration of the value surgery trainees assign to Master of Medicine research

by
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Declaration

I, the undersigned, hereby declare that the work contained in this assignment is my original work and that I have not previously submitted it, in its entirety or in part, at any university for a degree.

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Dedication

I think this one’s for me – for choosing what makes me happy.

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Abstract

Background: Since 2011 The Health Professionals Council of South Africa (HPCSA) has mandated the completion of a Master of Medicine (MMed) research project for specialist registration. This has introduced several challenges for the training environment and there is concern that institutions do not adequately prepare trainees for their role as scholars. MMed research has therefore received much critical resistance and stakeholders have questioned its value as part of the specialist training curriculum. To gain a deeper understanding of the affordances, enablers, and challenges of MMed research we were interested to hear how trainees construct the meaning of value in relation to their experiences.

Aim: To explore the value surgery trainees assign to their MMed research experiences.

Methods: This qualitative study adopted a social constructivist epistemological perspective. We purposively sampled 9 participants who had completed their research in a single surgical division at Stellenbosch University. Data were generated via semi-structured interviews with individual participants and analysed using reflexive thematic analysis.

Results and discussion: We identified four key themes: 1) resentment, relief, realisation, and prerequisite; 2) the clinician versus clinician-scientist dichotomy; 3) research exposure and leadership, and 4) “there’s no doubt one learns through it all”. MMed research is a source of trainee stress but they can recognise in hindsight research has served an important role in professional development. Through experiential and social learning, trainees develop critical appraisal skills and an improved understanding of the research process and recognise the value of scholarly competencies for evidence-based medicine. Research supervision and leadership represent key enablers in this learning process.

Conclusions: Our findings suggest that MMed research offers significant educational value to specialist trainees and therefore warrants continued inclusion in the curriculum. Research supervisors play an important role in managing the research process, initiating MMed candidates into the research community, and making explicit the hidden outcomes of postgraduate research. Therefore, amongst other recommendations for health professions education, we especially recommend that future research and faculty development initiatives should focus on the professional development of MMed research supervisors.

Opsomming

Agtergrond: Sedert 2011 het die Raad vir Gesondheidsberoep van Suid-Afrika (RGBSA) die voltooiing van 'n Meester in Geneeskunde (MMed) navorsingsprojek vir spesialisregistrasie opdrag gegee. Dit het verskeie uitdagings vir die opleidingsomgewing meegebring en daar is kommer dat instellings nie voldoende voorbereid is vir hul rol as skoliere nie. MMed-navorsing het dus baie kritiese weerstand gekry en belanghebbendes het die waarde daarvan as deel van die spesialisopleidingskurrikulum bevraagteken. Om 'n dieper begrip te verkry van die voordeleinstaatstellers en uitdagings van MMed-navorsing, was ons geïnteresseerd om te hoor hoe leerlinge die betekenis van waarde in verhouding tot hul ervarings konstrueer te verken.

Doel: Om die waarde wat chirurgie-leerlinge aan hul MMed-navorsingservarings toeken.

Metodes: Hierdie kwalitatiewe studie het 'n sosiaal-konstruktivistiese epistemologiese perspektief aangeneem. Ons het doelbewus 9 deelnemers geneem wat hul navorsing in 'n enkele chirurgiese afdeling by die Universiteit Stellenbosch voltooi het. Data is gegenereer deur middel van semi-gestruktureerde onderhoude met individuele deelnemers en ontleed met behulp van refleksiewe tematiese analise.

Bevindinge: Ons het vier sleuteltemas geïdentifiseer: 1) wrok, verligting, besef en voorvereiste; 2) die klinikus versus klinikus-wetenskaplike tweespalt; 3) navorsingsblootstelling en leierskap, en 4) "daar is geen twyfel dat 'n mens deur dit alles leer nie". MMed-navorsing is 'n bron van leerderstres, maar hulle kan agterna erken dat navorsing 'n belangrike rol gedien het, naamlik professionele ontwikkeling. Deur ervarings- en sosiale leer ontwikkel leerlinge kritiese beoordelingsvaardighede en 'n verbeterde begrip van die navorsingsproses en erken die waarde van vakkundige vaardighede vir bewysgebaseerde medisyne. Navorsingstoetsing en leierskap verteenwoordig sleutelbemaagtigers in hierdie leerproses.

Gevolgtrekkings: Ons bevindinge dui daarop dat MMed-navorsing beduidende opvoedkundige waarde aan spesialisleerlinge bied en daarom voortgesette insluiting in die kurrikulum regverdig. Navorsingsleiers speel 'n belangrike rol in die bestuur van die navorsingsproses, die inisiëring van MMed-kandidate in die navorsingsgemeenskap, en om die verborge uitkomst van nagraadse navorsing uitdruklik te maak. In terme van gesondheidsberoep opvoeding beveel ons dus onder andere aan dat toekomstige navorsings- en fakulteitsontwikkelingsinisiatiewe op die professionele ontwikkeling van MMed-navorsingsleiers moet fokus.

Chapter 1: Extended background

“The primary purpose of higher education is to change people in desirable ways. These changes may, in turn, have profound effects on the economy and the society and even on the course of history.” (Bowen, 1977)

Scholarliness as a core competency for medical doctors

Over the last 20 years, evidence-based medicine (EBM) has emerged as a conceptual approach to decision-making in the clinical environment (Sackett et al., 1996). EBM is driven toward combining clinical expertise with the “conscientious, explicit, judicious and reasonable use of modern, best evidence in making decisions about the care of individual patients” (Masic et al., 2008). To develop this professional competence, medical training programmes aim to equip health professionals with the competencies they need for making clinical decisions based on data.

One of the most widely used physician competency frameworks is the CanMEDS model, which defines a set of seven operationalized roles that physicians are expected to master by the end of their training (Tuhan, 2003). To promote the practice of EBM, the framework includes the role of being a scholar. Key competencies of this role include a commitment to life-long learning; the ability to critically appraise information; the ability to facilitate learning and contribute to the creation of knowledge through research activities (Frank et al., 2015). This role emphasises scholarly work as an important aspect of medical training.

To meet these outcomes, many medical schools across the world encourage or mandate medical students at both undergraduate and postgraduate levels to participate in some form of research during their training (Albarqouni et al., 2018; Montori & Guyatt, 1992; Solaja et al., 2018). This training requirement is especially important in Africa, where capacity and organisational structures for the development of EBM are still limited in many countries (Forland et al., 2013). Previous studies have demonstrated that health research productivity varies widely across Africa and that South Africa produces the bulk of research publications emerging from the continent (Uthman et al., 2015). There is still much need to develop clinical research capacity and an evidence base that is contextualised to the specific healthcare challenges on the African continent (Ezeh et al., 2010; Ijsselmuiden et al., 2012).

A research assignment as part of South African medical specialist training

Since 2011, the Health Professionals Council of South Africa has mandated the completion of a research project for specialist registration (Health Professionals Council of South Africa, 2010). The HPCSA guidelines for achieving this requirement include that candidates must demonstrate that they have completed a relevant research project; gained appropriate theoretical knowledge; compiled a research protocol according to required norms; provided regular progress reports; and resented their results in the format of a dissertation according to acceptable scientific norms (Health Professionals Council of South Africa, 2010). Because the HPCSA is not a training body, it is incumbent upon the universities to interpret these requirements, provide research training and supervision, manage assessment, and ensure trainees acquire relevant research-related knowledge and skills (Aldous et al., 2015; Biccard et al., 2017; Moxley, *in press*; Patel et al., 2016; Rout et al., 2018).

There has been some agreement amongst stakeholders that the research component is an essential component of the specialist training curriculum and has the potential to improve evidence-based practice (Biccard et al., 2017; De Beer et al., 2014a; Rout et al., 2015; Szabo & Ramlall, 2016). However, the directive has also received much critical resistance, especially from trainees. Trainees are reported to feel “resentful” of MMed research (Grossman, 2019) and even launched legal action against the HPCSA when candidates who had not completed their research were denied registration (Padayachee, 2016). There has been consistent hope that the HPCSA might reconsider its requirement for a research project (Aldous et al., 2016). Key to these grumblings is that this requirement has introduced several challenges to the training environment, which I have reviewed in full elsewhere (Moxley, *in press*).

From a health professions education perspective, MMed candidates represent a unique cohort of postgraduate researchers; they face distinct challenges and have very specific research training needs compared to the “typical” Master’s student (Grossman, 2019). They tend to have limited prior research experience and inadequate knowledge, or skills required to plan and complete (and publish, as is increasingly the norm) an appropriate project. In most cases, these candidates enter the specialist training programme as research novices and ideally require formal training in research methodology and significant support from their supervisors. Unfortunately, Patel et al. (2016) reported that candidates feel their institutions do not adequately prepare them for research.

Frank et al. (2010) emphasise that curriculum planning should be “explicitly tied” to the needs of students. But little is known about what research education and support strategies are best suited to the needs of specialist trainees, especially within the context of an intensive and already academically burdened training programme. There has been some discussion in the literature around the implementation of research training and support strategies that consider the specific needs of MMed researchers and the context of the specialist training programme as a whole. Some authors have reported on their implementation of structured supervision, support, and training models to facilitate MMed research and ensure students achieve research learning outcomes (Rout et al., 2015; Aldous et al., 2016). While these colleagues have reported the success of these models at their institution, there is still little knowledge or coherent implementation of suitable MMed research education strategies across South African institutions.

Another challenge to MMed research is that supervision capacity tends to be variable or limited across institutions. Furthermore, candidates are typically not granted protected research time from other academic and clinical service obligations. This is recognized as a major obstacle to candidates’ completion of a project (Grossman, 2019). In Moxley (*in press*) I echo numerous colleagues who have expressed concern that institutions might be falling short of their obligation to equip specialists with scholarly competencies and prepare them for evidence-based practice.

Conceptions of value relating to research experience during medical training

The idea of “value” is complex and subjective and there has been discussion and debate around the meaning of this term since antiquity, as evidenced by Aristotelian views on the subject (Hart, 2017). The term “value theory” encompasses all areas of philosophy that have some evaluative aspect. It is concerned with theoretical questions about what is “good” and “bad” and how, why, and to what degree humans value things. The theory of value incorporates another philosophical term, “axiology”, which refers to the study of the nature of values and value judgments. Axiology is primarily concerned with classifying what things are good (what is of value), and how good they are based on both subjective psychological states or objective states of the world (Schroeder, 2021). Two fundamental concepts of axiology include intrinsic and extrinsic (or instrumental) value.

The intrinsic value of research

Intrinsic value refers to what is good in virtue of its intrinsic properties. The two key notions of intrinsic value include whether something is good or valuable in itself or valued by someone for its own sake. Examples include genuinely moral actions, pleasure and happiness, knowledge, creativity, sentience, and the beauty of nature. Importantly, these items are intrinsically valuable only because they are experienced by someone, and it does not make sense to ask *why* a person wants to be happy; people value happiness for its own sake. In contrast, immoral actions or anguish are examples of items or states of being that hold little intrinsic value (Gatley, 2021; Schroeder, 2021).

Some local literature has highlighted notions of the intrinsic value assigned to MMed research. As mentioned previously, trainees are said to feel “resentful” of the MMed research component (Grossman, 2019) and the requirement has been subject to legal action (Padayachee, 2016). This perhaps highlights that trainees hold negative attitudes towards MMed research and place little intrinsic value on the experience. A study by De Beer et al. (2014) found that general surgeons held negative views about the research component of their training. Aldous et al. (2015) also stated that many specialist trainees have “no intrinsic interest in research” and that its pursuance during postgraduate training is viewed mainly as “something to get done”.

The extrinsic value of research

Extrinsic (or instrumental) value refers to that which is good because it leads to other good things. For example, money has extrinsic value because it provides good things like shelter and food (Rønnow-Rasmussen, 2015; Schroeder, 2021).

In a quantitative, survey-based study, De Beer et al. (2014) found that only 43% of general surgeons considered MMed research to be “useful” for a surgical career. The same authors showed that only 37% of respondents had engaged in research after qualification which possibly highlights a dominant narrative that MMed research is valuable for conducting further research, not as a useful training strategy to promote the practice of EBM. Later, Patel et al. (2016) found that 67.7% of surgical registrars recognised the value of undertaking research, apart from as a requirement for specialist registration. Advancement of knowledge was recognized as the most valuable aspect of MMed research (41.9%), followed by HPCSA registration (36.3%), academic promotion (7.3%), fame (4.0%), and wealth (4.0%). Due to the quantitative nature of recent studies by De Beer et al. (2014) and Patel et al. (2016) we cannot

understand how respondents fully construct the meanings of “usefulness” and “value” in relation to their MMed research experience.

The educational value of research

Gatley (2021) provides a useful commentary on the meaning of “educational value” and explains its close relationship with intrinsic value. Gatley offers that education, when considered from an axiological perspective, encompasses not only the goodness of having knowledge or skills but also quality of life. Thus, educational value considers whether the learning *experience* is good or valuable enough for the learner that it warrants inclusion in the curriculum. Thus, items of educational value could include knowledge or competencies, but also states of being such as “flourishing” (intrinsic value), as suggested by Gatley (2021).

Gatley argues that something is educationally valuable only if it is good for the person or changes them for the better. The transformative potential of an educational experience is emphasised by Peters (1966) who states that “it would be a logical contradiction to say that a man had been educated but that he had in no way changed for the better”. Authors of several editorials in the South African literature have highlighted that the desired change or transformation institutions hope to see in MMed researchers is the development of scholarly competencies that support evidence-based practice, such as critical thinking and the ability to appraise evidence (Biccard et al., 2017; De Beer et al., 2014b; Rout et al., 2018; Szabo & Ramlall, 2016). This aligns with guidelines elsewhere. The Accreditation Council for Graduate Medical Education (ACGME) in the United States argues the following:

“Medicine is both an art and a science. The physician is a humanistic scientist who cares for patients. This requires the ability to think critically, evaluate the literature, appropriately assimilate new knowledge, and practice lifelong learning. The program and faculty must create an environment that fosters the acquisition of such skills through resident participation in scholarly activities.”

To our knowledge, there is an absence of literature that has objectively measured the acquisition of scholarly competencies amongst MMed candidates. Elsewhere in the world, there appears to be variable, often conflicting evidence, that research experience or training contributes to the acquisition of research-related knowledge and skills amongst trainees. For example, Löwe et al. (2008) demonstrated that a 1-year training program in clinical research substantially increased internal medicine trainees’ research knowledge, as assessed by a

multiple-choice progress test and self-assessment of competence. In comparison, a study conducted with paediatric trainees who had completed a research project found that the self-rated knowledge of most research skills (such as statistical analysis, human research ethics regulation, manuscript writing, research design, and literature searches) to be fair or poor (Cull et al. 2003). In South Africa, Rodseth et al. (2017) anecdotally shared that despite meeting the dissertation requirement, many specialists “still cannot meaningfully critique published medical literature, explain the meaning of a p-value or a 95% confidence interval”.

There is also an absence of literature that has deeply explored South African MMed candidates’ perceptions of the research experience and whether they consider the practice of EBM to be a valuable professional goal and can appreciate the research experience as a valuable training component to meet this end. Generally, there seem to be very few studies that have explored specialist trainees’ perceptions of research using a qualitative methodology. In one phenomenological study by Ledford et al. (2013), there was an overarching theme of “uncertainty” among American family medicine trainees who questioned the clinical relevance of scholarly activity during their training.

Conclusions

Due to the quantitative nature of recent South African studies by De Beer et al. (2014) and Patel et al. (2016) we cannot understand how respondents fully construct the meanings of “usefulness” and “value” in relation to their MMed research experience. There also appears to be an absence of literature that explores the educational value of MMed research. Given the unique characteristics of South African MMed candidates and the challenges experienced within the specialist training environment, we identified a need to explore the meaning candidates assign to their research experience.

Therefore, the current study aimed to explore surgery trainees’ experiences of MMed research. We chose to focus on a surgical discipline to expand previous quantitative assessments of surgery trainees’ research experience in the South African context (De Beer et al., 2014; Patel et al., 2016). We had two specific objectives for this research: 1) To explore what value registrars assign to their research experience; and 2) to identify any enablers or constraints that affect the value of MMed research experience. Findings from this research might offer useful insight regarding the strengths and opportunities for MMed research support and training.

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Chapter 2: Publication-ready manuscript

The following manuscript has been prepared for submission to *Advances in Health Sciences Education*. The journal's aims and scope, as well as author guidelines, are given in Appendix A. The journal has no word restrictions, but the content of this manuscript will be reduced for publication. A comprehensive account of the findings is provided for examination purposes.

“There’s no doubt that one learns through it all”: South African surgery trainees’ experiences of Master of Medicine research

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Master of Medicine; medical specialist trainee; qualitative research; research experience; research supervision; resident research; transformative learning; South Africa

“There’s no doubt that one learns through it all”: Surgery trainees’ experiences of South African Master of Medicine research

Abstract

Background: Since 2011 The Health Professionals Council of South Africa (HPCSA) has mandated the completion of a Master of Medicine (MMed) research project for medical specialist registration. This has introduced several challenges for the training environment and there is concern that institutions do not adequately prepare trainees for their role as scholars. MMed research has therefore received much critical resistance and stakeholders have questioned its value as part of the specialist training curriculum. To gain a deeper understanding of the affordances, enablers, and challenges of MMed research we were interested to hear how trainees construct the meaning of value in relation to their experiences.

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Methods: This qualitative study adopted a social constructivist epistemological perspective. We purposively sampled 9 participants who had completed their research in a single surgical division at Stellenbosch University. Data were generated via semi-structured interviews with individual participants and analysed using reflexive thematic analysis.

Findings: We identified four key themes: 1) resentment, relief, realisation, and prerequisite; 2) the clinician versus clinician-scientist dichotomy; 3) research exposure and leadership, and 4) “there’s no doubt one learns through it all”. MMed research is a source of trainee stress but they can recognise in hindsight research has served an important role in professional development. Through experiential and social learning, trainees develop critical appraisal skills and an improved understanding of the research process and recognise the value of scholarly competencies for evidence-based medicine. Research supervision and leadership represent key enablers in this learning process.

Conclusions: Our findings suggest that MMed research offers significant educational value to specialist trainees and therefore warrants continued inclusion in the curriculum. Research supervisors play an important role in managing the research process, initiating MMed candidates into the research community, and making explicit the hidden outcomes of postgraduate research. Therefore, amongst other recommendations for health professions education, we especially recommend that future research and faculty development initiatives should focus on the professional development of MMed research supervisors.

Introduction

Over the last 20 years, evidence-based medicine (EBM) has emerged as a conceptual approach to decision-making in the clinical environment (Sackett et al., 1996). EBM is driven toward combining clinical expertise with the “conscientious, explicit, judicious and reasonable use of modern, best evidence in making decisions about the care of individual patients” (Masic et al., 2008). To develop this professional competence, medical training programmes aim to equip health professionals with the competencies they need for making clinical decisions based on data. To meet these outcomes, many medical schools across the world encourage or mandate medical students at both undergraduate and postgraduate levels to participate in some form of research during their training (Albarqouni et al., 2018; Montori & Guyatt, 1992; Solaja et al., 2018).

Since 2011, the Health Professionals Council of South Africa (HPCSA) has mandated the completion of a research project for medical specialist registration (Health Professionals Council of South Africa, 2010). Because the HPCSA is not a training body, it is incumbent upon South African universities to interpret these requirements, provide research training and supervision, manage assessment, and ensure trainees acquire relevant research-related knowledge and skills (Aldous et al., 2015; Biccard et al., 2017; Moxley, *in press*; Patel et al., 2016; Rout et al., 2018). Unfortunately, MMed research has introduced several challenges to the training environment, as reviewed in full by Moxley (*in press*).

One of the greatest challenges faced across training institutions is the limited supervision capacity for MMed research projects (Aldous et al., 2016; Rout et al., 2015). As discussed by Aldous et al., many specialists do not fulfill the regulatory requirements for supervision, as set out by the South African Council for Higher Education (Rout et al., 2015). There is also concern that many MMed research supervisors are “relatively inexperienced and may be as much in the dark as the students” (Rout et al., 2018). Furthermore, even though the specialist training curriculum was already burdened with clinical training and service commitments, and academic preparation for the respective College of Medicine exams, the programme was not amended to accommodate the additional time required to conduct research (Aldous et al., 2016; Biccard et al., 2017). Due to these challenges, the research project has been met with critical resistance from various stakeholders, especially trainees who have little intrinsic interest in research and view its pursuance during specialist training as merely “something to get done” (Aldous et al., 2015).

From a health professions education perspective, South African specialist trainees represent a unique cohort of postgraduate researchers; they face distinct challenges and have very specific research training needs compared to the “typical” Master’s student (Grossman, 2019). In many cases, these candidates enter the specialist training programme as research novices with limited prior research experience and inadequate knowledge or skills required to plan and complete (and publish, as is increasingly the norm) an appropriate project. These candidates ideally require formal training in research methodology, but their training programme offers insufficient time to learn about and conduct research (Aldous et al., 2016; Biccard et al., 2017). The added workload and severe time constraints associated with already overburdened academic and clinical responsibilities possibly account for why the MMed once represented the South African qualification with the lowest completion rate (Mbali, 2011).

Some authors have reported on their implementation of structured supervision, support, and training models to facilitate MMed research and ensure students achieve research learning outcomes (Aldous et al., 2016; Rout et al., 2015). There is still opportunity to explore research support and education initiatives that cater directly to the unique training needs of these postgraduates. The situation is further complicated by the limited clarity of guidelines on the nature and scope of MMed research and research training, acceptable outcomes, and how to ensure quality assessment (Biccard et al., 2017; Rout et al., 2018). This means that trainees and their supervisors tend to have a poor understanding of research expectations, what competencies need to be developed, and how these complement trainees’ development as medical professionals (Rodseth et al., 2017).

A survey-based study by De Beer et al. (2014) found that only 43% of general surgeons considered MMed research to be “useful” for a surgical career. Later, Patel et al. (2016) found that 67.7% of surgical registrars recognised the value of undertaking research, apart from as a requirement for specialist registration. Advancement of knowledge was recognized as the most valuable aspect of MMed research (41.9%), followed by HPCSA registration (36.3%), academic promotion (7.3%), fame (4.0%), and wealth (4.0%). Patel et al. (2016) also reported that candidates feel their institutions do not adequately prepare them for research. Neither of these studies considered the possible value of research experience for strengthening specialists’ practice of evidence-based medicine. This calls into question the value of MMed

research as a useful educational tool to develop medical experts who are competent in their roles as scholars and ability to practice EBM (Frank et al., 2015; J.R. Frank & Danoff, 2007).

Due to the quantitative nature of the studies by De Beer et al. (2014) and Patel et al. (2016) we cannot access an understanding of how respondents fully construct the meanings of “usefulness” and “value” in relation to their MMed research experience. To our knowledge, there is also an absence of literature that explores the educational value of the MMed research experience, both objectively and from the perspective of the trainee. In the global context, very few studies have explored specialist trainees’ perceptions of research using qualitative methodologies. In a phenomenological study by Ledford et al. (2013), there was an overarching theme of “uncertainty” among American family medicine trainees who questioned the clinical relevance of scholarly activity during their training.

In a recent review article, Moxley (*in press*) echoed Grossman (2019) who called on medical faculties to develop student-centred research support and education and supervisory models that can better meet the training needs of MMed candidates. We believed exploring the subjective experiences of our South African trainees might reveal some of the educational affordances and deepen our understanding of the value associated with MMed research. We chose to focus on trainees within a surgical discipline to expand previous quantitative assessments of surgery trainees’ research experience in the South African context (De Beer et al., 2014; Patel et al., 2016). Findings might offer useful insight regarding ways institutions can strengthen MMed research supervision, support, and training. Therefore, this study aimed to explore surgery trainees’ perceptions of the value of MMed research.

Conceptions of intrinsic, extrinsic, and educational value

The idea of “value” is complex and subjective and there has been discussion and debate around the meaning of this term since antiquity, as evidenced by Aristotelian views on the subject (Hart, 2017). The term “value theory” encompasses all areas of philosophy that have some evaluative aspect. It is concerned with theoretical questions about what is “good” and “bad” and how, why, and to what degree humans value things. The theory of value incorporates another philosophical term, “axiology”, which refers to the study of the nature of values and value judgments. Axiology is primarily concerned with classifying what things are good (what is of value), and how good they are based on both subjective psychological states or objective states of the world (Schroeder, 2021). Two fundamental concepts of axiology

include intrinsic value, referring to what is good in virtue of its intrinsic properties, and extrinsic (or instrumental) value, encompassing that which is good because it leads to other good things (Rønnow-Rasmussen, 2015; Schroeder, 2021).

Gatley (2021) provides a useful commentary on the meaning of “educational value” and explains its close relationship with intrinsic value. Gatley offers that education, when considered from an axiological perspective, encompasses not only the goodness of having knowledge or skills but also quality of life. Thus, educational value considers whether the learning *experience* is good or valuable enough for the learner that it warrants inclusion in the curriculum. Thus, items of educational value could include knowledge or competencies, but also states of being such as “flourishing” (intrinsic value), as suggested by Gatley (2021).

We have used these conceptions of value to frame the findings in the current study and interpret the value MMed candidates assign to their research experiences.

Methodology

This qualitative study adopted a social constructivist epistemological perspective. The central premise of this paradigm is that reality is socially constructed whereby individuals develop subjective meanings of their experiences and that this gives rise to multiple meanings of reality (Lincoln & Guba, 1985). Data were generated via semi-structured interviews which allowed us to deeply explore the experiences of individual participants (McGrath et al., 2019a). During reflexive thematic analysis of the data (Braun & Clarke, 2006, 2019), we used an inductive and interpretive perspective to understand participants’ subjective perceptions of their MMed research experience (Creswell, 2014; Willig, 2013). This study is reported according to the COREQ guidelines (COnsolidated criteria for REporting Qualitative research) (Tong et al., 2007).

Methods of data collection and analysis

Study context

This study was conducted within a single surgical division at the Faculty of Medicine and Health Sciences at Stellenbosch University, South Africa. The identity of the division is kept confidential to protect the identity of the participants. All MMed researchers in this division are supported by at least one supervisor with disciplinary expertise and also work with a clinical research expert who has been specifically appointed to act as a co-supervisor for MMed research. The research co-supervisor (hereafter abbreviated to RC) also provides

research training in the form of lectures within the division. Additional support for MMed researchers includes research training initiatives offered by the Registrar Research Support Office in the Research Development and Support Division, as well as other support structures within the faculty. Candidates are required to have had their research assignments marked before they are permitted to sit for their final exams with the respective College of Medicine.

Participants

We purposively sampled eligible participants who were those individuals that had completed their MMed research assignments (been examined or have published) or at least written a first draft. We expected that participants who had completed most of the important milestones in their research would be able to provide insight regarding the overall research experience. In this division, standard practice is for candidates to publish their research before examination. At the time of the interviews, all participants had published their research in accredited journals and passed their MMed research examinations. In May 2021, eligible participants were invited to participate via email and communication from the head of the division and research co-supervisor. Respondents were consecutively recruited in the order of their acceptance to partake in the study. The final sample comprised 9 participants including both males and females.

Data generation

In-depth, semi-structured interviews with individual participants were conducted by the first author (KM). The interview method allowed us to explore in an in-depth manner the unique experiences and perceptions of the trainees regarding their MMed research (McGrath et al., 2019). Individual interviews were chosen instead of focus groups to limit the possibility that a few individuals might dominate the conversation, thus limiting the richness of the different participants' insights (Leung & Savithiri, 2009). A semi-structured interview approach was used to provide prompts for reflection and to keep the interview focused. This approach also allowed participants to express themselves freely and the interviewer (KM) was able to probe for deeper insights where necessary. A newly developed interview guide was piloted with one trainee within a different surgical division. We used the interview schedule used by Ledford et al. (2013) to guide the development of these questions. The final interview guide included seven open-ended questions designed to capture detailed insights from participants about their experiences (Appendix B). The semi-structured nature of the interviews allowed the interviewer to amend the order and question phrasing as required.

All interviews were conducted in English because this is the language of the medical specialist programme at Stellenbosch University. Interviews were conducted via Microsoft Teams (due to ongoing health concerns related to the COVID-19 pandemic) at a time that was most convenient for the participants, given their clinical responsibilities. Participants joined the online interviews either from their homes or from a hospital-based office in which they felt most comfortable. KM took notes throughout the interviews to highlight key responses and record her reflections. Interviews lasted 42 minutes on average and were digitally recorded and auto transcribed using these features offered by Microsoft Teams. The recordings and transcriptions were de-identified upon download and deleted from the Microsoft online platform. KM checked the transcriptions for accuracy and completeness by comparing the text files with the audio recordings.

Data analysis

Data were analysed primarily by KM through an inductive and interpretive process guided by the reflexive thematic analysis approach of Braun & Clarke (2006, 2019). In the first step and through the process of checking the accuracy of the transcription, KM read the narratives several times to familiarise herself with the data. In the second step, KM used open coding to generate initial codes which were grouped into categories according to their similarities. In the third step, the categories were organized into themes that capture interpretations of the data. In the fourth step, all quotations that correspond to a theme were extracted from the narratives. In the fifth step, a comprehensive analysis was conducted to examine the extent to which the themes contribute to an understanding of the data. The sixth step involved writing up a detailed description and discussion of the results. To ensure robustness, descriptive results have been accompanied by quotations that illustrate the identified themes. The research supervisor (JB) provided guidance throughout the data analysis process and checked the codes and themes identified by the primary researcher (KM). We decided against using data analysis software, such as Atlas.ti due to concerns that the use of such software can involve deterministic, quasi-quantitative, and rigid processes and “put pressure a sense of pressure on researchers to focus on volume and breadth rather than on depth and meaning” (St John & Johnson, 2000).

Using an inductive approach, we allowed for both explicit and implicit interpretation of the data keeping in mind the possible intrinsic and extrinsic value of the research experience, as well as its educational value as defined by Gatley (2021). Gatley offers that education, when

considered from a value theory perspective, encompasses not only the goodness of having *knowledge* or *skills* but also quality of life. Thus, educational value considers whether the learning *experience* is good, or valuable enough for the learner, that it warrants inclusion in the curriculum.

Research team

This research was undertaken by KM as part of a structured Master of Philosophy in Health Professions Education. KM has a background in natural sciences which is grounded in a positivist paradigm, but she had some experience and training in qualitative methodologies before the current work. At the time of writing, KM had 7 years' experience providing research support and training for specialist trainees and is currently the head of the Registrar Research Support Office at Stellenbosch University. We believed that KM would be the most suitable person to conduct the interviews due to her understanding of the registrar research experience and to fulfill the expectations of the MPhil degree. JB was the research supervisor and provided guidance and insights from her perspective as a specialist physician, academic within health professions education, and experienced qualitative researcher. Neither researcher had any prior relationship, professional or otherwise, with any of the participants.

Trustworthiness of the findings

The researchers acknowledge that their interpretations of the data are their own and that other researchers could apply their own interpretations of the data. The trustworthiness of the findings was assured through addressing quality criteria such as credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1985).

Credibility

Credibility refers to the confidence that can be placed in the truth of the research findings. To mitigate threats to credibility we have provided details of our analytical process in which two complementary researchers contributed to the analysis and interpretation of the data. KM also compared the data to her written reflections taken during and after the interviews.

Confirmability

Confirmability refers to the extent to which the study findings are grounded in the participants' voices rather than the researcher's perspectives. To ensure confirmability, JB independently examined the data and guided the thematic analysis process. Both researchers

acknowledge that they bring their own perspectives to the analytic process. KM practiced reflexivity and kept written reflections throughout the data collection and analysis process. KM and JB engaged in discussions about potential partiality to mitigate their influence on the findings.

Dependability

Dependability refers to whether the study findings can be replicated if the same participants are interviewed again. To ensure this we kept an audit trail of our codebook and all decisions taken during data analysis.

Transferability

Transferability refers to how well the study findings can be transferred to other settings, contexts, or groups. To ensure this, we have provided a detailed description of the study context as well as the study design (including ontology, epistemology, methodology, and methods).

Ethics considerations

This study was approved by the Health Research Ethics Committee of Stellenbosch University (ref #: S16/09/175; Appendix C). We were also granted institutional approval from Stellenbosch University to recruit registered students. Participation was voluntary and all participants provided written or verbal informed consent.

Results and discussion

Through interpretation of our participants' experiences, we identified four key themes: 1) resentment, relief, realisation, and requisite; 2) the clinician versus clinician-scientist dichotomy; 3) research exposure and leadership; and 4) “there’s no doubt one learns through it all”. The sub-themes and categories underpinning these themes are summarised in Table 1.

Table 1: Summary of themes, sub-themes and categories informing the results.

Theme	Subtheme	Categories: sub-categories
Theme 1: Resentment, relief, realisation, and prerequisite	Resentment	Obligation to do research: Interest in research, Mandatory, "Get it done" Time pressures: Stress and burnout, no protected time from clinical work, impact on exam preparation Impact on motivation: Avoidance, intrinsic motivation, pressure from supervisors
	Relief	Key turning point, subsiding pressure
	Realisation	Challenging initial assumptions, extrinsic value
	Prerequisite	Mandatory, affordances, personal and professional development
Theme 2: The clinician versus clinician-scientist dichotomy	Reasoning behind MMed research	Not knowing why, no explicit outcomes, HPCSA's whim, money and esteem for university
	Dichotomy	Choose one or the other, value of research competencies for clinical work
	Third space	Connecting competing roles, evidence-based medicine, hidden curriculum
	Identification as researchers	Resistance to adopting researcher identity, feeling "other", conduct further research
Theme 3: Research exposure and leadership	Entering the research world	Research novices, not legitimate community members
	Preparation for MMed research	Undergraduate training, leadership in the clinical environment
	Leadership in the research community	Research culture, lead by example, research supervisors, motivation and management
	Initiation	Socialisation, newcomers and "old timers"
Theme 4: "There's no doubt that one learns through it all"	Outcomes of learning	Knowledge: Understanding of the research and publication processes, new clinical knowledge and insight, understanding of academic language, statistics concepts Skills: Academic writing, critical appraisal, data and reference management Confidence to conduct future research
	Mechanisms of learning	Experiential learning, social learning, feedback and guidance from supervisors, research training, studying for College exams, presenting at academic conferences

Theme 1: Resentment, relief, realisation, and prerequisite

This theme considers the resentment trainees feel about the obligation to do research, the relief they feel when they complete important research milestones, realisation about the value of the MMed research experience, and their thoughts about whether MMed research should be a requisite for registration with the HPCSA. This journey of conflicting outlooks is directly mediated by the HPCSA's requirement for a completed research project in that trainees would not have been afforded these experiences had research not been mandatory. Their shifting attitudes between the start and end of their projects are captured in Table 2 which documents reflections from Participant 1.

Resentment

This sub-theme comprised three categories of data relating to an obligation to do research, time pressures, and impact on motivation (Table 1).

When reflecting on the start of their MMed research, participants focused on the obligation to do research and the stress this brought them. Individuals had very little intrinsic interest in research which is perhaps linked with their preconceived notions about research and resistance to identifying as researchers (Theme 2). Individuals reflected that had they been given the option they would not have chosen to do research and initially viewed their projects as merely something to get done. This finding echoes similar anecdotal reports that candidates tend to enter the training programme with little interest in research and view it simply as a means to an end (Aldous et al., 2015).

“When I started out I told myself I just want something quick and fast to get it done” [P3]

“At this stage, the MMed¹ there's a lot of weight put on it and I think that's causing a lot of stress. Having that sword over you saying listen, you will not qualify if you haven't done this.” [P9]

“I definitely only did it an MMed because I had to. I wouldn't have done it if it wasn't a prerequisite.” [P6]

¹ When participants refer to “the MMed”, this is a colloquialism meaning “the MMed research project”

Table 2: Shifting attitudes to MMed research as demonstrated by Participant 1

Resentment	Relief	Realisation	Requisite
<p><i>“This MMed research thing that you have to do is mandatory, so a lot is a lot of expectation is based on it. You can't. You can't write your exams if you don't have it done [...] Yeah, I felt like I was uh well not drowning but it felt like a mountain that I had to overcome. But I yeah, I was I was quite worried about the whole thing. I I just wanted to get it over and done with initially.”</i></p>	<p><i>“I think once I did my yeah I think maybe my data collection. I think once that was done then it felt like a big hurdle and then I could sort of think clearly about what I wanted to do with it. [...] I think I think, once that was that was done then I thought like OK, maybe this is actually quite doable. It's a lot it's a lot less risky.”</i></p>	<p><i>“I think specifically over time um and in the registrar program my my outlook on it has changed significantly. I think I think it's very, very important to know about research, especially because I mean, for evidence-based medicine to practice evidence based you have to know a little bit about research and a good way of of learning about it is to do a research project.”</i></p>	<p><i>“It pains me to say it, but I think I would probably make it mandatory. It might be from my, you know, hindsight is always 2020 but uh it helps that I finished. I think if you told me that if you asked that question when I started, I'd probably say hell no, it should not be mandatory. I'm probably just I'm not going to become a researcher I'm going to become a clinician. I think. I think I think now I would as someone who has already gone through it I would say that it should be mandatory, yeah.”</i></p>

Individuals reflected on the overall training programme and how the research component added significant stress to their training experience. Like any other research for degree purposes, the MMed research project from planning to execution to final write-up requires “an enormous investment of time” for both the candidate and their supervisors (Rout et al., 2015). The lack of protected research time from clinical service and other academic obligations is widely cited to be a key barrier to MMed research (Biccard et al., 2017; Grossman, 2019; Mbali, 2011; Peer & Fagan, 2012). Patel et al. (2016) found that 87.9% of surgery trainees believed insufficient time to be the greatest obstacle to research. In the current study, individuals were also acutely aware of looming College exams and felt pressure to complete their research timeously; both to be permitted to sit for the exams and to allow enough studying time. Grossman (2019) demonstrated that most trainees can finish their research projects within the four-year specialist training programme, but this is often at the expense of being able to engage fully with final exam preparation.

Individuals experienced a range of negative consequences while trying to balance research time with their clinical schedules, academic workload, and personal lives. Individuals shared that they experienced burnout and chronic stress and often their personal lives were affected. These experiences do not appear to be unique to this division. A recent study by Beath et al. (2021) explored the factors affecting South African psychiatry training and the top three sources of stress were exam preparation (35.7%), time pressure (32.9%), and the research project (32.9%). Lack of time is cited as a top reason for poor specialist trainee engagement with research in other parts of the world, such as in Singapore (Chan et al., 2017), the United States of America (Rivera et al., 2005), Canada (S. Gill et al., 2001) and Japan (Takahashi et al., 2009). In light of this, it is perhaps unsurprising that individuals feel resentful of MMed research because it represents a key contributor to the stress associated with specialist training. This possibly also partly accounts for why trainees assign little intrinsic value to the experience.

“It's just burnout, uh because it it it the research does contribute to lots of stress I feel especially if you have issues collecting all your data um getting all your patients in all of that because the the the longer it goes on the the more stressful it will become because you know you only have a certain amount of time to finish it. You don't want to still be sitting with it when you do your exams uh, so I think they it's the most stressful that's the most stressful thing [...] It's very difficult juggling the academic requirements um your day to day duties

and also having to do, uh, a MMed it's very it's very difficult to to to balance all those those things while you're busy doing doing your registrar years.” [P3]

“I think is the chronic stress uh of its waiting and you always have it in the background, and it's always that thing that you have to do after you've studied for the test, after you've prepped for your surgical experience, after you've spent time with your family and got kids in the bed, and all of that, then you you never, really, you're never allowed to relax in your mind.” [P9]

“I probably wouldn't have done this study if it was just up to me and if it wasn't a prerequisite because it it does take time it does take time at home and beyond work um so sleepless nights not sleepless nights but definitely lost some sleep over getting everything ready and getting everything done. So just sort of time management and juggling it a bit between studying.” [P5]

Despite the HPCSA regulation, looming College exams, and the extrinsic motivation these provided, it appears that individuals' resentment toward MMed research and the stress and pressure associated with the training programme reduced individuals' intrinsic motivation to focus on their research. Findings from a systematic review of medical students' perspectives about research found that students with negative attitudes to research are less likely to put effort into research activities into conducting research (Naing et al., 2015).

The research supervisors in this division are aware that MMed candidates struggle to sustain momentum and motivation. They consistently emphasized that research should be prioritized, regularly checked in with individuals, and expected them to adhere to deadlines for certain tasks. While this ensures the completion of research, this pressure also causes stress for the trainees as they try to balance competing demands on their time. The role, importance, and characteristics of research supervisors in relation to MMed research is discussed further under Themes 3 and 4.

“When you're a registrar and you've got 1000 things going on you're like really I don't feel like doing this. I mean it's painful. No one wants something to be mandatory before they complete their degree, especially if you the one of the I mean if you're in a system that's already quite stressful and strenuous.” [P4]

“I'm just very thankful I'm not in that situation. I've I've seen too many people you know struggling in their final years handling the stresses of that and the daily academic onslaughts of your consultants you know asking constant questions and expecting you to know the answers and then just before you really topple over still ask you “so how far is your MMed?” you know? I think that's why a lot of people hate it or find it frustrating because all your study supervisor does the whole time is “where's this, where's that, when is this coming?” and you think it “ja it's on my to do list, but it's like it's number 14 on my to do list!” [P9]

“I had essentially finished writing the article after about and I was just submitting to different journals after two years, so I mean for me, I would never I would never have done that if I didn't have a good research if I didn't have [RC] and my consultants around. Yeah, yeah. Basically cracking the whip.” [P1]

“And it's one of those things that's easy to forget about and put off and life carries on.” [P2]

Relief

Completing data collection and analysis represented a key turning point for our participants whose feelings shifted from resentment to relief because the situation felt *“a lot less risky” [P1]*. Individuals expressed that it was when they achieved these milestones that the pressure and negative feelings associated with research began to subside.

“I think for me the the biggest part was just getting all my info well getting all my data done so when I when I knew all my data was collected and I have everything ready now and I can finally just start writing, I think that was that was the initial high and then at the end when you when you write it and you get feedback from your supervisor to say ja no, it looks good um and when the whole thing comes together at the end um I think that was that was also a special high so but I think initially just giving all the data getting all the data in I think once I had all my data I I felt I felt some some not not relief but I felt like OK so it at least this is done I can just sit now and start writing this this thing.” [P3]

“For me the aha thing was that once you have your data and it's analyzed and you're now in the write up phase [...] So for me, when I started writing, I was like this is actually not as hard or as difficult as everyone makes it out to be, and it actually doesn't like for me I got quite excited about writing it every day.” [P2]

Realisation

Individuals realized that research was not as difficult or terrible an experience as they initially believed it would be. They recognized in hindsight that their research journeys were worthwhile, rewarding, and enjoyable.

“I must say I didn't think I would change but I I have changed. I I think you really js it was what I would say that has changed is a research is actually in the end if it if you if you are interested in the topic it becomes quite enjoyable [...] You know being in a ship sailing to a new new world and you arrive at an unknown destination sort of that scenario that that was what made me think “No, this isn't just a project I should get done.” I enjoyed sailing on this ship and I enjoyed exploring the new country that that was enjoyable.” [P8]

“Haha in the end, I actually I'm actually glad I did it because it it in the end it was very rewarding, having having done it and having completed it and having done something that's worthwhile not just having done something that to get it done and hand it in and get your marks and be done but having done something that that was really, really worthwhile [...] it was my first like sort of introduction into research uh and I I found that I actually I did enjoy it, not at the beginning, but closer to the end I did I did enjoy it. And, uh, I'll probably do maybe some research in the future again.” [P3]

“It's way easier than I thought. Um it it is as rewarding as I thought. It's quite nice getting that first publication and getting that sort of an email with with the from the the the journal saying this is your publication, this is the the the issue number and and all that. Um but definitely easier than I thought and and then, but there's a lot more detail than I thought initially.” [P5]

They also realised the extrinsic value of MMed research, other than being able to register as a specialist. Individuals spoke about the value of the publications arising from their research and that having evidence of research participation would expand their career opportunities, especially when applying for fellowships and academic posts. The study by (Patel et al., 2016) also found that surgery trainees valued MMed research for academic promotion.

“In jobs and in reg posts and in further fellowship posts it's it's it's almost like currency if you don't have it, you're not going to get anything.” [P6]

“If you've got a CV and you've published a lot more than you've probably got new or I mean, if you're applying for state position, there's definitely an emphasis on having more research behind you if you wanna have your one foot ahead of the other person that's that's applied for the same post [...] Public, I think it's there's an expectation for you to produce research so if you're a consultant there's an expectation for you to produce research. And I think they'll explain that to you in your interview.” [P4]

“Fellowship positions one of the things that they look at is publications. So I guess that's how it would benefit, but I think to reap the benefits I'd have to do a little bit more research [...] “Opportunity brings opportunity in a sense and there's a lot of sort of I'm gonna say combined research like multicenter research going on, and in that sense I'm now involved in some of that.” [P1]

But in retrospect I I was a bit stupid not doing more um purely from uh future posts and future employment um the burden is very heavy on research. Um or not burden the emphasis. And I think it's actually quite easy if you do it in your registrar time. You're not as busy as you think you are. It's only looking back that you realize that.” [P6]

Prerequisite

There was agreement amongst individuals that MMed research should continue to be mandatory. Individuals recognized that their MMed research afforded them an opportunity for personal and professional development and would have missed out on this had the experience not been mandatory. Students who choose to conduct a research elective during their undergraduate training also realise that this exposes them to the intrinsic and extrinsic benefits of doing research (Marais et al., 2019). These students believed that research done only as an elective would be disadvantageous to those students who choose not to engage in research.

“So my my junior colleagues will shoot me for this but yes [...] I would keep it mandatory. I think so and I think it it adds enough value uh to the person themselves and to the academic body.” [P5]

“Ja, I would. For sure. Twofold: Because we had to do it. No I’m joking! I’m joking! I really know that’s a bad joke. I mean remember like part of I’m not done yet I still have to pass so I say this with humility but you realize as you go through things that the unpleasant stuff is there for reason too and you need that it needs to be part of practice. I mean, evidence-based has to be a part of practice like and to understand what that means you sort of at least need to have tasted it, whether whether your research is involved in that type of research or whether it’s just to see the process behind it and all the hoops.” [P6]

“Your problem is if you say it is it’s it’s a opt in you know if you want to do it you can, the moment you do that it’s just human nature to take the easier route and then no one would do it [...] They might lose out on that and there you will lose potential academics or researchers or people who in fact enjoy that because they would just never get the exposure due to their institution.” [P9]

Theme 2: The clinician versus clinician-scientist dichotomy

This theme highlights the value of MMed research for prompting trainees to make positive connections between research competencies and their clinical work.

In the South African literature, numerous scholars emphasise the importance of MMed research for equipping specialists with the competencies required for EBM (Biccard et al., 2017; Grossman, 2020; Patel et al., 2016b; Rodseth et al., 2017; Smith, 2014). However, what was missing from our participants’ reflections was any indication that stakeholders within the specialist training programme make this explicit. When asked directly about why the HPCSA mandates the completion of a research project, individuals struggled to provide an answer. This limited understanding perhaps contributed to individuals’ initial resentment toward MMed research because participants felt the HPCSA has made this decision on a whim. Participants also wondered if MMed research offers a way for the university to generate money or esteem.

“You mean why we why are we required to have a research research project? Why? Sjoe I wouldn’t know. I I like. No, I I would I wouldn’t know, sorry I don’t. I don’t know what, what, how they make their decisions.” [P8]

“I don't know, I think I think you pay them money each year so you could do this. That's probably how they're benefiting one way. Uh, and then. And then maybe they. Maybe they're paying it forward so you if you learn how to do some research while while you're here, then your following projects might be I think better might be more esteem for the university. That's what I assume. I have no idea.” [P1]

“I'm quite cynical, so I'll be like why do you want us to do it? What are you getting out of it? I suppose it depends on what the incentive is for doing something like that, but I don't have I don't I don't know why they do it so [...] if there's there's value in in knowing about the scientific method as as a doctor but I don't know what they're trying to achieve [...] I don't clearly understand how the financial part of this. I have a feeling it's financial. But how the financial, how the financial situation deals, how how they incorporate that into like university funding or funding for themselves or things like that I don't really understand that I don't know how they generate income based on research [...] The HPCSA now make it a requirement. So I'm like and why? What's the? What is the incentive and what's the incentive behind it? [...] I don't know their guidelines 'cause I keep going back to the guidelines and asking myself and this is why I'm doing this research it's like come on guys can you be more specific and define what it is that you want these guys to be taking away with them? And it's still very vague you know, produce a protocol, produce a thesis, you know?” [P4]

“I don't know if there's financial gain or stuff higher up for either the universities or the HPCSA or whoever. I can't see how it can be for the HPCSA or how they really get value from it [...] So so getting publications out obviously the financial incentive for the universities is is massive [...] So from my understanding, I think I think it was driven from the university side because, as I understand you still do the university still gets a quite a big incentive for every completed MMed. I can't remember the numbers but it sounded like it was quite substantial. For department like us, it's going to have probably eight or nine people qualifying this year and, you know, getting 9 incentives in in a year is is quite a quite a lot of money” [P5]

It is perhaps because the purpose of MMed research was not made explicit to our participants that they held in mind a distinction or dichotomy between training to be a clinician who does not conduct any research and training to be a clinician-scientist, defined as “those individuals holding an MD or MD/PhD degree who perform biomedical research of any type as their

primary professional activity” (Zemlo, as cited by Somekh et al., 2019). This type of dichotomous thinking where researchers and clinicians exist in different “camps” is apparent across the health professions discourse. Scholars speak of the “scientist-practitioner chasm” (Constantino et al., 2017) and the “divide” between those who identify as clinician-scientists and clinicians (McWilliams, 2017). Even for the clinician-scientists, scholars speak of the challenges of being “double-agents” (Yanos & Ziedonis, 2006) who must navigate a “clash in agendas” between their clinician and researcher roles.

When reflecting on the start of their research, participants seemed to focus on a need to choose one or the other (clinician or clinician-scientist) and failed to see the direct association between research competencies and their clinical work. This echoes the findings by De Beer et al. (2014) who found that only 43% of general surgeons considered MMed research to be “useful” for a surgical career. A previous study found similar results amongst European family physicians (Kersnik et al., 2015). Our participants grappled to understand why the HPCSA would mandate research for all trainees if only very few had the desire or opportunities to pursue research careers. Individuals emphasised that they had entered the training programme to become clinicians.

“I think if you told me that if you asked that question when I started, I’d probably say hell no, it should not be mandatory. I’m probably just I’m not going to become a researcher I’m going to become a clinician.” [P1]

It seems that through the process of conducting research that our participants recognized the existence of a type of “third space” – a nexus that positively connects these competing and opposing roles of clinician-researcher and clinician. This nexus constitutes the understanding and acknowledgment that scholarly competencies, such as evidence-based critique and decision making, enhance clinical decision-making and patient care. Individuals recognized that this also has legal implications and could therefore understand why the HPCSA, as the statutory body guiding the professions and protecting the public, would mandate research.

“I think a lot from the reading I’ve done a lot of the sort of eminent um academics or researchers in South Africa [...] a lot of the work they have done have been done from a private setting, so so so I don’t think uh it’s something to be once one is in private uh you

don't turn your back on evidence-based medicine, definitely not [...] the research did help me to become more aware of evidence based medicine” [P8]

“You realize as you go through things that the unpleasant stuff is there for reason too and you need that it needs to be part of practice. I mean, evidence-based has to be a part of practice like and to understand what that means you sort of at least need to have tasted it.” [P5]

“Apart from having the knowledge and maybe getting in trouble less, I don't know because you're practicing evidence-based medicine. So if you've got the paper to back you, it's probably easier for the HPCSA to protect you” [P5]

“We base a lot of stuff that we do on what is the latest what is the latest research and just even if it's just vaguely having the ability of knowing what is good research and bad research and 'cause the problem is you will be basing your decisions on a bad research topic and you will end up in court and some guy will then I mean they tell you “Oh no, you did this”, “but this was actually a scientific invalid research your honour” and you'll be in trouble.” [P9]

“I understand as a scientist what the value is for me and what the value is for like the public because obviously we're treating the public, they have a, they have an investment in us in making sure that we're doing what's right for them and the HPCSA probably does want that and they probably use that as a as their excuse for for making it compulsory.” [P4]

Through their reflections, individuals gained a better understanding of the intended outcomes of MMed research and that it is not aimed at “making researchers out of clinicians” (Smith, 2014), although it does also introduce clinicians to the research community should they wish to pursue academic careers (Theme 3). This important outcome of MMed research is largely unacknowledged and undefined in the training environment. It appears that understanding the role of scholarly competencies in clinical practice represents a component of the hidden curriculum, which refers to what students learn instead of what they are taught (Hafferty, 1998). We cannot know if our participants were consciously aware of this learning (the link between scholarly competencies and clinical work) or whether this was realised through the process of reflection afforded by the current research.

Even after completing their research, some individuals continued to resist identification as researchers and expressed some hesitance about conducting future research (Table 3). These participants tended to view themselves as “other” in comparison to colleagues who they perceived to be legitimate scholars or have a natural talent for research and scholarly thinking. Other participants seemed to be more enthusiastic about conducting future research and possibly pursuing academic careers, perhaps suggesting their greater affinity for research and confidence in their ability to function as members of the research community.

Theme 3: Research exposure and leadership

This theme considers research exposure and leadership as enablers for MMed research. This enabler is realised within the immediate environment (the training context of the surgery division) and within a broader context of the clinical research across South Africa and even abroad.

Our participants entered the training programme as research novices and had very little prior exposure to the research community. Based on participants’ reflections, this appears to be a consequence of the limited focus on research during their undergraduate training as well as limited research leadership in South African clinical environments.

“You get exposed to it a little bit maybe when you're a student um pre-grad um but but after that I don't think there's when you're in internship or during com-serve or even during your MO years if you didn't make an effort yourself then I felt that there was nobody else to support you um in terms of of doing research.” [P3]

“So I think uh before I did my MMed I was obviously a little quite hesitant about the whole thing, because obviously there's not much emphasis. There's a little bit of emphasis placed on research in your undergraduate training, but there's not much that you do. Um so you go in you you go into in into the space without any knowledge of how to conduct research or or anything about the research about methodology or anything like that.” [P1]

“I didn't actually have a lot of research experience just at med school with our normal projects that we had to do but I I didn't have any published articles before I had to start my MMed so in that way it was a little bit daunting.” [P7]

Table 3: Different levels of enthusiasm for conducting future research and the extent to which a clinician-researcher identity is adopted by surgical trainees through the process of conducting MMed research.

Little enthusiasm to conduct future research; resisting clinician-researcher identity	Greater enthusiasm to conduct future research; adopting clinician-researcher identity
<p><i>“I know guys who like [anonymous] you know him too probably. He loves writing up and brainstorming and scheming. Like some guys just naturally do it well.” [P6]</i></p> <p><i>“You do have ambitious researchers and people who've got a knack for it [...] I still have, you know, out of a academic point of view some some gaps in my knowledge in terms of, you know, statistics and all of those uh different definitions so I definitely wouldn't consider myself a researcher” [P9]</i></p> <p><i>“I personally don't understand the entire research world, because there's a lot more aspects to it than I think. I, I think I understand the tip of the iceberg.” [P4]</i></p> <p><i>“Going forward, I think I mean I would never I would for me I'm not a research person, I I still don't enjoy research, but if it's a question that appeals to me and if there then then I would definitely I would</i></p>	<p><i>“I didn't see myself as an academic but now I I would enjoy going into academic work.” [P8]</i></p> <p><i>“I think it's difficult at the start um because I never would have pictured myself going into an academic career but I think just if you there also a saying that you'll never know unless you try. So it's something I never would have thought but after my research I can actually see that that it is a possibility that I could actually going into an academic career or um even do further research and it is something that I am equipped to do which I never would have known I had done my MMed [...] I think it's definitely a learning experience and and the lessons that you learn um it definitely encouraged me to do further research stemming from my MMed um I've already got two subsequent articles published which I'm a coauthor um I'm working on another project now and I I've got three that I'm also a coauthor that will be published” [P7]</i></p>

<p><i>definitely go about undertaking research a research project and and I feel a lot a lot better about it now then then I did initially. So I would definitely conduct research now but not not for the sake of doing research, more if I had a question that I that I that I wanted to answer, then maybe I'd think about doing research, yeah." [P1]</i></p>	<p><i>"I'll probably do maybe some research in the future again [...] I told myself that I would like to set myself a goal of getting at least maybe 3 to 4 papers a year out if I can [...] It feels like there's something that I want to do." [P3]</i></p>
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Many current South African undergraduate curricula do not include mandatory exposure to research and historically placed little emphasis on evidence-based medicine (Mahomed et al., 2020; Marais et al., 2019; Rodseth et al., 2017). At present most institutions offer medical students the opportunity to conduct only a small, elective research project during their undergraduate training. But there is growing emphasis on the benefits of early exposure to research (Chang & Ramnanan, 2015; Laskowitz et al., 2010) and that medical schools should do more to develop scholarly competencies during undergraduate training. Institutions across South Africa are beginning to consider how to include research training into undergraduate medical curricula (Burman et al., 2019; Dommissie & Joubert, 2009; Katz et al., 2014; Knight et al., 2016).

Research leadership and mentorship in clinical environments depend on the capacity of clinicians to lead and support research efforts. A review of Australia's health and medical research recommended that research should be embedded in the health system because a research culture promotes quality clinical care (McKeon Report, as cited by Allison et al., 2016). While this recommendation has merit globally, this is not the reality nor feasible for the South African healthcare system. The clinical service demands and challenges within this South African healthcare system preclude many professionals from pursuing research. This, in conjunction with limited research training during the undergraduate curriculum, possibly accounts for limited research leadership and mentorship in South African clinical environments.

In the current study, a culture of *“lead by example”* [P4] was valued by our participants. There was a belief that the specialty has a positive research culture evidenced by high publication outputs and colleagues' enthusiasm for research. This suggests that senior members of this division, therefore, act as positive role models for junior researchers.

“I think it's a very positive culture in our department in terms of research and surrounded by um leadership that's got a hell of a lot of research um being done by them so they lead by example, so if that wasn't the case and we felt like it was being pushed down our throats then we would feel a little bit uh a little, uh, it would leave us with a probably a bit more of a bitter taste in our mouths, but because we see leadership that really push out a lot of literature and they lead by example, I think that creates a culture of um not only is research something that they're interested in and and why they think it's important, but um if you're le

by example it's it's I don't know it feels a lot it's obviously a lot easier and there's a lot of support because because it's a department that is heavily research backed, so there's a there's a lot of support for people that are doing research, so um ja you know, you don't even feel like it's like it's insurmountable.” [P4]

“Our head pushes the guys up to to um to get their their MMedS in their studies done. And then we also have lots of people within the department that's quite keen um on doing research [P3]

“I think ten years ago if you'd asked an [surgeon] about research, he'd laugh at you and he tell you I, I'm not a I fix things I don't, I don't I'm not interested in it. But there are now some very um I don't know like charismatic and good role models that that publish a lot and that like that, almost make it make it a positive make it look cool in a sense. You know you want you want people who make research sort of cool and and and to aspire to instead of guys just who's just shooting it down. And we've got we've got very good guys and [another South African university] I know have one or two very good clinicians and surgeons but also they push the research very hard. So I don't know there's like a positive spin around it at the moment.” [P5]

Having a culture of research is a key factor influencing the research productivity of universities (Bland & Ruffin, 1992). Research culture has been defined as “a set of values, beliefs, assumptions, and behaviours related to the implementation of research that is collectively owned by an organization” (Nadeem, 2011). Adefuye et al. (2021) assessed the perceptions of academic staff around whether a research culture exists within the Faculty of Health Sciences at the University of the Free State. Only half of the respondents from the School of Medicine agreed that is a robust research leadership within their school. Most respondents from the School of Medicine also believed there is little or no support structures available for research.

While the findings reported by Adefuye and colleagues are limited to a single South African university, they draw attention to the possibility that similar challenges might exist in other contexts. Previous research has demonstrated that appointing a leader who is research-focused has a positive impact on the research performance (Goodall, as cited by Allison et al.,

2016). This in conjunction with our findings suggests that departmental leadership has a critical role to play in the MMed research experience.

Research supervisors within divisions can also be considered as a type of research leader (in addition to their teaching role, Theme 4) and the nature of the student-supervisor relationship (most widely studied in the doctoral arena) is recognized to play an important role in student's satisfaction and success (Ives & Rowley, 2005; Lee, 2008; Madan, 2021; van Schalkwyk et al., 2016). The research supervisors played an important role in motivating and managing their candidates throughout the research process. Colleagues from the University of KwaZulu-Natal previously described the “expedient management” of the MMed research process through the use of a collaborative cohort model of supervision and a modular approach to progression (Aldous et al., 2016; Rout et al., 2015). Other than in these reports, MMed research supervision has received little attention as a topic of inquiry.

“I think a lot of it also boils down to your supervisor. I mean Prof [anonymous] when you start off there if he can see you're someone who's not gonna, you know, be motivated or pull weight they're gonna remind you regularly. I mean, I've often heard in the meeting or say to someone listen, don't forget about your research or whatever, which I think for me they could see I was motivated and then I would sort of most the time got on with it so they didn't ask me too much to do it. They'd just check in and and and so forth.” [P2]

“You have to set a goal for yourself what you want to what you want to um achieve within a certain time period and I think um [RC] and my supervisors [RC] and Prof [anon] pushed me quite a bit as well to say listen here by Wednesday this needs to be done or by in a month's time this thing needs to be done so it was good having those people pushing you and setting goals for yourself because otherwise you ja it's it's difficult to reach a target if you don't set goals for yourself.” [P3]

Our participants specifically mentioned the value of being initiated into the research community. Through interactions with the “old-timers” who guided them into adopting ways of being and doing in the research environment (Lave & Wenger, 1991). Individuals recognized this social learning (Kozulin et al., 2003) as an important mechanism through which they learned about research, which will be discussed further under Theme 4. Following research amongst otolaryngology graduates, Zahtz et al. (2014) emphasised that “if mentors

do not have experience and success in research endeavours, it is less likely that the trainee will be successful in this area". This is an important consideration in the South African context where concerns have been raised about the limited research supervision capacity for MMed research (Moxley, in press).

"I think it's bit daunting in the beginning research. But uh, especially [anon] as she also she's I think she's she has her PhD and she's very involved with research herself and she could give a lot of I don't know how to say it just lay of the land you know." [P8]

"We did a little course with [research cosupervisor] as well initially about how to go ahead and go about being an MMed researcher." [P1]

"I think driving that cart alone up the hill is way more difficult than having someone who's done it before and can at least on a very early stage guide you and tell you listen, you're going down the wrong path here." [P9]

"I think if if she wasn't there, you'd get confused you'd be like OK now when do I approach the statistician, or when do I do this or when do I do that, you know?" [P2]

"You're still running a race but you're having someone on an intercom or a mic telling you which way to go it just made things much easier for me." [P7]

Individuals also recognized the value of interacting with senior trainees who, having already completed their MMed research, could impart wisdom and guidance to their junior peers. Our participants, now as seniors themselves, were enthusiastic about mentoring junior trainees or junior colleagues within the clinical environment. This highlights our participants as leaders and "old-timers" themselves (Lave & Wenger, 1991), and the important contribution they can make in facilitating a positive research culture in their environments.

"The experience of of having gone through it, having used it as as a a talk as a publication um and then going through the process it can definitely help facilitate junior registrars going through the same from a study point of view [...] I don't know if it's just 'cause they sort of mates of mine or family friends or whatever that ask me now that oh I want to get into [surgical division]. I want to get involved with research type or you know what is the best

way and then obviously give them the same advice I was given all that time back [...] So he's a he's an intern he's a final year intern and he's already got three publications on but nothing nothing as a primary author. But so I wanna get him he must do a study [...] So when I'm done with finals I'm gonna I'm gonna trick him into that [...] What I'm saying is there needs to I almost want to say there needs to be a bit more like dumb support for guys to like literally log numbers [...]and compare this or phone the patients. They can do dumb work. And I was the same like and then you you sort get tricked it into then before you know it you're doing research" [P5]

"In terms of um the the hospital or the facility I'm working it's also going I think it's also going to be of benefit to them because suddenly there's going to be somebody that's doing research there is somebody there that is willing to the junior guys to also do some research and hopefully it can it can spill over to other departments and to other disciplines and hopefully we can make the hospital as a whole or the facility as a whole better just in terms of that everybody is doing reading everybody is doing research and and that's how you you improve a place." [P3]

Theme 4: "There's no doubt that one learns through it all"

This theme captures the educational value individuals assigned to their experience. This educational value includes the outcomes of their learning, such as the knowledge and skills they acquired. It also includes the different mechanisms through which they developed these outcomes and how they became more legitimate members of the research community. Overall, individuals agreed MMed research warrants its inclusion in the specialist training curriculum because it afforded them the opportunity to develop a range of skills required for professional practice. There was agreement that *"there's no doubt that one learns through it all" [P6]*.

"You pick up lots of skills along the way or while doing the research [...] definitely I would say you need to do you need to do research because at the end of the day it's beneficial to yourself, you can add benefit to other people, but I would definitely say add it to the to the curriculum." [P3]

“I think it's definitely important for an education level. You you need to be able to critically appraise these sort of things, so you need to be able to have had an education in research if you are a scientist.” [P4]

Recognised learning outcomes of MMed research

Table 4 provides illustrative quotes demonstrating the range of learning outcomes our participants recognized to be associated with their MMed research experiences. These outcomes include understanding of the research and publication processes; new clinical knowledge and insight; understanding of academic language; academic writing skills; critical appraisal skills; and data and reference management skills. Understanding of statistical concepts and confidence to conduct further independent research were areas of weakness.

The purpose of master's research is to introduce students to research and train them as researchers (Lessing & Schulze, 2002). It appears that this purpose was achieved for our participants who believed that their understanding of the research process and research-related activities had improved. Confidence in their ability to conduct future research was variable and often contingent on ongoing support from more experienced colleagues. This is unsurprising at this level because we would expect doctoral research to fully prepare individuals to conduct independent research. That individuals have greater confidence and competence to conduct future research highlights MMed research as an important vehicle to increase the number of specialists who engage in research and who can lead a research agenda or culture in their clinical environments. However, Zahtz et al. (2014) found that many factors in the research environment, including the quality of research supervision and the institution's commitment to research training, influenced the career path of otolaryngology trainees. Our participants' research experiences appear to be positive, but this might not be the case across all specialties or throughout South Africa.

Table 4: Learning outcomes associated with MMed research

Outcomes	Illustrative quotes
<i>Understanding of the research and publication processes</i>	<p><i>“Um just so you can understand how to go about how research is conducted. I think it’s a lot easier once you’ve done it to know you know the pitfalls to see where uh where shortcuts can be taken, how things happen.” [P1]</i></p> <p><i>“So it’s maybe changed my understanding of it and and how I go about it I’ve certainly learned that you know learned where you bump your head and where there are slightly easier, easier parts.” [P6]”</i></p> <p><i>“Definitely in terms of the actual approach to conducting research that’s that’s definitely been um positive, I mean, I’ve I’ve, I’ve learned a lot more about it.” [P4]</i></p>
<i>New clinical knowledge and insight</i>	<p><i>“I got insight into the the causality behind the pathologies and and also how that relates to other uh systems uh you know. So the patients that patients I saw were osteoporotic ladies with fragility fractures and I was examining their muscular uh function and and mass and um you know you you you one gets on a trend one sees the vitamin D that in influences that as a metabolic effect on the skeleton has a effect on the immune system so everything is interrelated so it it broadened my concept of the [anonymised discipline] pathology.” [P8]</i></p> <p><i>“It does empower you quite a bit um on a topic because you you read much wider than than you’re writing and and I found now, even even a simple thing like some of our questions and our final exam was on on coding and and and sort of venturing to the private side of things, and so it it’s worthwhile from an academic point of view as well, it definitely definitely gives you way more knowledge than you would have had on a certain topic.” [P5]</i></p> <p><i>“I did a randomized controlled trial so I had to go and basically do intervention on all the patients myself. So you build a rapport with your patients. Um you know from that aspect you know from a clinical point of view it’s it’s, I think it’s a really great thing and it teaches you</i></p>

about research” [P2]

**Understanding of
academic
language**

“I think to me understanding what the author of the article that I'm reading is trying to say and the way in which he said it. Initially it was frustrating reading 'cause you want to read in a storytelling fashion and then you question, but why are they continuously repeating sentences or saying the same thing over and over or sometimes the sentence structure feels strange. Uhm, but actually when you understand that way they formulate the sentence your mind automatically switches over in sort of remembering the stats part of what you are reading and understanding why he's saying this and why he's saying it in such a way. [P9]

**Academic writing
skills**

“In terms of, you know, abstract writing and writing a discussion and writing a protocol for ethics and that I think I'm I'm pretty good at that now and I have a good basis for that.” [P2]

“I think I'm probably better than I was, but it's definitely my sort of you know, some guys write well and they enjoy writing. I I write poorly and it doesn't give me a major kick [...] I think like each paper does get easier [...] you borrow that guys idea and you and you work it to suit your paper, and you give him credit for it and you cite it but but ultimately you're repeating a lot of snippets from other papers to to build your story.” [P6]

“Well you you learn a range of skills, scientific writing, um doing a literature review um uh your in terms of journal searching, citations, referencing um your actual physical scientific uh like writing.” [P7]

**Critical appraisal
skills**

“What I have learned a lot what has stuck with me is the scientific language because that has changed the way in which I read articles [...] I think my my positive thing about the MMed is it has giving me perspective when reading research and understanding not just you know theoretically knowing levels of evidence, but really understanding why this evidence is better than others [...] I've started reading like the materials and methods or methodologies when looking at the article where in the past I looked at an article and I'll just go straight to

conclusion and just highlight conclusion [...]I do not consider myself a pro in that but you really get an idea of yes OK the findings of this might be applicable to to my my setting or clinically relevant or not really, you know, so I think that in terms of scientific and evidence base uh has changed the way in which I review an article quickly by looking at the abstract before I go further and just not taking everything in the conclusion sentence as as word you know.” [P9]

“So I think there’s other skills you can take from it and it’s ok if you’re not going to do research but the skills that you learned in critically evaluating other people’s research and their research methodology and um if there’s any flaws in their research and to see if the research that was done was if generalisations can be made and if it is relevant.” [P7]

“I think you develop a little bit of a technique to be able to look at something a bit more critically when you're listening to a lecture or um reading an article or something like that so to be able to analyze something critically, uhm, it's definitely, I think one of the major lessons that I've learned.” [P4]

**Data and
reference
management skills**

“And in terms of, you know, computing data and coding data and that I'm very comfortable with that I just need someone to analyze it for me.” [P2]

“Along the way I learned lots of skills learned out to use uh, Mendeley to for the reference manager you learned how to you you got a bit deeper into into all the Excels and all that in terms of capturing your data. So all these things that's needed in your your research for your research into collecting data, all these are new skills that you learn along the way.” [P3]

**Confidence to
conduct further
research**

“So just the skills I acquired and getting published I think it’s something that has filled me with a lot of confidence [...] I feel comfortable about conducting research in the future. I know the process, I know what it entails, I know how to navigate all the speedbumps along the way.” [P7]

“Let’s say I do a fellowship 2023 um I will definitely be able to conduct forms different forms of research. I don’t think that’s out of my scope but I will definitely want supervision and you know active assistance going through that but it should be well it can only be easier the second time around.” [P9]

“I think I would still need some a lot of help from [RC] and and someone you know definitely a biostatistician I'd never be able to do that kind of stuff on my own.” [P2]

“I can also now assist my wife because she's she's also doing a masters uhm helping her with her data, referencing and helping her with Excel stuff and all of that.” [P3]

Understanding of statistics

“I would never be able to uh, I still don't understand the stats and and we uh I mean I can understand the basics of stats and stuff and we have to study a little bit about it to for our exams but I still have no idea how we performed our stats. I don't understand the stats.” [P4]

“I don't understand a thing about statistics. I mean, I've obviously now. You know, I literally don't have a clue and and I speak for all my colleagues like it's not one of us who actually has a clue. We might be able to waffle some nonsense, but there's like I don't know” [P6]

“I knew zero about stats and I'm think I'm now probably at about two out of 10 when it comes to stats [...] I read up on the stats and I study it hard for a test or exam then for about a month I understand and I know it and then it just creeps away from me again. But yeah, I just have to continuously repeat that.” [P9]

Individuals believed their understanding of academic writing improved which in turn changed their process of reading academic articles. Individuals felt that their critical appraisal skills had improved and recognized the value of this skill for EBM. This is an important outcome because the ability to evaluate research evidence is one of five steps of evidence-based medicine (Evidence Based Medicine Working Group, 2015; Sackett et al., 1996).

However, statistics knowledge represents a challenging aspect for our participants. Individuals attended statistics lectures offered within the department and were required to study statistical concepts for the College exams. Despite this, individuals believed that they still have little understanding of statistics and do not fully understand the statistics used in their own published papers. Rodseth et al. (2017) anecdotally shared that despite meeting the dissertation requirement, many specialists “still cannot meaningfully critique published medical literature, explain the meaning of a p-value or a 95% confidence interval”.

This is a concerning deficit because an important component of critical appraisal skills is the ability to evaluate statistical methods and their reported outcomes in the scientific literature. Our participants might not be able to comprehensively appraise research and there is a need for training initiatives to address this gap. Prior research has demonstrated that underdeveloped critical appraisal skills in conjunction with poor research capacity hinder development in low-income and middle-income countries, such as South Africa (Gill et al., 2021; Käser et al., 2016). We cannot know from our study how individuals construct the meaning of critical appraisal and do not know the extent of their proficiency or how this translates to their clinical practice. But our findings suggest that MMed research could provide a platform to begin addressing the appraisal skills gap amongst clinicians.

Mechanisms of learning

Our participants shared that they learned research knowledge and skills (Table 4) through a variety of different teaching and learning strategies, including experiential and social learning; feedback and guidance from supervisors; attending training initiatives within the FMHS; studying for College exams; and attending and presenting at academic conferences. These different mechanisms of learning are summarized with illustrative quotes in (Table 5).

Table 5: Mechanisms of learning during the MMed research process.

Mechanisms of learning	Illustrative quotes
<i>Experiential learning</i>	<p data-bbox="566 308 2123 798"><i>“It’s a steep learning curve and you can do it by trial and error uh I think that’s the way I did it um I I did, but you can’t do it without support and a supervisor who knows the system but then you go and you make your mistakes and you correct it and you go on [...] Conducting and struggling that first time through definitely prepares you to be able to do it again. That first time you actually you start off doing that and you’ve got no clue what you were doing. But you learn a lot. The moment you struggle with something as much as we do with that MMed we um it becomes ingrained in you [...] Having worked with a database myself and knowing the frustration of an incomplete database and the amount of time it takes to go and get this stuff, filling it out correctly the first time has become you know you focus a bit more when you do that ‘cause you realize the repercussions it might have for you or others down the line. And that’s sort of something you learn from the pains of doing it. You know you’ll set up your own little database and then you realize that’s completely wrong and you re type the whole database again and by your fourth or fifth draft you only get the right right thing going. And then you’ve actually just learned how to put up a database for that type of study.” [P9]</i></p> <p data-bbox="566 866 2123 1201"><i>“I think the the seniors are always keen that you try to shoot the lights out and I think I think one needs to critically look at what you produce and where it fits in and if it’s not gonna fly in international big like world renowned journal then not try like it’s it’s in a time sensitive scenario and it’s also frustrating ‘cause you you sort of get not shot down but you get I mean, sometimes you get a bunch of silly suggestions and you make that you make all the effort and then it’s like oh OK, but now it’s still not. So then it’s it’s frustrating. But but I’ve I’ve learned that and the subsequent things I’ve published I’ve aimed appropriately and I’ve got it published first round, so in that sense that to that to me, it’s been a big learning curve. So I don’t. I don’t when the guys say oh let’s try this and try that I say no I’m fine thanks. I’m gonna try this.” [P6]</i></p>
<i>Social learning</i>	<p data-bbox="566 1278 2123 1359"><i>“I think when you get to Tygerberg and you are confronted with with all these guys that’s high up in academics and all of that where you can’t just say something if you don’t have any uhm proof to to support your answer that’s when you start reading a bit</i></p>

	<p><i>more and um doing a bit more research in terms of what the the comments you're making or the things you're saying is it really true is it is there really literature or evidence out there to to back what you are saying." [P3]</i></p> <p><i>"With the with the response to reviewers um that's definitely something that one needs to know how to word it um and sort of be I don't want to say friendly about it 'cause 'cause usually like questioning whatever you said and then lost sleep over it and and stuff so uhm or they misread your article and and sort of commented weirdly on it um so so sort of wording that response correctly without just giving up almost, it's probably the wrong way of saying it, but uhm, I think that's that's quite a skill to to learn." [P5]</i></p>
<p>Feedback and guidance from supervisors</p>	<p><i>"What sometimes worked was I would set up my thing as a presenting everything with mean values and then [RC] come back and say that you are looking at your study size and the way the values are split rather use median values with interquartile ranges, and then I'll obviously reply back and say that's a great idea, and my next step will be to go to Google and see what the hell is interquartile ranges." [P9]</i></p> <p><i>"It's pointless writing an MMed, and you gain nothing from it because it was a ticking a box to get through, but you actually did not know what you were doing the whole time while you're doing it and you didn't learn anything. Where she gives proper feedback and really, it was very valuable." [P2]</i></p> <p><i>"If you email them a draft, you'll get a draft back that looks like a bloodbath from all the track changes within an hour um and and all valuable changes without taking over without sort of forcing you in a direction, and they they've been immense um and then I must say most of our consultant group whether you go chat to them how to phrase a paragraph or whatever um they they actually all quite quite good but but specifically um [anonymous] and [RC] was quite immense." [P5]</i></p> <p><i>"Sometimes you can read things but you still don't understand it, and they're always there to to explain it a bit better just because</i></p>

	<i>they've been through the through the whole process themselves already or couple of times or few times and they know what is expected or what's needed.” [P3]</i>
<i>Attending faculty training initiatives</i>	<i>“I made all the mistakes that I subsequently learned 'cause I did that clinical research and protocol writing workshop the first one that you launched here in in Stellenbosch uh but by that time my ethics and everything was already done, and I made all the mistakes that you guys warned us not to do [...] I actually thought that was very worthwhile. But I do think the people who enrol in that, even though you you've made it quite open in terms of anyone, can do it I think it's going to be of little value for people who don't have a study topic yet if you can while you go through that physically do each segment as it takes your through that's very helpful. As with any you know course that you do if you're physically doing it helps.” [P9]</i>
<i>Studying for College exams</i>	<i>“We get examined on it, so we have to have a place of understanding about stats and about research because we can get short questions on it in our exam we can get MCQS we can get asked about it in an oral so so you have to have some sort of baseline knowledge into what what you're talking about.” [P4]</i> <i>“Some of our questions and our final exam was on on coding.” [P5]</i>
<i>Attending and presenting at academic conferences</i>	<i>“I was fortunate well, I didn't deem myself pushing at the time, but I had to give it talk at the Registrar Congress on level of evidence and and specifically Mendeleev. Um and, uh, so I I basically just used that as my studying for for research and it worked out well. I I think I did quite well in or I think I did well in the research. It was multiple choice but I never if I did well or not, but I'm I'm obviously sitting here afterwards so so it should must have gone OK.” [P3]</i>

	<p><i>“While presenting, I think every time you present you sitting in front of a bunch of profs and seniors so so that's I think you you gain skill in in answering them and answering different people's perspectives and then obviously you you generally get to spend the rest of the congress um there as well so then you just get all the input from the other sessions and and and topics and sort of general academics and then sort of coping in that environment between the role players if I can put it that way.” [P5]</i></p>
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Individuals learned about the research process “*from the pains of doing it*” [P9]. They felt some discomfort and were frustrated when faced with research dilemmas but learned how to navigate these stumbling blocks through active problem-solving. As shown in some of the quotes in Table 5, this learning empowered individuals to make their own, confident decisions when they encountered similar dilemmas during other research projects. Therefore, learning through a constructivist approach is evident in the MMed research context.

Constructivism as an approach to learning holds that learners “actively construct or make their own knowledge and that reality is determined by the experiences of the learner” (Elliott et al., 2000). Constructivist thinking influenced the development of David Kolb’s experiential learning theory (ELT) which proposes that experience and active engagement are critical for the development of knowledge (Kolb, 1984; Yardley et al., 2012). Kolb’s four-stage learning cycle includes having an experience, reflecting on the experience, learning from the experience (abstract conceptualisation), and active experimentation or trying out what has been learned. Our participants felt greater confidence in their ability to navigate future research and make decisions about research problems, which indicates that they had moved through all four stages of the experiential learning cycle.

Kolb’s cycle encourages reflection on the experience. Indeed, reflective practice is recognized as an essential characteristic for professional competence in the health professions (Mann et al., 2009; Sandars, 2009). However, reflection as a mechanism of learning was not overtly mentioned by our participants but we noted under Theme 2 that the process of reflection afforded by the interview process possibly assisted individuals in establishing positive connections between MMed research and its value for clinical practice. This is important because this outcome of MMed research is not made explicit by stakeholders in the training environment. There might be potential for reflective practice to be harnessed in the MMed research space to make explicit for individuals the hidden competencies of research as well as the learning that takes place for them during the research experience.

In addition to the individual process of learning afforded by experience, our participants also learned about research through social learning. Social learning draws on sociocultural theories, such as that proposed by Vygotsky who considers “experience and its learning consequences as essentially located in social milieus rather than the heads of individuals” (Kozulin et al., 2003; Yardley et al., 2012). We noted under Theme 3 that individuals valued the role their supervisors played in guiding the novices into the research community.

Therefore, we also draw on the concept of legitimate peripheral participation (LPP) to explain the situated learning that takes within a community of practitioners.

As explained by Lave & Wenger (1991), LPP is a process by which “newcomers “interact with “old-timers” who guide them in becoming full participants in a community of practice. It was through interactions with the research supervisors, peers at conferences, and journal peer reviewers that individuals were exposed to the norms, practices, and culture of research. For example, our participants reflected on how interactions with colleagues prompted them to adopt the practice of drawing on evidence from scholarly literature when engaging in academic discussions. It is possible that these particular interactions not only introduced individuals to the scholarly practice of drawing on evidence but also caused individuals to recognize the value of this scholarly competency for supporting clinical decision-making (Theme 2).

Individuals expressed much gratitude for the feedback they received from their supervisors during the research process. The provision of high-quality feedback is widely recognised to be foundational to learning (Black & Wiliam, 1998; Hattie & Timperley, 2007). Written feedback provided by supervisors on drafts of the protocol and final manuscript is particularly important in the postgraduate space (Bitchener et al., 2010) and our participants valued the feedback they received from their supervisors about what is expected in written academic communications. Lehan, Hussey, & Mika (2016, pg. 10) emphasise that “if quality feedback is not provided to candidates, they might not produce high-quality dissertations or develop into independent scholars”.

Recommendations for health professions education

In Table 6 we have provided a summary of our recommendations for health professions education.

Table 6: Recommendations for MMed research education and further research

Theme	Recommendation
Theme 1: Resentment, relief, realisation, and prerequisite	<ul style="list-style-type: none"> • Employers of medical specialist trainees, such as the Department of Health in the South African context, should allocate protected time for trainees to attend to their research obligations. • Research leaders in the clinical environment, and stakeholders within the broader clinical research community should engage in strategic and continuous dialogue with trainees to make explicit the importance of research learning for clinical practice • Future research in the South African context could focus on using motivational theories to understand whether there are other mechanisms driving individuals' behaviour in relation to their research projects.
Theme 2: The clinician versus clinician-scientist dichotomy	<ul style="list-style-type: none"> • We encourage medical faculties to incorporate research in the undergraduate curriculum • How the culture of a research community impacts the outcomes MMed might be an avenue for further research. • Again, we encourage stakeholders to make explicit the value and expected professional and personal outcomes of MMed research.
Theme 3: Research exposure and leadership	<ul style="list-style-type: none"> • The feedback practices of MMed research supervisors is an area needing further research which could inform faculty development initiatives that improve feedback practices. • We recommend that faculties should find ways to leverage the important role of research supervisors in creating positive MMed experiences for specialist trainees. • We recommend implementing a situation analysis that explores MMed research supervisors' research knowledge, supervision skills, feedback practices, and research leadership. This could inform faculty development initiatives.
Theme 4: "There's no doubt that one learns through it all	<ul style="list-style-type: none"> • We recommend that the project approach should remain and not be replaced by a structure coursework programme. • We recommend the evaluation of research training initiatives provided by research capacity development offices. • There is a critical need for departments and faculty support structures to develop student-centred training strategies that can equip specialists with the statistics knowledge they need to appraise medical literature. • We encourage future research that deepens our understanding of the affordances of different learning strategies, such as experiential and social learning and reflective practice, and how they can be more overtly leveraged within the MMed research environment.

Because MMed candidates must manage competing demands within limited time, we can understand the significant stress associated with performing and completing MMed research. We, therefore, echo previous calls for employers of medical specialist trainees, such as the Department of Health in the South African context, to recognise the academic requirements of specialist training and allocate protected time for trainees to attend to their research

obligations (Aldous et al., 2015, 2016; Grossman, 2019; Patel et al., 2016; Peer & Fagan, 2012; Szabo & Ramlall, 2016).

The pressures associated with the specialist training programme have negative implications for individuals' motivation to prioritize research (Theme 1). Furthermore, we noted that the value of MMed research for clinician practice is not made explicit to candidates by the stakeholders involved in the specialist training environment (Theme 2). This important outcome forms part of a "hidden" curriculum. Individuals, therefore, feel confused and unsure about the purpose and outcomes of MMed research, which could also contribute to decreased motivation. Motivation theories, such as self-determination theory, explain that student engagement with activities increases when they believe learning activities are meaningful and relevant (Deci et al., 1991; Ryan & Deci, 2000). We, therefore, recommend that research supervisors, research leaders in the clinical environment, and stakeholders within the broader clinical research community should engage in strategic and continuous dialogue with trainees to make explicit the importance of research learning for clinical practice. Future research in the South African context could focus on using motivational theories to understand whether there are other mechanisms driving individuals' behaviour in relation to their research projects.

Our participants entered the training programme as research novices, possibly due to limited exposure to research during undergraduate training (Theme 2). Previous research has demonstrated that involving undergraduate medical students in research activities increases their future engagement in research (Solomon et al., 2003; Weaver et al., 2017) and offers them the opportunity realise the extrinsic and intrinsic value of research (Marais et al., 2019). Undergraduate research training could ensure that specialist trainees enter their postgraduate training with at least some foundational knowledge (and enthusiasm) required to plan and execute their MMed research projects. We, therefore, encourage medical faculties to incorporate research in the undergraduate curriculum.

Findings also indicate that research culture and leadership are enabling factors in the MMed research context (Theme 3). The academic community has the potential to influence the messages individuals receive about the cultural and social norms and the ways of being and doing in the research community. How the culture of a research community impacts the outcomes MMed might be an avenue for further research.

Key to the culture of an academic community is the role MMed research supervisors (Themes 3 and 4). Individuals value their supervisors who as research experts or “old-timers” (Lave & Wenger, 1991), guided MMed candidates into the research community. During this socialisation process, individuals value the feedback offered to them by their research supervisors. Written feedback provided by supervisors on drafts of the protocol and dissertation is one of the most important sources of input on what is required or expected of MMed candidates (Bitchener et al., 2010). Sadler (1989) identified three elements that are crucial to the effectiveness of this type of formative assessment: 1) helping students to recognise the desired goal (understand what is required); 2) providing students with evidence about how well their work matches that goal; and 3) explaining ways to close the gap between the goal and their current performance. The quality of the feedback given to MMed candidates largely rests on to what extent the supervisors’ feedback meets these expectations. The feedback practices of MMed research supervisors could be an avenue worth exploring and may highlight a need for faculty development initiatives that improve feedback practices.

A concern here is that ensuring “quality” research experiences across South Africa is difficult given that universities are unequally resourced to support MMed research (Patel et al., 2016b; Szabo & Ramlall, 2016). We recommend that faculties should find ways to leverage the important role of research supervisors in creating positive MMed experiences for specialist trainees. To do this, we first recommend the implementation of a situation analysis that explores MMed research supervisors’ research knowledge, supervision skills, feedback practices, and research leadership. Findings from such research might reveal the need for faculty development initiatives that enhance supervision capacity and support supervisors in their practices. A deeper understanding of supervision practices that lead to the best MMed research outcomes might provide useful recommendations for how best we should tailor supervision practices to the needs of MMed candidates. Staff development initiatives across health faculties are also important to address research leadership gaps (Owusu et al., 2017; Suleman et al., 2021).

Because specialist trainees often enter the training programme as research novices and owing to the limited MMed research supervision capacity across South Africa, Biccard et al. (2017) recommended that a structured coursework master’s programme might be an alternate strategy to the research project. While formal instruction on research-related concepts was also a valuable mode of learning for our participants (Table 4), the process of conducting a research project is important to bridge the gap between theoretical research knowledge and

being able to navigate research in practice. Many scholars agree that students' learning is optimised when they take an active role in the learning process (Smart & Csapo, 2006). Individuals appear to appreciate (in hindsight) the value of learning to do research through the "pains" of doing it (Theme 4). We, therefore, recommend that the project approach should remain in place.

That individuals see value in experiential learning could be important for guiding research training initiatives both at the departmental and faculty levels. For example, the health sciences Research Development and Support Division at Stellenbosch University offers MMed candidates a voluntary 3-month clinical research course during which MMed candidates are encouraged to develop a research protocol. Learning about research concepts in conjunction with the active process of planning and writing a research protocol is expected to enhance learning (Smart & Csapo, 2006). An evaluation of the effectiveness of this initiative is still underway.

There is a critical need for departments and faculty support structures to develop training strategies that can equip specialists with the statistics knowledge they need to appraise medical literature. Furthermore, future research could explore the development of critical appraisal of MMed candidates and how these translate to their clinical practice. When considering the development of research training initiatives, Grossman (2019) cautions that "inflexible, generic, scheduled faculty research techniques courses fail the andragogic needs" of MMed candidates. Therefore, we encourage that any new or current research training initiatives should be "explicitly tied" to the needs of this group of postgraduates (Frank et al., 2010).

In the end, participants showed positive responses toward their research experiences and reported on the numerous ways MMed research contributed to their development of scholarly competencies. Several learning mechanisms are apparent during MMed research including experiential learning and socialisation into the academic community (Theme 4). We also note that there might be potential for reflective practice to be harnessed in the MMed research space to make explicit the learning outcomes of MMed research (Themes 2 and 4). Indeed, reflective practice is recognized as an essential characteristic for professional competence in the health professions (Mann et al., 2009; Sandars, 2009). These new insights into how and what MMed candidates learn during their research journey could provide the foundation for future studies and training initiatives. We encourage future research that deepens our

understanding of the affordances of these learning strategies and how they can be more overtly leveraged within the MMed research environment.

Limitations

Our decision to sample registrars from the surgical disciplines results from previous research that explored surgical registrars' perceptions about the MMed research project. These previous studies might indicate that the surgical disciplines place a high value on research. This could reduce the transferability of our findings to other contexts. Although the challenges of training programmes are expected to be similar across South Africa, the transferability of our findings might also be limited due to differences in supervision capacity across disciplines and institutions.

Participants in the study are registered at Stellenbosch University. They share experiences of research in the context of a single training institution. The training context is likely to vary between South African institutions or even between disciplines. Therefore, the results will not necessarily be transferable to the broader South African specialist training context. However, we also acknowledge that the purpose of qualitative research is not to formulate generalizable findings but to get a rich and in-depth understanding of participants' individual and subjective experiences (Moser & Korstjens, 2018).

Concluding remarks

This qualitative research project aimed to understand the value of MMed research by exploring surgery trainees' experiences of their research projects. At the start of and during their research journeys, individuals' little intrinsic value to their experiences of MMed research. Their experiences were initially overshadowed by the resentment they feel about being obligated to conduct research. MMed research also individuals to experience considerable stress while trying to balance research with pressures of their clinical and other academic training. When considered from an axiological perspective, the educational value of MMed is initially undermined by the reduced quality of life individuals experience (Gatley, 2021)

It is only once individuals complete their research that the pressure and negative feelings associated with research began to subside. When reflecting on their research in hindsight, participants showed positive responses toward their research experiences and could

acknowledge the extrinsic, intrinsic, and educational value of their experiences. Individuals acknowledged several important outcomes of MMed research including an improved understanding of the research process and the importance of scholarly competencies, such as critical appraisal, for EBM. The HPCSA's mandate, therefore, represents both pain and pleasure for trainees but they acknowledge this obligation as a key driver for professional development and believe that MMed research should continue to be mandatory. MMed research, therefore, appears to hold educational value, in that it contributes to knowledge and skill development and personal growth (Gatley, 2021). However, we acknowledge that trainees' experiences depend on the context of their training programme and the research community within which they conduct their MMed projects.

Research supervision and leadership represent key enablers for MMed research. Research supervisors play an important role in managing the research process, initiating MMed candidates into the research community, and making explicit the hidden outcomes of postgraduate research. Therefore, amongst other recommendations for health professions education, we especially recommend that future research and faculty development initiatives should focus on the professional development of MMed research supervisors.

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Appendix A – Journal guidelines

ADVANCES IN HEALTH SCIENCES EDUCATION

Prospective authors are encouraged to download the file Standards for an Acceptable Manuscript (pdf, 519 kB), which describes in detail AHSE's requirements for an acceptable manuscript. If you do your best to ensure that your manuscript complies with these requirements, you will increase the likelihood that your manuscript will be accepted.

Online Manuscript Submission

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The online manuscript submission and review system for Advances in Health Sciences Education offers easy and straightforward log-in and submission procedures. This system supports a wide range of submission file formats: for manuscripts - Word, WordPerfect, RTF, TXT and LaTeX; for figures - TIFF, GIF, JPEG, EPS, PPT, and Postscript. PDF is not an acceptable file format.

NOTE: In case you encounter any difficulties while submitting your manuscript online, please get in touch with the responsible Editorial Assistant by clicking on "CONTACT US" from the tool bar.

Colour figures

Colour figures may be printed at the author's expense. Please indicate at submission which figures should be printed in colour, the number of colour pages you prefer and to which address we can send the invoice. In addition, please specify if figures are to appear together on a colour page.

Electronic figures

Electronic versions of your figures must be supplied. For vector graphics, EPS is the preferred format. For bitmapped graphics, TIFF is the preferred format. The following resolutions are optimal: line figures - 600 - 1200 dpi; photographs - 300 dpi; screen dumps - leave as is. Colour figures can be submitted in the RGB colour system. Font-related problems can be avoided by using standard fonts such as Times Roman, Courier and Helvetica.

Language

We appreciate any efforts that you make to ensure that the language is corrected before submission. This will greatly improve the legibility of your paper if English is not your first language.

Manuscript Presentation

The journal's language is English. British English or American English spelling and terminology may be used, but either one should be followed consistently throughout the article. Leave adequate margins on all sides to allow reviewers' remarks. Please double-space all material, including notes and references. Quotations of more than 40 words should be set off clearly, either by indenting the left-hand margin or by using a smaller typeface. Use double quotation marks for direct quotations and single quotation marks for quotations within quotations and for words or phrases used in a special sense.

Number the pages consecutively with the first page containing:

running head (shortened title)

title

author(s)

affiliation(s)

full address for correspondence, including telephone and fax number and E-mail address

Abstract

Please provide a short abstract of 100 to 250 words. The abstract should not contain any undefined abbreviations or unspecified references.

Section Headings

First-, second-, third-, and fourth-order headings should be clearly distinguishable but not numbered.

Key Words

Please provide 5 to 10 key words or short phrases in alphabetical order.

Appendices

Supplementary material should be collected in an Appendix and placed before the Notes and Reference sections.

Notes

Please use endnotes rather than footnotes. Notes should be indicated by consecutive superscript numbers in the text and listed at the end of the article before the References. The references should also be collected in a list at the end of the article. A source reference note should be indicated by means of an asterisk after the title. This note should be placed at the bottom of the first page.

Cross-Referencing

In the text, a reference identified by means of an author's name should be followed by the date of the reference in parentheses and page number(s) where appropriate. When there are more than two authors, only the first author's name should be mentioned, followed by 'et al.'. In the event that an author cited has had two or more works published during the same year, the reference, both in the text and in the reference list, should be identified by a lower case letter like 'a' and 'b' after the date to distinguish the works.

Examples:

Winograd (1986, p. 204)

(Winograd, 1986a, b)

(Winograd, 1986; Flores et al., 1988)

(Bullen and Bennett, 1990)

Acknowledgements

Acknowledgements of people, grants, funds, etc. should be placed in a separate section before the References.

Figures

All photographs, graphs and diagrams should be referred to as a 'Figure' and they should be numbered consecutively (1, 2, etc.). Multi-part figures ought to be labelled with lower case letters (a, b, etc.). Please insert keys and scale bars directly in the figures. Relatively small

text and great variation in text sizes within figures should be avoided as figures are often reduced in size. Figures may be sized to fit approximately within the column(s) of the journal. Provide a detailed legend (without abbreviations) to each figure, refer to the figure in the text and note its approximate location in the margin. Please place the legends in the manuscript after the references.

Tables

Each table should be numbered consecutively (1, 2, etc.). In tables, footnotes are preferable to long explanatory material in either the heading or body of the table. Such explanatory footnotes, identified by superscript letters, should be placed immediately below the table. Please provide a caption (without abbreviations) to each table, refer to the table in the text and note its approximate location in the margin. Finally, please place the tables after the figure legends in the manuscript.

References

1. Journal article:

Barlow, D. H. & Lehman, C. L. (1996). Advances in the psychosocial treatment of anxiety disorders. *Archives of General Psychiatry*, 53, 727-735

2. Book chapter:

Cutrona, C. E. & Russell, D. (1990). Type of social support and specific stress: Towards a theory of optimum matching. (In I.G. Sarason, B. R. Sarason, & G. Pierce (Eds.), *Social support: An interactional view* (pp. 341-366). New York: Wiley.)

3. Book, authored:

Capland, G. (1964). *Principles of preventive psychiatry*. (New York: Basic Books)

4. Book, edited:

Felner, R. D., Jason, L. A., Moritsugu, J. N. & Farber, S. S. (Eds.) (1983). *Preventive psychology: Theory, research and practice*. (New York: Pergamon Press)

5. Paper presented at a conference:

Phelan, J. C., Link, B. G., Stueve, A. & Pescosolido, B. A. (1996, November). Have public conceptions of mental health changed in the past half century? Does it matter? (Paper presented at the 124th Annual Meeting of the American Public Health Association, New York)

Research Data Policy

This journal operates a [type 1 research data policy](#). The journal encourages authors, where possible and applicable, to deposit data that support the findings of their research in a public repository. Authors and editors who do not have a preferred repository should consult Springer Nature's list of repositories and research data policy.

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Appendix B – Interview schedule

Warm-up questions

Tell me a little about yourself?

When you were a child did you know you wanted to become a doctor?

Why did you choose [surgical discipline] for specialisation?

Can you tell me a little about the topic of your MMed research project? Why did you choose this topic?

What outputs have you generated from your research?

Interview questions

What are your thoughts about the HPCSA requirement for a research project for specialist registration?

Do you remember how you felt when you embarked on your MMed research project? What were some of the expectations or assumptions you had for this experience?

Looking back on your MMed research project, how do you feel about your overall experience? And in relation to your initial expectations and assumptions?

Can you tell me about a specific ‘aha!’ moment, experience, or conversation you had during your research? How did this situation influence your research experience?

Can you tell me about a specific moment, experience or conversation that was particularly difficult for you? How did this situation influence your research experience?

Can you tell me about the person(s) you feel had the most impact on you during your research?

In what ways has the MMed research experience changed anything for you? What are some of the things you know now that you didn’t know at the start of your research? (What new insights have you gained through this experience?)

How do you think the MMed research experience might influence you, your career, and your practice going forward? What will you do differently as a result of your MMed research experience?

If you had to impart any wisdom to a registrar who is just starting their research, what would this be?

If you were the person in charge of deciding whether to make MMed research mandatory or not, what decision would you make and why?

Cool-down questions

Overall, which aspects of MMed research do you feel positive about?

Overall, what aspects of MMed research do you feel most concerned about?

Is there anything we haven't covered in these questions that you would like to comment on?

Appendix C – Ethics approval letter



UNIVERSITEIT
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Approval Notice

New Application

11/05/2021

Project ID :21925

HREC Reference No: S21/03/052

Project Title: A qualitative exploration of the value surgical registrars assign to the Master of Medicine research requirement

Dear Dr K Moxley

At a review meeting held on 05 May 2021, the **New Application** received on 24/03/2021 was reviewed and **approved** by the **Health Research Ethics Committee (HREC1)**.

Please note the following information about your approved research protocol:

Protocol Approval Date: 11 May 2021

Protocol Expiry Date: 10 May 2022

Please remember to use your Project ID 21925 and Ethics Reference Number S21/03/052 on any documents or correspondence with the HREC concerning your research protocol.

Please note that the HREC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

After Ethical Review

Translation of the informed consent document(s) to the language(s) applicable to your study participants should now be submitted to the HREC.

Please note you can submit your progress report through the online ethics application process, available at: [Links Application Form Direct Link](#) and the application should be submitted to the HREC before the year has expired. Please see [Forms and Instructions](#) on our HREC website (www.sun.ac.za/healthresearchethics) for guidance on how to submit a progress report.

The HREC will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly for an external audit.

Please note that for studies involving the use of questionnaires, the final copy should be uploaded on Infonetica.

Provincial and City of Cape Town Approval

Please note that for research at a primary or secondary healthcare facility, permission must still be obtained from the relevant authorities (Western Cape Department of Health and/or City Health) to conduct the research as stated in the protocol. Please consult the Western Cape Government website for access to the online Health Research Approval Process, see: <https://www.westerncape.gov.za/general-publication/health-research-approval-process>. Research that will be conducted at any tertiary academic institution requires approval from the relevant hospital manager. Ethics approval is required BEFORE approval can be obtained from these health authorities.

We wish you the best as you conduct your research.

For standard HREC forms and instructions, please visit: [Forms and Instructions](#) on our HREC website <https://applyethics.sun.ac.za/ProjectView/Index/21925>

If you have any questions or need further assistance, please contact the HREC office at 021 938 9677.

Yours sincerely,

Melody Shana

Coordinator

HREC1

National Health Research Ethics Council (NHREC) Registration Number: