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Registrars' perspectives towards virtual teaching in an academic department during the COVID-19 pandemic

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2022

University of the Witwatersrand, Johannesburg

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Mpemnyama, Lerato Nomonde . (2022). Registrars' perspectives towards virtual teaching in an academic department during the COVID-19 pandemic [Master's dissertation, University of the Witwatersrand, Johannesburg]. WireDSpace.

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Registrars' perspectives towards virtual teaching in an academic department during the COVID-19 pandemic

Lerato Nomonde Mpemnyama

A research report submitted to the Faculty of Health Sciences,

University of the Witwatersrand, Johannesburg,

in the partial fulfilment of the requirements for the degree of

Master of Medicine in the branch of Anaesthesiology

Johannesburg, 2022

Declaration

I, Lerato Nomonde Mpemnyama, herewith declare that this research report is my own, unaided work. It is being submitted for the degree of Master of Medicine at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.

_____

Signed

On this_____day of_____20--

Dedication

This project is dedicated to my daughter, Elihle; my mom, Priscilla; my brother, Thato and my family for their never-ending full support and cheerleading me always especially on those days when my world felt like it was crumbling.

To my supervisors for the ongoing help and support during this journey of my MMED.

Presentations and publications from this research project

A manuscript will be submitted to the BMC Medical Education Journal for publication.

Abstract

Background

The COVID-19 pandemic brought about unprecedented times that resulted in measures of social distancing that had to be put in place. The Department of Anaesthesiology at the University of Witwatersrand had to comply with these regulations and switched the teaching of registrars from in-person format to a virtual platform. The study aimed to look at the perceptions registrars had towards virtual teaching during the COVID-19 pandemic.

Methods

This cross-sectional quantitative study was conducted in the Department of Anaesthesiology at the University of Witwatersrand via an online self-administered questionnaire that was distributed to the registrars registered in the department. The validated questionnaire that was used was developed following a literature search and an adaptation from two validated questionnaires. The study was conducted from December 2021 to February 2022.

Results

The department has a total of 100 registrars, and the response rate was 90%. The study highlighted that virtual teaching did have a positive impact in teaching in the academic department, with 91% (n=81) finding virtual teaching to be effective and 63.9% (n=53) of respondents preferring virtual teaching over in-person teaching.

Conclusion

The COVID-19 pandemic brought about a disruption to the academic programme in the Department of Anaesthesiology at the University of Witwatersrand, resulting in virtual teaching being implemented. This move has been met with a positive response among the registrars in the department.

Acknowledgements

I would like to acknowledge and give a great amount of gratitude to my supervisors for their continual support with my research and extensive professional guidance, and their continuous encouragements and pushing me to get through my MMED.
I would like to acknowledge my statistician for all the help with the statistics and data analysis.
I would like to give thanks to the Lord Almighty for everything He has done and continues to do for me. I thank my family who pushed me to the best version of myself, especially during the times when I felt I could not go on and for the unconditional support they give to me daily. My “Mila” for keeping up with a mother who was always busy and my motivation to continue going.

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List of abbreviations

Wits:	University of Witwatersrand
COVID-19:	Coronavirus disease
WHO:	World Health Organisation
CDC:	Centre for Disease Control and Prevention
WITS PG:	University of Witwatersrand Postgraduate
FCA:	Fellowship of the College of Anaesthetists

Draft Article

Registrars' perspectives towards virtual teaching in an academic department during the COVID-19 pandemic

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Keywords: Anaesthesia, COVID-19, virtual teaching, registrars, perspectives

Introduction

Traditionally in the Department of Anaesthesiology at the University of Witwatersrand (Wits) postgraduate teaching included in-person interaction: namely morning meetings, specialist anaesthetists lead tutorials, lectures, and combined meetings where registrars would also be given the opportunity to participate. These in-person interactions would therefore take place in a meeting room where medical officers, registrars, and anaesthetic specialists would gather.

The Coronavirus (COVID-19) pandemic resulted in the disruption of activities that included the gathering of people. The activity disruption affected teaching at all levels of education and postgraduate teaching at the Wits Department of Anaesthesiology was no exception. The novel coronavirus, which was first identified in Wuhan City of China on 31 December 2019, resulted in COVID-19 disease.(1) The COVID-19 disease was declared by the World Health Organisation (WHO) to be a global public health emergency of great concern worldwide. (2) As a result of the rapid spread and catastrophic consequence to the human population across the globe, COVID-19 was declared a pandemic by WHO on 11 of March 2020. (3) On 5 of March 2020, the first positive COVID-19 case was confirmed in South Africa. (4) The head of the National Disaster Management Centre subsequently declared COVID-19 pandemic a national disaster on 15 of March 2020, this was in accordance with the South African Disaster Management Act, 2002 (Act No. 57 of 2002) under section 23. (1)(b).(5-7)

Due to the COVID-19 pandemic having catastrophic consequences leading to death in many, the risk needed to be minimised and decreased as far as possible as directed by the South African Disaster Management Act of 2002.(6) These preventative measures to curb the spread of COVID-19 were advised by WHO and the Centres for Disease Control and Prevention (CDC). These included personal hygiene, isolation of those who presented with symptoms or tested positive for COVID-19, self-quarantine for those who encountered an individual who tested positive for COVID-19 and social distancing. (8-10)

In accordance with the amended South African Occupational Health and Safety Act, Act 85 of 1993, (11) The South African Minister of Employment and Labour stated that working and teaching environments needed to be as safe as possible for all individuals. (11) A circular by the Department of Employment and Labour regarding COVID-19 of workplace preparedness,

stated that health risk due to COVID-19 infection to employees should be circumvented. (12, 13)

Virtual learning became a feasible platform to conduct teaching during the COVID-19 pandemic in many teaching facilities at all levels of education across the globe. (3, 14-16) The South African Department of Employment and Labour set out administrative controls to prevent the spread of COVID-19, which meant that a virtual teaching platform was instituted at the post-graduate level in the Department of Anaesthesiology at Wits to continue in training registrars to becoming specialist anaesthetists. (12, 17) Therefore, the usual academic meetings and in-person teaching platforms needed to be changed to comply with set out restrictions by the government for the lockdown regulations.

Since the invention of the world wide web by Sir Tim Berners-Lee in 1989,(18) online and virtual teaching has been made possible by many education facilities including those at the higher education level and postgraduate level.(19) Similarly to postgraduate anaesthesia training programmes in many countries where training to become specialists had to continue via a virtual platform, the Department of Anaesthesiology at Wits had to adapt to postgraduate teaching being conducted on virtual platforms such as Zoom® and Microsoft Teams® meetings (a communication platform for video conferencing of virtual meetings). (19-22) These teachings included morning tutorials ideally before commencing daily work duties that are conducted by specialists, and afternoon tutorials ideally after work duties, which are normally chaired by specialists and presented by a registrar, some of the tutorials are also conducted by specialists at combined departmental meetings. These meetings would cover the topics and syllabus essential for the successful completion of specialist training in anaesthesiology as outlined by the College of Medicine of South Africa (CMSA) stipulated by the College of Anaesthetists.(23) Lectures in the form of "Updates" were also introduced as a form of teaching that was also held via a virtual platform. These would be held as a full-day event that would take place on a Saturday. With these virtual teaching meetings, the presenter could share their presentation on screen. (24)

The meetings led to isolated teaching and a lack of human contact at most times. Although the examination results remained positive, the aim of this study was to look at the registrars'

perspective on the change of teaching platform to virtual teaching amidst the COVID-19 pandemic and the challenges they face with accessing virtual teachings. Furthermore, to determine if virtual teaching is a sustainable form of teaching registrars in an academic setting, such as that of the Department of Anaesthesiology at Wits, even post the COVID-19 pandemic.

Methods

Approval to conduct this study was obtained from Wits PG Ethics committee certificate number M210930 and other relevant authorities.

A cross-sectional quantitative method was followed via an online self -administered questionnaire which was distributed to the Wits registrars via RedCap® (which is a web application to create and organize online surveys and databases).(25) The study was conducted from December 2021 to February 2022. The questionnaire that was used, was developed following a literature search and an adaptation of questions from two validated questionnaires following the authors permission. (26, 27) The questionnaire was content, and face validated prior to distribution to the registrars by three senior specialists in the department with an interest in postgraduate education. Participation in the study was voluntary; anonymity and confidentiality of the participants were maintained. A declaration letter was included in the online questionnaire for the participants to give their consent prior to completion; and proceeding with the questionnaire implied consent. (28)

The questionnaire was used to assess the registrars' perspectives on virtual teaching at Wits' Department of Anaesthesiology. In addition to assessing the demographics of the registrars, the study also examined how COVID-19 disease affected their training to be specialist anaesthetists, as well as their perceptions of virtual teaching.

Participants for the study were exclusively the registrars in the Department of Anaesthesiology at Wits during the COVID-19 pandemic. The department had 100 registrars and the calculated sample size was 85 respondents in order to obtain a 95% confidence with a 5% margin of error using a population proportion of 50%.(29, 30)

The questionnaire included demographic profile, the participants' personal perception of teaching during the COVID-19 pandemic, as well as the participants; perspectives on virtual teaching (questionnaire see attached appendix 8).

The inclusion criteria to participate in the study were anaesthesia registrars registered in the Department of Anaesthesiology at Wits. Exclusion criteria were registrars not registered in the Department of Anaesthesiology at Wits, registrars who refuse to participate in the study, medical officers, interns, and consultants.

To analyse data, and to compare the attendance of tutorials based on demographics, the chi-squared test was used for categorical variables while the two-sample t-test was used for continuous variables. For the categorical data, Fisher's exact test was used and in the case of continuous data, the Kruskal Wallis test was used.
In comparing the perspectives by registrars of the morning and afternoon tutorials the McNemar test was used. Frequencies and percentages were used to describe categorical data of the Update lectures.

Results

Table 1 demonstrates participants' demographics. A total of 90 registrars responded out of the 100 registrars registered in the Department of Anaesthesiology at Wits. The mean age was 34.3 years, and the study was composed of 52.2% females and 47.8% males. There were 64.0% (55) married, 4.6% (4) cohabiting and 27.9% (24) single registrars. There were 39.5% (34) of the registrars had no dependents.

Table 1: Participants' demographics

Demographic Information		
Variable	**Category**	**n = 90, n (%)**
Age	Mean (SD)	34.3 (4.4)
Gender	Male	43 (47.8)
	Female	47 (52.2)
Marital status	Married	55 (64.0)
	Single	24 (27.9)
	Cohabiting	4 (4.6)
	Other	3 (3.5)
Number of dependents	0	34 (39.5)
	1	18 (20.9)
	2	17 (19.8)
	3	10 (11.6)
	4	6 (7.0)
	5	1 (1.2)
Register level of training	First	24 (27.0)
	Second	16 (18.0)
	Third	17 (19.1)
	Fourth	31 (34.8)
	Extended registrar time	1 (1.1)
Completed part 1 exams	Yes	87 (97.8)
	No	2 (2.2)

Table 2 demonstrates COVID-19 and its effect on teaching. There were 64.4% (58) of the participants quarantined for COVID-19 infection during the period preceding and up to our data collection. Of those, 22.4% (13) had encountered a positive case with no symptoms and 8.6% (5) had symptoms of the COVID-19 disease. A total of 61.1% (55) of the participants felt that the COVID-19 crisis brought about anxiety. In addition, there were 14% (13) of the participants commented that they may have 'missed opportunities in terms of exposure to elective cases' and were 'worried about quality of teaching,' and that 'personally they do not

like virtual teaching'. While 83% of the 90 participants found that COVID-19 brought disruption to their registrar time teaching and training, with a common response being that it 'delayed completing research'.

Table 2: Registrars COVID-19 exposure and its effect on teaching

COVID-19 and Teaching (n (%))		
Ever been quarantined for COVID-19	Yes	58 (64.4)
	No	32 (35.6)
Reason for quarantining	Tested positive	39 (67.2)
	Contact with a case	13 (22.4)
	Symptoms	5 (8.6)
	Other	1 (1.7)
Learning anxiety due to COVID-19	Yes	55 (61.1)
	No	35 (38.9)
Anxiety level*	Median (IQR)	7 (5 – 8)
Training disruption due to COVID-19	Yes	75 (83.3)
	No	15 (16.7)

(*Anxiety was measured as a scale of 1 to 10 where 1 is "not at all stressful or anxiety provoking" and 10 being "extremely stressful or anxiety provoking" on the questionnaire, with 7 being the median and an interquartile range of 5-8.)

The frequency of attendance of morning or afternoon tutorials was variable, 25.6% (23) of the participants reporting not attending both morning and afternoon tutorials and 18.2% (16) reported not attending afternoon tutorials. Also of note, there were 91% of the participants (81) felt that the implementation of virtual teaching was effective. More than 50% of the participants felt that virtual teaching had a positive overall impact on their teaching during registrar training. (Table 3)

Table 3: Perspectives on virtual teaching platform

Virtual teaching perspectives		
Variable	**Category**	**n (%),**
Was the implemented virtual teaching effective?	Yes	81 (91.0)
	No	8 (9.0)
How comfortable with virtual teaching.**	Median (IQR)	7 (5 – 8)
Frequency of attending morning tutorials	None	23 (25.6)
	Once a week	25 (27.8)
	Twice a week	18 (20.0)
	Three times a week	15 (16.7)
	Four times a week	5 (5.6)
	Five times a week	4 (4.4)
Frequency of attending evening tutorials	None	16 (18.2)
	Once a week	33 (37.5)
	Twice a week	29 (32.9)
Attended updates	Yes	39 (43.8)
	No	50 (56.2)
Overall impact of virtual teaching on reg training	Extremely negative	6 (6.7)
	Neutral	36 (40.0)
	Extremely positive	48 (53.3)

(** How comfortable the participant was with virtual teaching was asked on a basis of a scale of 1 to 10, where 1 is uncomfortable and 10 significantly comfortable.)

Table 4 looked at perspective of virtual teaching post COVID-19, 83 of the 90 participants indicated that they attended at least either the morning or afternoon or both tutorials. When looking at the perspectives of registrars towards virtual teaching post COVID-19 pandemic of the 83 participants that attended at least either the morning or afternoon tutorials, 58.9% (53) preferred virtual teaching to in-person teaching.

There were 73.3% (66) participants that indicated that they would want to continue with virtual teaching post COVID-19 pandemic, while 18.9% (17) did not want to continue with virtual teaching post COVID-19. However, there were 68.9% (62) of the 90 participants that had indicated that they would also prefer to have a combination of both virtual and in-person teaching. When comparing virtual teaching to in-person teaching, 41.3% reported that they found that virtual teaching was the same as in-person teaching. There were 28.9% (26) of the

participants that preferred in-person teaching over virtual teaching. Of the 83 respondents that attended the tutorials 73.3% (66) said they would want to continue with virtual teaching post the COVID-19 pandemic, while 68.9% (62) preferred a teaching programme with combination of virtual and in-person teaching.

Table 4: Perspective of virtual teaching post COVID-19

Virtual Teaching post COVID-19		**n (%)**
Prefer virtual teaching to in-person teaching	Yes	53 (58.9)
	No	30 (33.3)
Compare virtual teaching to in-person teaching	Virtual teaching > in-person	21 (23.3)
	Virtual teaching = in-person	33 (36.7)
	Virtual teaching < in-person	26 (28.9)
Want to continue with virtual learning post COVID	Yes	66 (73.3)
	No	17 (18.9)
Prefer a combined virtual and in-person programme	Yes	62 (68.9)
	No	21 (23.3)

In both the morning and afternoon tutorials, there was no significant difference in attendance based on demographics. With each of the demographic variables of both the morning and afternoon tutorial attendance having a p-value greater than 0.05.(Table 5)

Table 5: Tutorial Attendance by Demographics

Variable		**Morning Tutorials**			**Afternoon Tutorials**		
		Not-Attend n = 23	Attend n = 67	p-value	Not-Attend n = 16	Attend n = 74	p-value
Age: Mean (SD)		33.0 (4.3)	34.7 (4.4)	0.12	32.5 (2.0)	34.7 (4.7)	0.07
Gender	Male	15 (34.9)	28 (65.1)	0.052	10 (23.3)	33 (76.7)	0.19
	Female	8 (17.0)	39 (83.0)		6 (12.8)	41 (87.2)	
Marital status	Married	14 (25.5)	41 (74.5)	0.73	10 (18.2)	45 (81.8)	0.60
	Single	7 (29.2)	17 (70.8)		3 (12.5)	21 (87.5)	
	Other	1 (14.3)	6 (85.7)		2 (28.6)	5 (87.5)	

Number of dependents	0	10 (29.4)	24 (70.6)	0.44	9 (26.5)	25 (73.5)	0.33
	1	5 (27.8)	13 (72.2)		1 (5.6)	17 (94.4)	
	2	2 (11.8)	15 (88.2)		3 (17.6)	14 (82.3)	
	≥3	6 (35.3)	11 (64.7)		3 (17.6)	14 (82.3)	
Registrar level of training	First	8 (33.3)	16 (66.7)	0.20	5 (20.8)	19 (79.2)	0.64
	Second	6 (37.5)	10 (62.5)		4 (25.0)	12 (75.0)	
	Third	4 (23.5)	13 (76.5)		2 (11.8)	15 (88.2)	
	Fourth	4 (12.9)	27 (87.1)		4 (12.9)	27 (87.1)	

Virtual teaching perspectives were analyzed in relation to registrar training levels (Table 6). The confidence of registrars using virtual teaching showed no significant difference across the levels of registrar training (p-value = 0.68). According to the analysis of the responses by the registrars based on level of registrar training, the effectiveness of the implementation of virtual teaching was not significantly different (p-value= 0.96). The overall positive impact of virtual teaching on registrar training was among first year and fourth year registrars at 54.2% (13) and 58.1% (18) respectively; however, there was no statistical significance shown (p-value= 0.64).

Table 6: Perspectives according to registrar training level in years

Variable	**First Median (IQR)**	**Second Median (IQR)**	**Third Median (IQR)**	**Fourth Median (IQR)**	**p-value**
Confidence with virtual teaching	7.5 (6.5 – 8)	7 (5 – 8.5)	6 (5 – 8)	7 (5 – 9)	0.68
Was the implemented virtual teaching effective?	N (%)				
Yes	22 (91.7)	14 (87.5)	16 (94.1)	27 (90.0)	0.96
No	2 (8.3)	2 (12.5)	1 (5.9)	3 (10.0)	
Overall impact of virtual teaching on registrar training					
Extremely negative	0 (0.0)	2 (12.5)	2 (11.8)	2 (6.4)	0.64
Neutral	11 (45.8)	7 (43.8)	7 (41.2)	11 (35.5)	
Extremely positive	13 (54.2)	7 (43.8)	8 (47.0)	18 (58.1)	

Table 7 (page 26-29) compares perspectives of the morning and afternoon tutorials only the data from participants who attended both morning and afternoon tutorials (n=61) was used.

According to the teaching barriers experienced, technical difficulties were different between groups (p-value= 0.008), while the other barriers did not show any significant statistical difference (p-value > 0.05). Data cost experienced was marginally different (p-value of 0.052). While the teaching barriers in regards to the benefits of the current morning or evening tutorial slots, showed that there was no significant statistical difference regarding the convenience of the tutorials (p = 0.51). There was a significant difference with the perspective towards benefit of tutorial timing being accessible at the end of the day (p <0.001).

The disadvantages of the current time slots of both the morning and afternoon tutorials showed significant statistical differences with timing interfering with driving to work (p <0.001), interfering with preparing to go to work (p = 0.002), interfering with family responsibilities (p < 0.001), and night call handover of duties (p = 0.003). There was no significant statistical difference with the factors that influenced registrar tutorial attendance of either morning or afternoon tutorials; such as preference of morning versus afternoon tutorials (p= 0.061), enjoying the content covered (p= 0.49), proximity to exams (p= 0.37) and other reasons (p= 0.18). There was no statistical difference with factors that influenced registrar tutorial non-attendance , namely tutorials not being beneficial (p= 0.50), the tutorials being too early or too late (p=0.32), too many tutorials in the week (p= 0.23) and registrars being on call or post call (p =0.39).

When it came to content that was preferred to be covered in both the morning and afternoon tutorials, the content that showed the significant statistical difference was preparation for the part 2 fellowship of anaesthesia exam (FCA 2) with the multiple-choice questions (p =0.003), OSCE type preparation (p = 0.004), and exam paper case preparations (p = 0.005). Preparation for short answer questions did not show any significant difference (p = 0.53) and other topics to be covered also did not show any statistically significant difference (p = 1.00).

For responses on perspectives of the 13 domains as outlined by the College of Anaesthesiology of CMSA, the domains that the registrars wanted to be covered included anaesthesia for cardiac, thoracic and vascular surgery (p = 0.02), anaesthesia for neurosurgery (p = 0.009), airway management anaesthesia for ear nose and throat (ENT), eye, dental maxillofacial and head and neck surgery (p = 0.033). There was no significant statistical difference for the other domains such as fundamentals of anaesthesia and pain management, anaesthesia for major and trauma surgery, and obstetric anaesthesia and analgesia (p-value 0.78, 0.65 and 0.49 respectively), paediatric anaesthesia (p = 0.35), intensive care medicine (p = 0.20), pain medicine (p = 0.30), anaesthesia in remote location (p = 0.18), professionalism and ethics in practice (p = 0.47) and education, self-direct learning and research (p = 0.32).

Table 7: Barriers to morning and evening tutorial attendance

Teaching barriers				
Parameter n = 61		**Morning**	**Afternoon**	***p*-value**
Data Costs	Yes	10 (16.4)	10 (16.4)	0.052
	No	3 (4.9)	38 (62.3)	
Technical difficulties	Yes	12 (19.7)	14 (22.9)	0.008
	No	3 (4.9)	32 (52.5)	
Difficulties following tutor	Yes	0 (0.0)	8 (13.1)	0.11
	No	2 (3.3)	51 (83.6)	
Timing	Yes	37 (60.7)	11 (18.0)	0.22
	No	6 (9.8)	7 (11.5)	
Other	Yes	1 (1.6)	5 (8.2)	0.10
	No	1 (1.6)	54 (88.5)	
Benefits of current slot				
Convenient	Yes	6 (9.8)	9 (14.8)	0.51
	No	12 (19.7)	34 (55.7)	
Can get tutorials at the end of the day	Yes	17 (27.9)	22 (36.1)	<0.001
	No	4 (6.5)	18 (29.5)	
Accommodates all sites	Yes	25 (41.0)	9 (14.7)	0.82
	No	10 (16.4)	17 (27.9)	
Tutorial after pre-operative assessment***	Yes	0 (0.0)	4 (6.6)	0.13
	No	0 (0.0)	57 (93.4)	
Factors that influence attendance				

Prefer morning/afternoon tutorials	Yes	1 (1.6)	7 (11.5)	0.061
	No	16 (26.2)	37 (60.7)	
Enjoy the content covered	Yes	14 (23.0)	8 (13.1)	0.49
	No	11(18.0)	28 (45.9)	
Proximity to exams	Yes	16 (26.2)	7 (11.5)	0.37
	No	4 (6.6)	34 (55.7)	
Other reasons	Yes	2 (3.3)	7 (11.5)	0.18
	No	2 (3.3)	50 (81.9)	
Factors that influence non-attendance				
Tutorials not beneficial	Yes	0 (0.0)	2 (3.3)	0.50
	No	0 (0.0)	59 (96.7)	
Too early / late	Yes	3 (4.9)	6 (9.8)	0.32
	No	10 (16.4)	42 (68.9)	
Too many tutorials in the week	Yes	7 (11.5)	6 (9.8)	0.23
	No	11 (18.0)	37 (60.7)	
On call or post call	Yes	28 (45.9)	13 (21.3)	0.39
	No	9 (14.8)	11 (18.0)	
Disadvantages of current slot				
None	Yes	1 (1.6)	1 (1.6)	0.13
	No	6 (9.8)	53 (87.0)	
Interferes with driving to work	Yes	13 (21.3)	36 (59.1)	<0.001
	No	1 (1.6)	11 (18.0)	
Interferes with preparation to go to work	Yes	12 (19.7)	19 (31.1)	0.002
	No	4 (6.6)	26 (42.6)	
Interferes with family responsibilities	Yes	13 (21.3)	1 (1.6)	<0.001
	No	24 (39.4)	23 (37.7)	
Interferes with night call handover/duty	Yes	12 (19.7)	4 (6.6)	0.003
	No	18 (29.4)	27 (44.3)	
Other disadvantages	Yes	0	2 (3.3)	0.50
	No	0	59 (96.7)	
Content preferred in the tutorials				
Preparation for short answer questions	Yes	27 (44.3)	10 (16.4)	0.53
	No	13 (21.3)	11 (18.0)	
Preparation for multiple choice questions	Yes	12 (19.7)	6 (9.8)	0.003
	No	22 (36.1)	21 (34.4)	
OSCE type preparations	Yes	20 (32.8)	5 (8.2)	0.004
	No	19 (31.1)	17 (27.9)	
Paper case preparations	Yes	27 (44.3)	6 (9.8)	0.050

	No	15 (24.6)	13 (21.3)	
Other topics	Yes	2 (3.3)	2 (3.3)	1.00
	No	2 (3.3)	55 (90.1)	
Domains preferred in the afternoon				
Fundamentals of anaesthesia and pain management	Yes	26 (42.6)	7 (11.5)	0.78
	No	6 (9.8)	22 (36.1)	
Anaesthesia for major and trauma surgery	Yes	31 (50.8)	9 (14.8)	0.65
	No	11 (18.0)	10 (16.4)	
Obstetric anaesthesia and analgesia	Yes	28 (45.9)	8 (13.1)	0.49
	No	11 (18.0)	14 (23.0)	
Anaesthesia for cardiac, thoracic and vascular surgery	Yes	32 (52.5)	4 (6.6)	0.002
	No	19 (31.1)	6 (9.8)	
Anaesthesia for neurosurgery	Yes	27 (44.3)	6 (9.8)	0.009
	No	19 (31.1)	9 (14.8)	
Anaesthesia for ENT, eye, dental, maxillofacial and head and neck surgery, including airway management	Yes	26 (42.6)	6 (9.8)	0.033
	No	16 (26.2)	13 (21.3)	
Paediatric anaesthesia	Yes	30 (49.2)	7 (11.5)	0.35
	No	11 (18.0)	13 (21.3)	
Intensive care medicine	Yes	26 (42.6)	8 (13.1)	0.20
	No	14 (23.0)	13 (21.3)	
Pain medicine	Yes	23 (37.7)	9 (14.7)	0.30
	No	14 (23.0)	15 (24.6)	
Anaesthesia in remote location	Yes	22 (36.1)	7 (11.5)	0.18
	No	13 (21.3)	19 (31.1)	
Education, self-direct learning and research	Yes	19 (31.1)	10 (16.4)	0.32
	No	6 (9.8)	26 (42.6)	
Professionalism and ethics in practice	Yes	26 (42.6)	10 (16.4)	0.47
	No	7 (11.5)	18 (29.5)	
Quality, safety, management and health economics	Yes	27 (44.3)	11 (18.0)	0.071
	No	4 (6.6)	19 (31.1)	

(*** preoperative assessments of patients booked for the following day elective surgical list are done by the registrars when the surgical list has been constructed and handed in by the surgical teams of that particular surgical list. These assessments are usually done at the end of the current day's surgical list which can end before 16h00 or at 16h00 or after 16:00 but on most days the lists end either at 16h00 or after 16h00.)

The updates that run on the weekend were attended by 39 of the 90 participants included. Of note, 92.3% (36) of those who attended found that the updates were satisfactory with the

subjects that were offered. Of the 7.7% (3) participants who responded that they were not satisfied with the subjects offered, 100% of them responded that the updates were too expensive. However, 100% of them did not find that the duration was too long nor did they find the topics irrelevant. The 66.7% (2) of the three participants who were dissatisfied did not consider the days to be inconvenient. (Table 8 Registrar updates lectures)

Table 8: Registrars' perceptions towards "Update" lectures

Variable	Category	n (%), n = 39
Satisfied with subject updates offered.	Yes	36 (92.3)
	No	3 (7.7)
Reason for Dissatisfaction		
Updates too expensive	Yes	3 (100)
	No	0 (0.0)
Days of updates inconvenient	Yes	1 (33.3)
	No	2 (66.7)
Duration too long	Yes	0 (0.0)
	No	3 (100)
Topics not relevant	Yes	0 (0.0)
	No	3 (100)
Other	Yes	2 (66.7)
	No	1 (33.7)

The frequency of the updates attendance in order of the popularity to the least attended were, neuroanaesthesia "update" at 59% (23), paediatric "update" at 51.3% (20) participant and, obstetric "update" had an attendance of 11 (28.2%). Regarding primaries (FCA 1) subjects attendance, physics, physiology and pharmacology had an attendance of 15.4% (6), 7.7% (3) and 7.7% (3) respectively.

There were 84.6% (33) participants who indicated that they would appreciate attending an intensive care update, 69.2% (27) indicated that they would be interested in an "update" on cardiothoracic and vascular surgery, 59% (23) were interested in an "update" on ethics, pain management had an interest of 56.4% (22) participants. While 48.7% (19) participants

indicated that they would like an “update” on head and neck anaesthesia, while 28.2% (11) would be interested in an “update” on remote location anaesthesia. (Table 9)

Table 9: Types of attended “Updates” and suggested future subjects.

Variable	Category	n (%), n = 39
Neuroanaesthesia	Yes	23 (59.0)
	No	16 (41.0)
Paediatrics	Yes	20 (51.3)
	No	19 (48.7)
Obstetrics	Yes	11 (28.2)
	No	28 (71.8)
Physics	Yes	6 (15.4)
	No	33 (84.6)
Physiology	Yes	3 (7.7)
	No	36 (92.3)
Pharmacology	Yes	3 (7.7)
	No	36 (92.3)
Other	Yes	6 (15.4)
	No	33 (84.6)
Subject areas would like to be covered		
Pain management	Yes	22 (56.4)
	No	17 (43.4)
Head and neck	Yes	19 (48.7)
	No	20 (51.3)
Intensive care	Yes	33 (84.6)
	No	6 (15.4)
Cardiothoracic and vascular	Yes	27 (69.2)
	No	12 (30.8)
Ethics	Yes	23 (59.0)
	No	16 (41.0)
Remote location anaesthesia	Yes	11 (28.2)
	No	28 (71.8)
Other	Yes	1 (2.6)
	No	38 (97.4)

Discussion

In this study, we found that the participants' perception towards virtual teaching was positive as evidenced by their responses in regard to the beneficial impact it had on their teaching. They felt that virtual teaching should continue post-COVID-19. The registrars at all levels of training agreed that the implementation of virtual teaching during the pandemic had a positive impact.

Similar to our study, Rana et al (27) of surgical residents found that COVID-19 brought about a state of consternation in surgical residents' personal lives and training. A by Aisa et al (32) noted that COVID-19 resulted in disruption to training of Anaesthesia and Critical care residents in Spain. In our study, a number of the registrars were concerned that COVID-19 would result in their training being disrupted.The participants also indicated that they were anxious because of the COVID-19 disease and its possible effects on their learning. Some of the registrars were anxious about the "risk of contracting the virus". They were "too anxious to read the material and participate in tutorials" and that "majority of our learning is experience based."

The current study findings were similar to the study by Adnan et al (33) where the participants revealed that they were comfortable with the virtual teaching platform. In contrast, Adnan et al (33) found virtual teaching to lack socialisation and less effective than in person interaction, in our study the registrars found that the implementation of virtual teaching was effective. The registrars in the current study preferred virtual teaching over in-person teaching. It was evident that the registrars would prefer virtual teaching to continue post the COVID-19 pandemic in spite of the attendance of online tutorials being low for both the morning and the afternoon tutorials.

The study highlighted that the timing of the online tutorials did interfere with registrars' family or home responsibilities and duties.

There were similar comments made by the respondents in the study by Khalil et al (34) to the current study of online learning affecting family time. Some of the comments by the registrars that were similar to those made by the respondents in the Khalil et al study,

including comments such as "it interferes with family time". However, registrars' marital status and number of dependents did not significantly affect whether they attended tutorials.

Akin to the barriers faced by the respondents in the study by Dost et al (26), such as the timing of the tutorials, the current study found that the timing of the morning tutorials were a barrier to attendance as they commonly coincided with driving to work making it difficult to follow the tutorial discussion. The study also found that attending morning tutorials was challenging because registrars had to participate while driving. Morning preparations for theatre also created barriers to tutorial attendance, with some theatre cases being complex and requiring extensive preparations.

Registrars reported that they were able to obtain tutorial content at the end of the day. Registrars preferred the morning tutorials over the afternoon tutorials to prepare for the FCA 2 final exams since the morning tutorials were specialist-led and covered topics specific to the CMSA college of anaesthesia domains.

Updates attendance was not as high as the tutorial attendance, with less than half of the participants attending Updates. Among the 100 registrars registered in the Department of Anaesthesiology at Wits and the 90 survey participants, only 39 attended at least one Update, which is not significant for establishing the effectiveness of the Updates and assessing registrars' perception. Most of the updates attendees were closer to writing their FCA 1 or final FCA 2 exam.

The training of doctors in their specialities has been affected by the COVID-19 pandemic as there is less exposure to skills and experience, such as that seen in the study by Ehrlich et al, Hau et at and Rose et al, (35-37). This lack of exposure to speciality training was experienced by the registrars in the Department of Anaesthesiology at Wits. Training and teaching of registrars in the Department of Anaesthesiology at Wits include both theory and practical skills. Due to social distancing, the COVID-19 pandemic limited close contact, which caused some elective procedures to be cancelled. Patients who tested positive had to be postponed, therefore limiting the amount of skills exposure. Registrars had to seek other ways to learn skills, as some have expressed concern that they were 'worried that they were not getting enough experience' and they were 'not doing the same amount of cases as before.

Although the study was small and only looked at the registrars registered in the department of Anaesthesiology at Wits, the study is of benefit to the department going further post COVID-19 pandemic in knowing what teaching method is preferred by the registrars. This study will also be of benefit to the Department in guiding the online tutorials. The study will also be of benefit to the registrars going forward with the incorporation of issues addressed by the consultants. It allows for the equitable teaching of registrars irrespective of their rotation and location. As all the formal morning and afternoon tutorials have remained virtual.

The teaching platform shift to virtual online classes that had to be made during this pandemic has expanded the access to learning resources even post-pandemic.

Limitations

The limitations that were experienced with the study included the sample size that was contextual and small as it was only looking at registrars only in the Department of Anaesthesiology at Wits, thus possibly creating bias. Thus far at the time of conducting the study there had been no study found that looked at post-graduate anaesthesia registrars' perspectives on virtual teaching during the COVID-19 pandemic.

The range of registrars was from first year up to fourth year registrars, with some of the first-year registrars having recently joined the department at the time the survey was conducted. Comparison of perspectives of virtual teaching to in-person face-to-face teaching conducted in the Department of Anaesthesiology at Wits by the first-year registrars who had not been part of the department before the COVID-19 pandemic could result in bias. While the senior registrars, who were preparing for their final (FCA part 2) exams in becoming specialist anaesthetists who would have experienced both virtual and in-person face-to-face teaching, they however make up less than half of the respondents. Nonetheless, due to the senior registrars preparing for their final exams some if not most would be making use of online learning and virtual teaching platforms as part of their preparation for the exam.
The study was conducted as an online survey this could have created some level of bias by the respondents which could be limited by in-person interviews. Collection of the data was conducted during the pandemic when social distancing was paramount. Therefore, due to the

nature of the current pandemic requiring social distancing, in-person interviews could not be conducted to eliminate respondent bias.

Barriers that affect virtual teaching such as connectivity, data cost and technical difficulties could also impact the completion of the survey as it is also an online survey. This therefore could be a reason for the number of participants not being the complete 100 registrars registered in the Department of Anaesthesiology at Wits.

Conclusion

With the COVID-19 pandemic having disrupted the academic programme in the department of Anaesthesiology at the University of Witwatersrand, virtual teaching had to be implemented for the continued training of registrars in the department in preparing them for their specialist CMSA FCA 2 final exams. Topics covered in the virtual teachings are those that are outlined by the CMSA college of anaesthesia curriculum and examined in the final CMSA FCA 2 final exams, with the morning tutorials that are presented by an anaesthetic specialist consultant in the department, that take place on most mornings before registrars start their theatre preparation for the day. The afternoon tutorials that take place usually after most elective lists are done for the day, these are presented by one of the registrars and facilitated by an anaesthetic specialist consultant from the Wits anaesthesia department, these were topics also based on the outline by the CMSA college of anaesthesia curriculum that would be examined in the final CMSA FCA 2 exam. This study showed that virtual teaching in the Department of Anaesthesiology at Wits encountered difficulties, such as anxiety related to the pandemic, barriers with adapting to virtual teaching such as connectivity and interreference with personal time. It has been found that registrars attended online tutorials and expressed a positive perspective toward virtual teaching. These perceptions have been expressed in similar studies where a positive response by the registrars was seen to continuing with virtual teaching even post the pandemic.

For an overall assessment of registrars' perspective and overall outcome of virtual teaching a follow up study would be beneficial to assess effectiveness of virtual teaching outcomes. Therefore, data for the outcomes of examination results of those registrars who were taught

via virtual teaching, to compare the outcomes of results of the groups prior to COVID-19 and those who had to be taught virtually would be of value. This will further assist to determine the impact that virtual teaching had and the competency consequence that have resulted with COVID-19 pandemic on registrars for the department. Furthermore, including other anaesthesiology departments outside of Witwatersrand and other disciplines within the University of Witwatersrand to assess the overall impact of virtual teaching as a result of the COVID-19 pandemic on education and competency at a postgraduate level of training registrars to become specialists.

Conflict of interest

No conflict of interest to declare

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Appendix 1: Proposal

Registrars' perspectives towards virtual teaching programme in an academic department during the COVID-19 pandemic

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Co-supervisor: Dr S Dingezweni

Co-supervisor: Dr P Motshabi

1. Introduction and problem statement

Traditionally postgraduate teaching at Wits Department of Anaesthesia included in- person interaction such as morning meetings, consultant lead tutorials, lectures, and combined meetings in a room with the registrars' participation.
Medical education for registrars has had to change as a result of coronavirus (COVID-19) pandemic.

On the 30th of January 2020 COVID-19 was declared to be a global public health emergency of international concern by the World Health Organisation (WHO).(1) As a result of the rapid spread and catastrophic consequence to the human population across the globe, WHO declared COVID-19 as a pandemic on the 11th of March 2020.(2)

In South Africa the first positive COVID-19 case was confirmed on the 5th of March 2020.(3) The COVID-19 pandemic was subsequently declared a national disaster on the 15th of March 2020 by Head of the National Disaster Management Centre in accordance with the South African Disaster Management Act, 2002 (Act No. 57 of 2002) under section 23(1)(b). As directed by the South African Disaster Management act of 2002; in a case of a disaster such as COVID-19, that can result in a disease and possible death, therefore the risk needs to be reduced and be prevented as far as possible by means of implementing strategies swiftly.(4, 5)

As a result of the spread of COVID-19, preventative measures were advised by World Health Organisation (WHO) and the Centers for Disease Control and Prevention (CDC). The general measures needed to curb the spread of COVID-19 included personal hygiene measures that ought to be carried out by all persons. Adherence to social distancing was the paramount measure. Those individuals who display signs and symptoms of being sick or have tested positive for COVID-19 needed to self-isolate for at least 10 days from the first onset of symptoms or from the day of testing positive. Self-quarantine was advised for those individuals that had come into close contact with known positive persons. (6, 7)

Nationally, the minister of Employment and Labour, in accordance with the amended South

African Occupational Health and Safety Act, Act 85 of 1993 stated that a working and teaching environment (such as in this case, at the University of Witwatersrand Anaesthesiology Department), should, as far as possible, be safe for all employees. (8) There should not be any health risk due to COVID-19 infection and illness to the employees (this includes registrars) through the implementation of control measures with risk assessments that needed to be reviewed and updated prior to their implementation. This risk assessment is in accordance with the Department of Employment and Labour circular of Workplace Preparedness COVID-19 (SARS- CoV-19 virus) circular, which includes determining risk of exposure to employees along with all other hazards that could affect employees such a biological, physical, chemical, ergonomic and psychosocial aspects and aspects that are of significance to registrars include long working hours at work, fatigue, burnout and psychological distress.
(9, 10)

The University of Witwatersrand Anaesthesiology Department also implemented measures to reduce COVID-19 spread. Measures implemented included social distancing. (11) Administration controls that have affected teaching in the University of Witwatersrand Anaesthesiology Department were to minimise contact among workers; contact and communication, including teaching were to be replaced by virtual communications.(10) The restrictions to gatherings, including the usual academic meetings and in-person teaching platforms, meant that many fields had to adapt their usual way of functioning in order to comply with the COVID-19 regulations as stipulated by governmental lockdown regulations. The anaesthetic academic department, like many other teaching departments, also had to adapt their style of teaching. Virtual learning became one of the feasible means to conduct teaching during the pandemic in many teaching facilities.(12-19)

Virtual teaching has been a form of sharing information and teaching even prior to the COVID-19 pandemic. Platforms for virtual teaching that were described by GonzalesZamora J.A et al. (19), included videoconferencing such as Skype™, Facebook™ and Zoom™, as means of teaching and sharing information during the period of November 2018 to January 2020 amongst academics from different parts of the world even prior to the COVID-19 pandemic. (19). In a study done by Tomlinson J et al.(20) which was conducted prior to the COVID-19 pandemic, the perceptions of participants were positive, the participants were enthusiastic about using virtual platform. Virtual teaching platforms such

as tele-learning could be beneficial as a form of teaching in the future. There were those in the study that felt that virtual tele- learning should be reserved when in-person teaching was not possible or feasible, (20) which is the current case with the COVID-19 pandemic.

Other medical academic centres that have implemented virtual teaching include centres in the United States of America, the United Kingdom and Iran. Those in the united Kingdom include the Brigham and Women's Hospital Harvard Medical School, Heart and Vascular Centre and Harvard Medical School; Department of Neurology, Depart of Medicine and Department of Neurosurgery of Allegheny General Hospital, Allegheny Health Network Pittsburgh; Sidney Kimmel Medical College in Philadelphia; the Department of Endodontics, School of Dentistry Shiraz University of Medical Sciences in Shiraz in Iran and United Kingdom registered medical schools. (17, 18, 21)

A systematic review by Wilcha R, where 34 articles were reviewed on the "effectiveness of virtual medical teaching during the COVID-19 crisis"(14) the reviews were predominantly done on undergraduate medical students. The study showed there were benefits of virtual teaching, these included the ability to interact with patients with the reduced risk of COVID19 infection. The students' perceptions on virtual teaching were positive towards their learning amid the pandemic, as they could keep up with medical knowledge. However; there were dissatisfactions expressed towards virtual learning which were mainly due to technology issues such as access to digital equipment, internet access along with its vulnerability to hackers.

In a study done by Dost S et al. (13) in the United Kingdom on medical students from registered United Kingdom medical schools, the medical students felt the need for face-toface teaching with the lecture, they also felt that they were unable to complete their course with virtual teaching. (13, 21).

In a systematic review by Pei L et al. (22) they have gathered that there are advantages noted from virtual teaching for medical students, it was however also noted that it was not effective for all students. This was more so in the case of self- study work. It was indicated that more research was needed to further determine which situations where this platform would be more effective. (22) The sentiments of virtual teaching not being effective for all students were also reiterated by Holt R et al.(23) where a programme that was redeveloped for

masters students in the programme for Dental Public Health at the University of London and Diploma of the
Royal College of Surgeons. This was as a result of the students' educational history and the students' own personalities and that they had to sacrifice their time from leisure activities.(23)

A study done by Rana T et al. (17) conducted on medicine and surgery residents in Allgeheny General Hospital in Pittsburgh, United States of America the perceptions of medical students and residents (the equivalent of the South African registrar) were both positive and negative. The positive perceptions were that it allowed for more time at home to read academic materials and catch up on their research. Students felt more comfortable communicating during the virtual lectures. For medicine residents the platform for telemedicine also allowed practical experiences to engage with patients even if they were in quarantine. The negative perceptions from surgical residents were that their practical skills teaching, and training were affected due to the decline in elective cases. Junior residents were less at ease with virtual teaching as compared to the senior residents. Another limitation with online teaching was internet accessibility as a result of internet connectivity issues.(17)

In a study by Adnan M (12) among students in higher education in the Department of Mass Communication at the National University of Sciences and Technology in Pakistan, technical issues such as lack of adequate internet access and facilities. They also felt they were confined when it came to carrying out group projects. (12) In a study by Tuladhar et al.(15), looking at online teaching for medical and dental students at Gandaki Medical College in Pokhara Nepal, they were faced with issues of electricity cuts causing internet connectivity problems. (15) With our current power cut crisis in South Africa due to scheduled national power outages, this too could pose as an internet connectivity problem that registrars face with virtual teaching.

In a study by Hau H et al.(16) on surgical oncology at the Department of Visceral, Thoracic and Vascular Surgery at the University Hospital and Faculty of Medicine Carl Gustav Carus Technische Universität Dresden in Germany, it was pointed out that teaching and training is limited with virtual teaching especially when it comes to skills and practical surgical management of patients. (16) Locally, there are no studies on virtual teaching in higher education, post graduate and registrar level that we are currently aware of. A study by

Mahaye NG on basic education looking at teaching and learning using in-person interactions with students in addition to different platforms of online teaching. From the study it was concluded that the "blended" approach to teaching could be a useful tool in preventing education gaps as a result of the COVID-19 pandemic in the basic education group. (2)
In a study related to virtual teaching in anaesthesia by Kiwanuka JK et al.(24) which was conducted prior to the COVID-19 pandemic, regarding knowledge that was transferred to two groups; one of the groups were in-person teaching while the second was a group done via virtual teaching to a distant group. It showed that information and knowledge that was transferred was the same between the groups, indicating that virtual platform was a good tool for teaching and transferring of anaesthetic knowledge.(24)

Registrar teaching has had to change in the face of the COVID-19 pandemic in order to prepare registrars for their specialty examinations. The change has been crucial in order to continue knowledge transfer from consultants to the registrars. Not much literature is currently available regarding the change to virtual teaching platform as a result of the COVID-19 pandemic such as that of the proposed study of an Anaesthetic Academic Department. In an article by Martinelli SM et al. (25) addressing the need of virtual teaching platforms for anaesthetic residents (which are the American equivalent of the South African registrar), from the more traditional "didactic in-person teaching", stating in the article that more research around virtual teaching in an anaesthetic academic department is essential.(25)

The University of the Witwatersrand Anaesthesiology Department adapted their academic programme for all levels of teaching and academic meetings to virtual teaching at the beginning of the pandemic in March 2020. The current modes of teaching that are present in the depart currently are virtual weekday morning meetings at 06:00, weekdays afternoon teachings and updates on certain weekends using mainly the Zoom platform.

The virtual teaching, telemedicine and online teaching have been defined differently. According to Dost et al. online teaching sessions that are conducted through live streamed tutorials such as Zoom $^{TM.}$ where the "key clinical conditions, case studies and examination questions" are shared. (13) Currell et al. defined telemedicine as "the use of

telecommunications technology for medical diagnosis and health care" which also included sharing of test results for education purposes and long distance consultations.(26) While Tuladhar et at. Defined online classes as a course that is conducted "over the internet through learning management system". The syllabus and academic progress can be accessed by students to view.(15) Virtual learning according to a report by Van Beek on "Virtual learning in Michagan's schools" was defined as the use of software, the internet or both to deliver instructions to students. This was further classified under 5 different forms; namely computer based, internet based, remote teacher online, blended learning and facilitated virtual learning.(27)

The perspectives of the registrars at the University of Witwatersrand Anaesthesiology Department to virtual teaching are unknown. Therefore, the aim of the study is to assess the registrar's perceptions on virtual teaching during the COVID-19 pandemic.

2. Aim

The aim, of the study is to determine the perspectives of registrars at the University of Witwatersrand Anaesthesiology Department towards virtual teaching.

3. Objectives

Primary objectives are to describe

- The registrars' demographics.
- The registrars' experiences with virtual teaching platform
- The registrars' perspectives regarding the benefits and barriers of virtual teaching
- The perspectives relating to virtual teaching timing and frequency.
- Registrars' perspectives towards virtual teaching post COVID 19 pandemic

Secondary objectives are:

- To describe the relation between perspectives and registrars' demographics.
- To compare the perspectives of weekday morning teachings, weekday afternoon teachings and weekend updates meetings
- To compare the perspectives according of registrar training level

4. Research assumptions

- Anaesthetic registrar:- for the purpose of this study is an individual registered with
- specialising in the training of becoming a specialist anaesthesiologist.
- Perspectives:- defined as "a particular attitude towards something; a way of thinking about something"(28)
- Virtual teaching:- for the purpose of this study is defined as a form of imparting knowledge, ideas or principles through an online medium in where there is no physical face-to-face interaction.

5. Demarcation of study field

The study will be conducted among registrars training at the University of Witwatersrand Anaesthesiology Department hospitals, namely Charlotte Maxeke Johannesburg Academic Hospital. Chris Hani Baragwanath Academic Hospital, Helen Joseph Hospital, Rahima Moosa Mother and Child Hospital, Klerksdorp and Thelle Mogoerane Hospital.

6. Ethical considerations

- The study will be conducted in accordance to the principles of the Declaration of Helsinki (29) and the South African Guidelines for Good Clinical Practice.(30)
- Permission to conduct this study will be requested from academic head of the department
- Ethics clearance to conduct the study will be requested from Wits HREC

- Storage of data will be on RedCap™ (31), which will be destroyed after 6 years post the completion of the study
- Data will only be accessed by the researcher and supervisors of the study
- Questionnaire based study, need to obtain permission from participants to carry out the study through asking questions.
- Questions asked on the questionnaire will not be incriminating to the participant.
- The questionnaire will be conducted anonymously through RedCap™ survey.(31)

7. Research Methodology

7.1 Research design

This will be a quantitative cross-sectional study conducted at the University of Witwatersrand Anaesthesiology Department via an online questionnaire distributed to registrars. A questionnaire was developed following a literature search and an adaptation of questions from two validated questionnaires following permission from Dost et al.(13) and by Rana T et al.(17), questions were adapted to the setting of the virtual teaching program that was implemented at the University of Witwatersrand Anaesthesiology Department as a result of the COVID-19 pandemic, this includes morning tutorials that are conducted at 06:00 every morning, the afternoon tutorials that are conducted at 18:00. Demographics, registrar seniorority level and personal effects or COVID-19 were adapted. Questions about tutorial timing, frequency, barriers to attending tutorials and College of Medicine Domains are specific to the current study

7.2 Study population

Registrars in the University of Witwatersrand Anaesthesiology Department during the COVID-19 pandemic, currently there are 108 registrars. The registrars will be classified as pre-part 1 or post- part 1 based on the demographics of having passed their primary Fellowship of the College of Anaesthetists of South Africa (FCA (SA) part 1).

7.3 Study sample

Number of registrars currently registered at the University of Witwatersrand Anaesthesiology Department are 108. In our population of 108 registrars (finite population),

we require 85 plus responses to obtain 95% confidence level with 5% margin of error using population proportion of 50%.(32, 33)

Due to the study looking at registrars at the University of Witwatersrand Anaesthesiology Department, the sampling method will be a convenience sampling method. Convenience sampling method, also known as "Accidental sampling" is a sampling method based on the whether the participants are within reach .(32) All of the 108 registrars will be considered for the study, though only 90 responses are required.

Inclusion criteria

- Registrars who are registered in the University of Witwatersrand Anaesthesiology Department

Exclusion criteria

- Registrars that refuse participation
- Medical officers and interns
- Consultants

7.4 Data collection

- The questionnaire was adapted from two questionnaires by Dost et al.(13) and Rana et al.(17) after acquisition of permission (appendix A). The questions that were specific to the University of the Witwatersrand Anaesthesiology Department were added after extensive literature review to ensure content validity. Specific issues addressed included the times the virtual teachings were conducted. The questionnaire was sent to three senior consultants in the department to ensure face validity.
- Questionnaires will be sent via email to the registrars, registered at the University of Witwatersrand Anaesthesiology Department using RedCap™. Registrars will be reminded of the study through regular emails and WhatsApp™ messages.

7.5 Data analysis

Data will be transferred from Redcap™ to STATA software tool for analysis.
Statistical analysis will be done with a statistician assistance using latest software version of statistical tool STATA. Continuous variables will be presented as medians with an interquartile range (IQR) and categorical variables as numbers and percentages. Parametric tests will be used for normal distributed data. Non-parametric statistical tests will be used for non-normal distributed data. The in-between groups comparisons will be assessed using the students t-test for parametric data and for non-parametric data, Pearson's chi-square test or a Fisher's exact (two-tailed) test will be used depending on frequency in each group. Correlations of perspectives will be done using the Pearson's or Spearman's correlation coefficients, depending on whether data is parametric or non-parametric respectively. A *P*value <0.05 will be considered statistically significant.

7.6 Significance of the study

Due to the COVID-19 pandemic, teaching of registrars has had to change due to decreasing contact through social distancing. With this the usual, forms of teaching which were consultant lead in-person tutorials and morning meetings. Virtual teaching has become the new platform for teaching to continue. The study will be to determine if the virtual teaching platform is a good sustainable form of teaching of registrars during their programme and if the registrars find it beneficial. This may inform decisions and way forward of teaching post COVID-19 pandemic.

8. Validity and reliability of the study

Validity would be ensured by not using open ended questions in the questionnaire. Some of the questions would also require explanation to a yes or no question. To avoid lack of enough participants not receiving the questionnaire, the questionnaire will be sent as an email.

9. Potential limitations of the study

Lack of interest in the participation by participants, resulting in a delay in obtaining data. Participants not answering questions honestly. The sample size being too small. This will be a single centre study results cannot be entirely applicable to national or and international norms.

10. Project outline

10.1 Time frame

Year	2021									2022
Month	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.
Proposal	x	x	x	x	X					
Ethics approval						x	x			
Postgraduate approval						x	x			
Data collection							x	x		
Data analysis							x	x	x	
Submission										x

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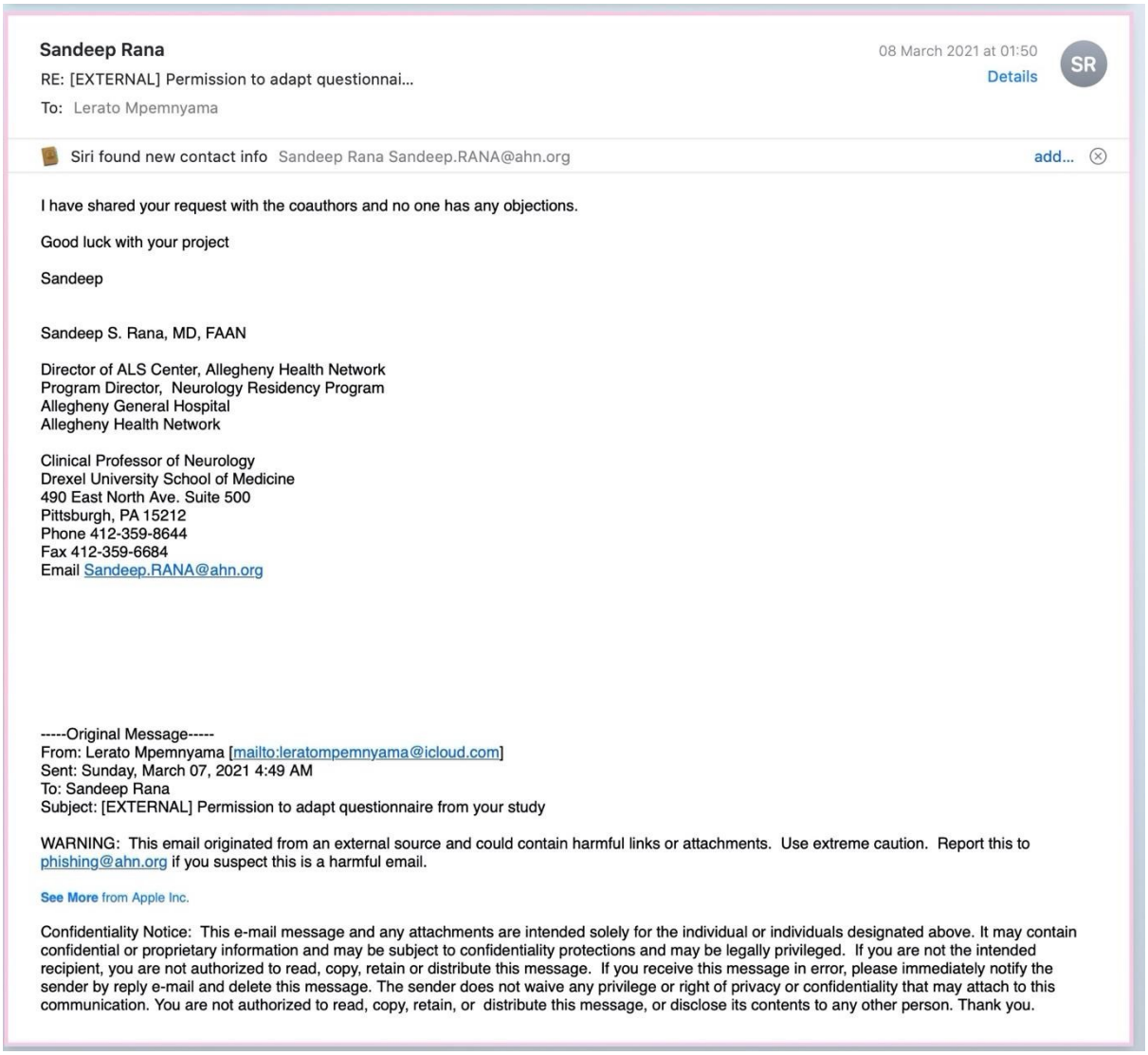
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12. Appendices

Appendix A: Emails for acquisition of permission



Sandeep Rana

08 March 2021 at 01:50

Details

SR

RE: [EXTERNAL] Permission to adapt questionnai...

To: Lerato Mpemnyama

Siri found new contact info Sandeep Rana Sandeep.RANA@ahn.org add...

I have shared your request with the coauthors and no one has any objections.

Good luck with your project

Sandeep

Sandeep S. Rana, MD, FAAN

Director of ALS Center, Allegheny Health Network
Program Director, Neurology Residency Program
Allegheny General Hospital
Allegheny Health Network

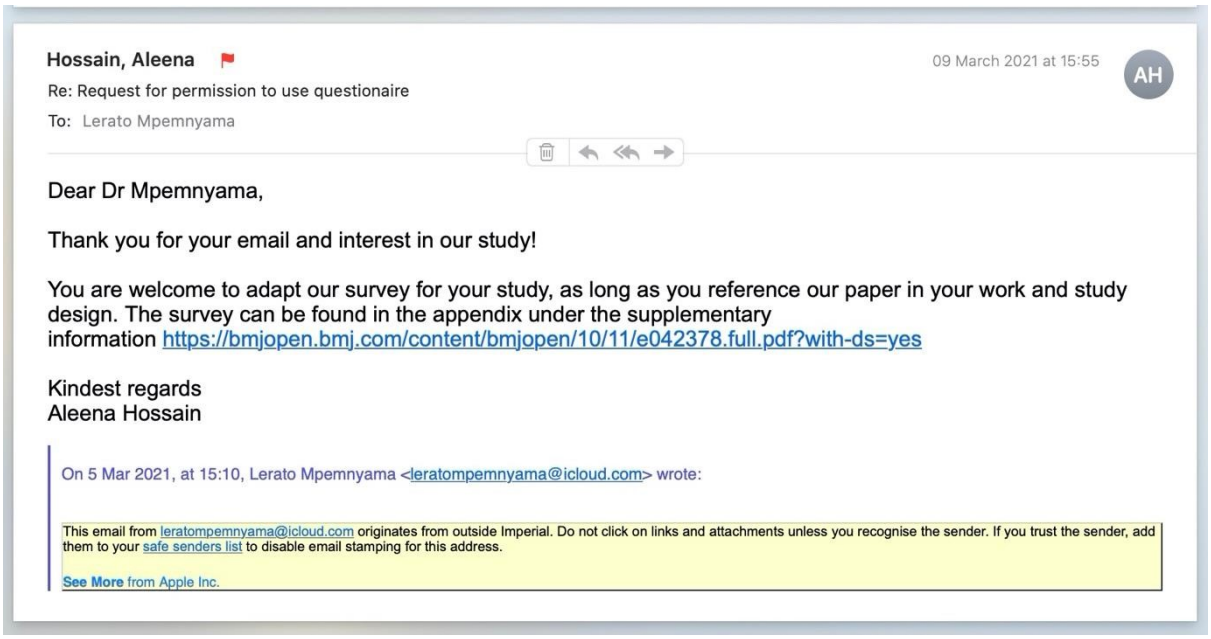
Clinical Professor of Neurology
Drexel University School of Medicine
490 East North Ave. Suite 500
Pittsburgh, PA 15212
Phone 412-359-8644
Fax 412-359-6684
Email Sandeep.RANA@ahn.org

-----Original Message-----
From: Lerato Mpemnyama [mailto:leratompemnyama@icloud.com]
Sent: Sunday, March 07, 2021 4:49 AM
To: Sandeep Rana
Subject: [EXTERNAL] Permission to adapt questionnaire from your study

WARNING: This email originated from an external source and could contain harmful links or attachments. Use extreme caution. Report this to phishing@ahn.org if you suspect this is a harmful email.

See More from Apple Inc.

Confidentiality Notice: This e-mail message and any attachments are intended solely for the individual or individuals designated above. It may contain confidential or proprietary information and may be subject to confidentiality protections and may be legally privileged. If you are not the intended recipient, you are not authorized to read, copy, retain or distribute this message. If you receive this message in error, please immediately notify the sender by reply e-mail and delete this message. The sender does not waive any privilege or right of privacy or confidentiality that may attach to this communication. You are not authorized to read, copy, retain, or distribute this message, or disclose its contents to any other person. Thank you.



Hossain, Aleena

09 March 2021 at 15:55

AH

Re: Request for permission to use questionaire

To: Lerato Mpemnyama

Dear Dr Mpemnyama,

Thank you for your email and interest in our study!

You are welcome to adapt our survey for your study, as long as you reference our paper in your work and study design. The survey can be found in the appendix under the supplementary information https://bmjopen.bmj.com/content/bmjopen/10/11/e042378.full.pdf?with-ds=yes

Kindest regards
Aleena Hossain

On 5 Mar 2021, at 15:10, Lerato Mpemnyama <leratompemnyama@icloud.com> wrote:

This email from leratompemnyama@icloud.com originates from outside Imperial. Do not click on links and attachments unless you recognise the sender. If you trust the sender, add them to your safe senders list to disable email stamping for this address.

See More from Apple Inc.

Appendix B: Permission from the Academic Head of Department

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG | FACULTY OF HEALTH SCIENCES | WITS SCHOOL OF CLINICAL MEDICINE | DEPARTMENT OF ANAESTHESIOLOGY Tel.(011)488 4344

29 July 2021

To Whom It May Concern

Re: Permission to conduct research in the Department of Anaesthesiology

This letter stands to affirm that I, Dr PMV Motshabi, grant permission to Dr Lerato Mpemnyama, to conduct a study in the Department of Anaesthesiology at University of Witwatersrand titled: "Registrars' perspectives towards virtual teaching in an academic department during the COVID-19 pandemic"

The information obtained from the data will be used for te Department to advance the training.

Yours sincerely

Dr P Motshabi

Dr Palesa Motshabi
Academic Head: Department of Anaesthesia
Head of Clinical Unit: Cardiac Anaesthesia
Tel: +27 (0)11 488 4344
Cell: 083 432 1994
Email: palesa.motshabi@wits.ac.za
Website: www.wits.ac.za
Charlotte Maxeke Johannesburg Academic Hospital, 9th Floor, Area 38/10, Jubilee Road, Parktown, Johannesburg

WITS UNIVERSITY | WITS SCHOOL OF CLINICAL MEDICINE | FACULTY OF HEALTH SCIENCES

Appendix C: Survey

Confidential

Registrars' perspectives towards virtual teaching programme in an academic department during the COVID-19 pandemic

Please complete the survey below.

Thank you!

Dear participant

My name is Lerato...

Completion of the questionnaire implies consent to the study

Basic demographics

Registrar level of training	◯ First ◯ Second ◯ Third ◯ Fourth ◯ Extended Registrar Time
Have you completed your Part 1 exams?	◯ Yes ◯ No
Gender	◯ Male ◯ Female
Age (years)	_____
Marital status	◯ Married ◯ Single ◯ Co-habiting ◯ Other
Specify other marital status	_____
Number of dependents living with you	_____

COVID 19 and teaching

Have you been quarantined/isolated at any point during the current COVID-19 pandemic?	◯ Yes ◯ No

	Tested positive for COVID-19	Contact with high-risk patient	Fever and/or upper respiratory symptoms	Travel to high-risk area	Other
yes	◯	◯	◯	◯	◯

Other _____

Appendix B: Permission from the Academic Head of Department

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG | FACULTY OF HEALTH SCIENCES | WITS SCHOOL OF CLINICAL MEDICINE | DEPARTMENT OF ANAESTHESIOLOGY
Tel.(011)488 4344

29 July 2021

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The information obtained from the data will be used for te Department to advance the training.

Yours sincerely

Dr P Motshabi

Dr Palesa Motshabi
Academic Head: Department of Anaesthesia
Head of Clinical Unit: Cardiac Anaesthesia
Tel: +27 (0)11 488 4344
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WITS UNIVERSITY | WITS SCHOOL OF CLINICAL MEDICINE | FACULTY OF HEALTH SCIENCES

Appendix C: Survey

Confidential

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Please complete the survey below.

Thank you!

Dear participant

My name is Lerato...

Completion of the questionnaire implies consent to the study

Basic demographics

Registrar level of training	◯ First ◯ Second ◯ Third ◯ Fourth ◯ Extended Registrar Time
Have you completed your Part 1 exams?	◯ Yes ◯ No
Gender	◯ Male ◯ Female
Age (years)	_____
Marital status	◯ Married ◯ Single ◯ Co-habiting ◯ Other
Specify other marital status	_____
Number of dependents living with you	_____

COVID 19 and teaching

Have you been quarantined/isolated at any point during the current COVID-19 pandemic?	◯ Yes ◯ No

	Tested positive for COVID-19	Contact with high-risk patient	Fever and/or upper respiratory symptoms	Travel to high-risk area	Other
yes	◯	◯	◯	◯	◯

Other _____

Appendix 2: Postgraduate committee approval letter

UNIVERSITY OF THE
WITWATERSRAND,
JOHANNESBURG

Private Bag 3 Wits, 2050
Fax: 027117172119
Tel: 02711 7172076

Reference: Mrs Sandra Benn
E-mail: sandra.benn@wits.ac.za

25 October 2021
Person No: 0602235V
PAG

Dr LN Mpemnyama
14 Ackermann Street
Breaunanda
Roodepoort
1724
South Africa

Dear Dr Lerato Mpemnyama

Master of Medicine in Anaesthesia: Approval of Title

We have pleasure in advising that your proposal entitled *Registrars' erspectives towards virtual teaching programme in an academic department during the COVID-19 pandemic* has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences

Appendix 3: Ethics approval for protocol amendments

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
Office of the Deputy Vice-Chancellor Research & Post Graduate Affairs

MEMORANDUM
(This memo is not a clearance certificate)

TO: **Dr Lerato Nomonde Mpemnyama**
Department of Anaesthesia
E-mail: leratompemnyama@icloud.com

FROM: **Mr Rhulani Mkansi**
Administrative Officer: Human Research Ethics Committee (Medical)
Tel: 011 717-1234/2656/2700
E-mail: Rhulani.Mkansi@wits.ac.za or HREC-Medical.ResearchOffice@wits.ac.za

DATE: 29 October 2021

REF: *R14/49*

PROTOCOL NO: M210930 *(This is your ethics application study reference number. Please quote this reference number in all correspondence relating to this study)*

The protocol below was considered at a virtual meeting of the Human Research Ethics Committee (Medical) **on Friday 01 October 2021.** The Committee requires the following amendments/corrections/information from you before your application can be approved.

Project Title: Registrars' perspectives towards virtual teaching programme in an academic department during the COVID-19 pandemic

Conditions: **Provisionally approved subject to:**
(This memo is not a clearance certificate, no research should commence prior to obtaining a clearance certificate)

- *Application Form:*
  - No P/G Committee approval yet. Please provide.
  - A PIS is needed, but none was provided (4.6).
  - A questionnaire was provided, contrary to what is said at (4.7).
  - Gender – both? (5.5).
  - Who are the 90 controls mentioned at (5.6)? Applicant may be confusing this with required level of participation, but her Protocol talks about 80, so who knows? The response (i.e. 108 patients and 90 control) is not clear or consistent with what has been presented in the protocol.
  - Study procedures are specific to this research (6.2).
  - Will not start on 01/10/2021 (6.4). Has data collection started?
- *Information Sheet:*
  - Missing – must be provided.
- *Informed Consent Form:*
  - Not required for a SAQ.
- *Questionnaire:*
  - COVID19-related challenges to learning might not be the only challenge/s experienced and it might be worth finding out (i.e. adding one question) about other challenges that had impacted their online learning during this pandemic.

Appendix 4: Human research ethics committee clearance certificate

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG	HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

Office of the Deputy Vice-Chancellor (Research and Innovation)

TO:	Dr LN Mpemnyama School of Clinical Medicine Department of Anaesthesia Medical School University E-mail: leratompemnyama@icloud.com
CC:	Supervisor: Drs JH Moutlana, S Dingezweni and P Motshabi <hlamatsi@yahoo.com> and <HREC-Medical Research Office@wits.ac.za>
FROM:	Mr Iain Burns Human Research Ethics Committee (Medical) Tel: 011 717 1252 E-mail: Iain.Burns@wits.ac.za
DATE:	2021/11/29
REF:	R14/49
PROTOCOL NO:	**M210930** (This is your ethics application reference number. Please quote it in all enquiries, oral or written, relating to this study.)
PROJECT TITLE:	*Registrars' perspectives towards virtual teaching programme in an academic department during the COVID-19 pandemic*

Please find attached the Clearance Certificate for the above project. I hope it goes well and that an article in a recognized publication comes out of it. This will reflect well on your professional standing and contribute to Government funding of the University.



MSWorks2000/Iain0007/Clearscan.wps

Appendix 5: Plagiarism/ Turnitin report cover page



Mpemnyama Turnitin.docx

ORIGINALITY REPORT

8%	7%	3%	2%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	hdl.handle.net Internet Source	3%
2	Submitted to University of Witwatersrand Student Paper	1%
3	www.ncbi.nlm.nih.gov Internet Source	1%
4	ebin.pub Internet Source	1%
5	S Au, V Bellato, J M Carvas, C D Córdoba et al. "Global parental leave in surgical careers: differences according to gender, geographical regions and surgical career stages", British Journal of Surgery, 2021 Publication	<1%
6	Submitted to University of the Western Cape Student Paper	<1%
7	www.dbsa.org Internet Source	<1%

Appendix 6: Journal guidelines to authors

BMC Medical Education

Preparing main manuscript text
Quick points:

- Use double line spacing
- Include line and page numbering
- Use SI units: Please ensure that all special characters used are embedded in the text, otherwise they will be lost during conversion to PDF
- Do not use page breaks in your manuscript

File formats
The following word processor file formats are acceptable for the main manuscript document:

Microsoft word (DOC, DOCX)
Rich text format (RTF)
TeX/LaTeX (use BioMed Central's TeX template)

Editable files are required for processing in production. If your manuscript contains any non-editable files (such as PDFs) you will be required to re-submit an editable file when you submit your revised manuscript, or after editorial acceptance in case no revision is necessary.
Additional information for TeX/LaTeX users
Please use BioMed Central's TeX template and BibTeX stylefile if you use TeX format. Submit your references using either a bib or bbl file. When submitting TeX submissions, please submit both your TeX file and your bib/bbl file as manuscript files. Please also convert your TeX file into a PDF (please do not use a DIV file) and submit this PDF as a supplementary file with the name 'Reference PDF'. This PDF will be used by our production team as a reference point to check the layout of the article as the author intended.

The Editorial Manager system checks for any errors in the Tex files. If an error is present then the system PDF will display LaTex code and highlight and explain the error in a section beginning with an exclamation mark (!).

All relevant editable source files must be uploaded during the submission process. Failing to submit these source files will cause unnecessary delays in the production process.

Style and language

For editors and reviewers to accurately assess the work presented in your manuscript you need to ensure the English language is of sufficient quality to be understood. If you need help with writing in English you should consider:

- Getting a fast, free online grammar check.
- Visiting the English language tutorial which covers the common mistakes when writing in English.
- Ask a colleague proficient in English to review your manuscript for clarity.
- Using a professional language editing service where editors will improve the English to ensure that your meaning is clear and identify problems that require your review. Two such services are provided by our affiliates Nature Research Editing Service and American Journal Experts.

Preparing tables

When preparing tables, please follow the formatting instructions below.

Tables should be numbered and cited in the text in sequence using Arabic numerals (i.e. Table 1, Table 2 etc.).

Tables less than one A4 or Letter page in length can be placed in the appropriate location within the manuscript.

Tables larger than one A4 or Letter page in length can be placed at the end of the document text file. Please cite and indicate where the table should appear at the relevant location in the text file so that the table can be added in the correct place during production.

- Larger datasets, or tables too wide for A4 or Letter landscape page can be uploaded as additional files. Please see [below] for more information.

- Tabular data provided as additional files can be uploaded as an Excel spreadsheet (.xls) or comma separated values (.csv). Please use the standard file extensions.
- Table titles (max 15 words) should be included above the table, and legends (max 300 words) should be included underneath the table.
- Tables should not be embedded as figures or spreadsheet files, but should be formatted using 'Table object' function in your word processing program.
- Colour and shading may not be used. Parts of the table can be highlighted using superscript, numbering, lettering, symbols or bold text, the meaning of which should be explained in a table legend.
- Commas should not be used to indicate numerical values.

Preparing additional files

As the length and quantity of data is not restricted for many article types, authors can provide datasets, tables, movies, or other information as additional files.

All Additional files will be published along with the accepted article. Do not include files such as patient consent forms, certificates of language editing, or revised versions of the main manuscript document with tracked changes. Such files, if requested, should be sent by email to the journal's editorial email address, quoting the manuscript reference number. Please do not send completed patient consent forms unless requested.

Results that would otherwise be indicated as "data not shown" should be included as additional files. Since many web links and URLs rapidly become broken, BioMed Central requires that supporting data are included as additional files, or deposited in a recognized repository. Please do not link to data on a personal/departmental website. Do not include any individual participant details. The maximum file size for additional files is 20 MB each, and files will be virus-scanned on submission. Each additional file should be cited in sequence within the main body of text.

If additional material is provided, please list the following information in a separate section of the manuscript text:

- File name (e.g. Additional file 1)
- File format including the correct file extension for example .pdf, .xls, .txt, .pptx (including name and a URL of an appropriate viewer if format is unusual)
- Title of data

Citations

Research articles and non-research articles (e.g. Opinion, Review, and Commentary articles) must cite appropriate and relevant literature in support of the claims made. Excessive self-citation, coordinated efforts among several authors to collectively self-cite, gratuitous and unnecessary citation of articles published in the journal to which the paper has been submitted, and any other form of citation manipulation are inappropriate.

Citation manipulation will result in the article being rejected, and may be reported to authors' institutions. Similarly, any attempts by peer-reviewers or editors to encourage such practices should be reported by authors to the publisher.

Authors should consider the following guidelines when preparing their manuscript:

Any statement in the manuscript that relies on external sources of information (i.e. not the authors' own new ideas or findings or general knowledge) should use a citation.

Authors should avoid citing derivations of original work. For example, they should cite the original work rather than a review article that cites an original work.

Authors should ensure that their citations are accurate (i.e. they should ensure the citation supports the statement made in their manuscript and should not misrepresent another work by citing it if it does not support the point the authors wish to make).

Authors should not cite sources that they have not read.

Authors should not preferentially cite their own or their friends', peers', or institution's publications.

Authors should avoid citing work solely from one country.

Authors should not use an excessive number of citations to support one point.

Ideally, authors should cite sources that have undergone peer review where possible.

Authors should not cite advertisements or advertorial material.

What should be cited?

Only articles, clinical trial registration records and abstracts that have been published or are in press, or are available through public e-print/preprint servers, may be cited.

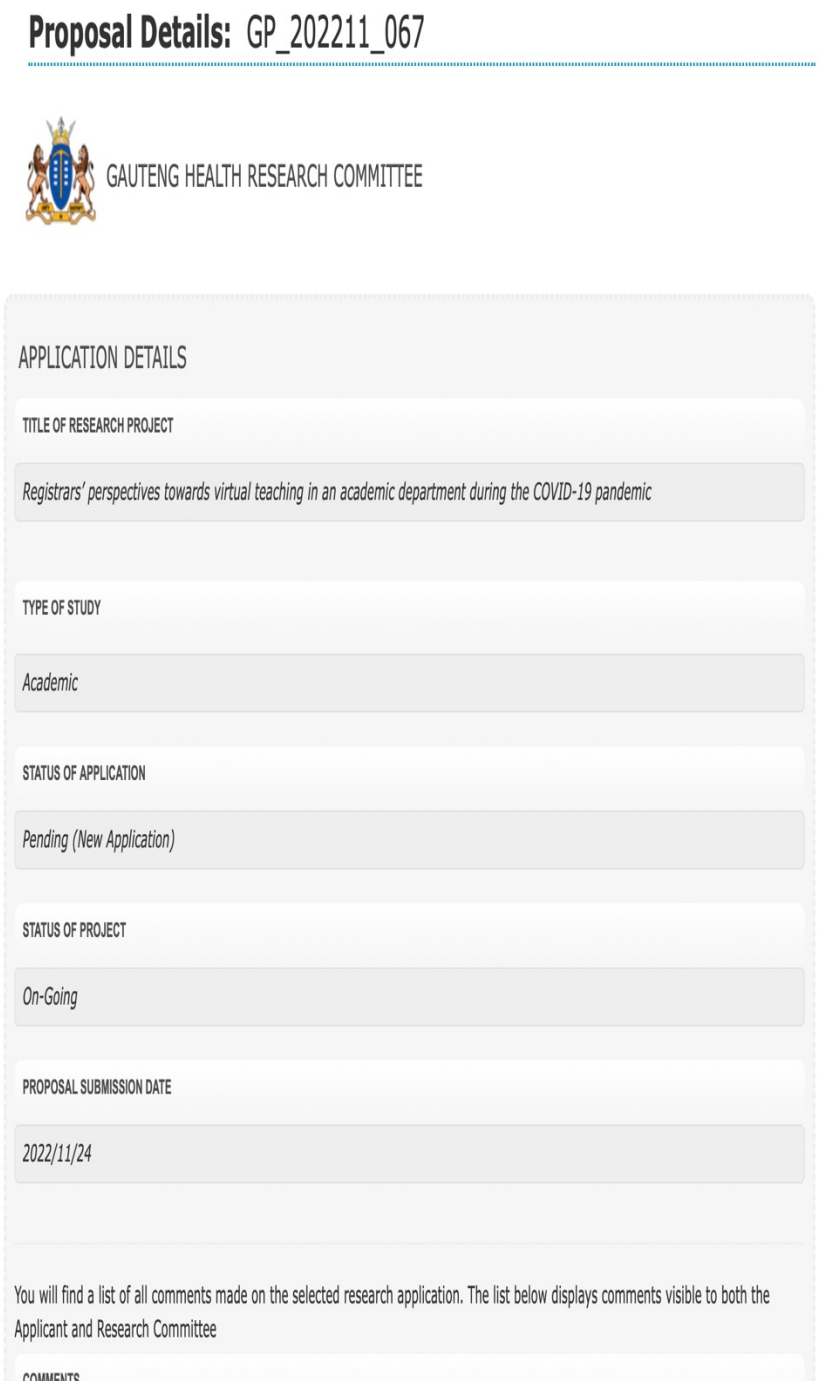
Unpublished abstracts, unpublished data and personal communications should not be included in the reference list, but may be included in the text and referred to as "unpublished observations" or "personal communications" giving the names of the involved researchers. Obtaining permission to quote personal communications and unpublished data from the cited

colleagues is the responsibility of the author. Only footnotes are permitted. Journal abbreviations follow Index Medicus/MEDLINE.

Any in press articles cited within the references and necessary for the reviewers' assessment of the manuscript should be made available if requested by the editorial office.

Authors may wish to make use of reference management software to ensure that reference lists are correctly formatted.

Appendix 7: National Health Research Database (NHRD) Approval



Proposal Details: GP_202211_067

GAUTENG HEALTH RESEARCH COMMITTEE

APPLICATION DETAILS

TITLE OF RESEARCH PROJECT

Registrars' perspectives towards virtual teaching in an academic department during the COVID-19 pandemic

TYPE OF STUDY

Academic

STATUS OF APPLICATION

Pending (New Application)

STATUS OF PROJECT

On-Going

PROPOSAL SUBMISSION DATE

2022/11/24

You will find a list of all comments made on the selected research application. The list below displays comments visible to both the Applicant and Research Committee

COMMENTS

Appendix 8: Permission letter by the Anaesthesiology Head of Department

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
FACULTY OF HEALTH SCIENCES
WITS SCHOOL OF CLINICAL MEDICINE
DEPARTMENT OF ANAESTHESIOLOGY
Tel.(011)488 4344

29 July 2021

To Whom It May Concern

Re: Permission to conduct research in the Department of Anaesthesiology

This letter stands to affirm that I, Dr PMV Motshabi, grant permission to Dr Lerato Mpemnyama, to conduct a study in the Department of Anaesthesiology at University of Witwatersrand titled: "Registrars' perspectives towards virtual teaching in an academic department during the COVID-19 pandemic"

The information obtained from the data will be used for te Department to advance the training.

Yours sincerely

Dr P Motshabi



Appendix 9: Data collection sheet

Registrars' perspectives towards virtual teaching programme in an academic department during the COVID-19 pandemic

Please complete the survey below.

Thank you!

Good day,

My name is Lerato Nomonde Mpemnyama. I am a registrar in the Department of Anaesthesiology at the University of Witwatersrand. I would like to extend an invitation to you to participate in my research study for my Masters in Medicine (MMED) titled "Registrars's perspectives towards virtual teaching programme in an academic department during the COVID-19 pandemic".

Participation to this study is completely voluntary. Information provided will be kept anonymous and confidential. refusal to participate shall not lead to any penalties incurred. My supervisors and I will be the only persons who will have access to the raw data. Raw data will be stored onto Redcap data base for 6 years. Completion of the questionnaire implies consent to the study.

Should there be any clarity required regarding the study, you can contact myself Dr LN Mpemnyama (0843054461), or my supervisors Dr HJ Moutlana (0614965676), Dr S Dingezweni (0738165451), Dr P Motshabi (0834321994.)
If you would be interested in seeing the results of the study you can contact myself, Dr LN Mpemnyama, or my supervisors.

This study has been approved by the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, Johannesburg ("Committee"). A principal function of this Committee is to safeguard the rights and dignity of all human subjects who agree to participate in a research project and the integrity of the research.
If you have any concern over the way the study is being conducted, please contact the Chairperson of this Committee who is Dr Clement Penny, who may be contacted on telephone number 011 717 2301, or by e-mail on Clement.Penny@wits.ac.za. The telephone numbers for the Committee secretariat are 011 717 2700/1234 and the e-mail addresses are Zanele.Ndlovu@wits.ac.za and Rhulani.Mukansi@wits.ac.za

Thank you for reading this Study Information Sheet.
your participation would be greatly appreciated

Yours sincerely

Lerato Nomonde Mpemnyama

Basic demographics	
Registrar level of training	◯ First ◯ Second ◯ Third ◯ Fourth ◯ Extended Registrar Time
Have you completed your Part 1 exams?	◯ Yes ◯ No
Gender	◯ Male ◯ Female
Age (years)	_____

Marital status	◯ Married ◯ Single ◯ Co-habiting ◯ Other
Specify other marital status	_____
Number of dependents living with you	_____

COVID 19 and teaching

Have you been quarantined/isolated at any point during the current COVID-19 pandemic?	◯ Yes ◯ No

	Tested positive for COVID-19	Contact with high-risk patient	Fever and/or upper respiratory symptoms	Travel to high-risk area	Other
yes	◯	◯	◯	◯	◯

Other	_____
Did COVID-19 pandemic create any anxiety about learning/ teaching?	◯ Yes ◯ No
If yes how so?	_____
On a scale of 1-10, how stressful/anxiety-provoking has the current COVID-19 crisis been for you?	Not at all stressful/anxiety-rovoking — Somewhat stressfull/anxiety provoking — Extremely stressfull/anxiety provoking *(Place a mark on the scale above)*
Did you feel Covid-19 disrupted your teaching and training?	◯ Yes ◯ No
If yes, on a scale of 1-10, how disruptive do you think the current COVID-19 crisis has been on your registrar training?	not at all disruptive — somewhat disruptive — extremely disruptive *(Place a mark on the scale above)*

Virtual teaching perspectives

Do you think the implemented virtual teaching registrar program was an effective way to handle registrar teaching amid the current COVID-19 crisis?	◯ Yes ◯ No
How comfortable do you feel with virtual teaching platform?	Uncomfortable — Moderately comfortable — Significantly comfortable *(Place a mark on the scale above)*

How would you evaluate the overall impact that virtual teaching has had on your registrar training?	◯ Overall extremely positive impact ◯ Neutral ◯ Overall extremely negative impact

Morning Tutorials Perspectives

What barriers do you experience with the morning tutorials?	☐ Data costs ☐ Technical difficulties ☐ Difficulties following the tutor ☐ Timing ☐ Other
Specify other morning tutorial barriers	_____
Are you satisfied with the current time slot of the morning tutorials?	◯ Yes ◯ No
If you are not satisfied with the current time slot, what start time slot would you be happy with?	◯ 05:00 am ◯ 05:30 am ◯ 06:00 am ◯ 06:30 am ◯ 07:00 am ◯ Other
Specify other suggested morning tutorial time slot	_____
What are the benefits of the current morning tutorial time slot? (Start time 06:00 to 07:00 am)	☐ Convenient ☐ Can get teaching before start of list ☐ Accommodates all sites ☐ Other
Specify other current morning tutorial time slot benefits	_____
How frequently do you attend the morning tutorials?	◯ Five times a week ◯ Four times a week ◯ Three times a week ◯ Twice a week ◯ Once a week ◯ None
What influences your attendance of morning tutorials?	☐ Morning tutorials not beneficial ☐ Too early ☐ Too many tutorials in the week ☐ On call or postcall ☐ Prefer the morning tutorials ☐ Enjoy the content and topics covered ☐ Proximity to exams ☐ Other
Specify other morning tutorial attendance influences	_____

What are the disadvantages of the current morning tutorials time slot (06:00 - 07:00 am)?	☐ None ☐ Interferes with driving to work ☐ Interferes with preparation to go to work ☐ Interferes with family responsibilities ☐ Interferes with night call handover ☐ Other
Specify other disadvantages of current morning tutorial time slots?	_____
Are you satisfied with the content covered in the morning tutorials?	◯ Yes ◯ No
What content type would you prefer for the morning tutorials?	☐ Preparation for short answer questions ☐ Preparation for multiple choice questions ☐ OSCE type preparations ☐ Paper case preparations ☐ Other
Specify other morning tutorial content preference	
What domains would you prefer to be covered in the morning tutorials?	☐ Domain 1: Fundamentals of anaesthesia and pain management ☐ Domain 2: Anaesthesia for major and trauma surgery ☐ Domain 3: Obstetric anaesthesia and analgesia ☐ Domain 4: Anaesthesia for cardiac, thoracic and vascular surgery ☐ Domain 5: Anaesthesia for neurosurgery ☐ Domain 6: Anaesthesia for ENT, Eye, Dental, Maxillofacial and Head and Neck Surgery, including airway management ☐ Domain 7: Paediatric Anaesthesia ☐ Domain 8: Intensive Care Medicine ☐ Domain 9: Pain Medicine ☐ Domain 10: Anaethesia in Remote Location ☐ Domain 11: Education, Self-direct learning and Research ☐ Domain 12: Professionalism and Ethics in Practice ☐ Domain 13: Quality, Safety, Management and Health Economics
Afternoon tutorials perspectives	
What barriers do you experience with the afternoon tutorials?	☐ Data costs ☐ Technical difficulties ☐ Difficulties following the tutor ☐ Timing ☐ Other
Specify other afternoon tutorial barriers	_____
Are you satisfied with the current time slot of the afternoon tutorials?	◯ Yes ◯ No

If you are not satisfied with the current time slot, what start time slot would you be happy with?	◯ 17:00 ◯ 17:30 ◯ 18:00 ◯ 18:30 ◯ 19:00 ◯ 19:30 ◯ Other
Specify other suggested afternoon tutorial time slot	_____
What are the benefits of the current afternoon tutorial time slot? (Start time 18:00)	☐ Convenient ☐ Can get teaching at the end of the day ☐ Accommodates all sites ☐ Tutorial happens after premeds ☐ Other
Specify other current afternoon tutorial time slot benefits	_____
How frequently do you attend the afternoon tutorials?	◯ Three times a week ◯ Twice a week ◯ Once a week ◯ None
What influences your attendance of afternoon tutorials?	☐ Afternoon tutorials not beneficial ☐ Tutorials happens too late ☐ Too many tutorials in the week ☐ On call ☐ Prefer the afternoon tutorials ☐ Enjoy the content and topics covered ☐ Proximity to exams ☐ Other
Specify other afternoon tutorial attendance influences	_____
What are the disadvantages of the current afternoon tutorials time slot?	☐ None ☐ Interferes with driving to home ☐ Interferes with doing premeds ☐ Interferes with family responsibilities ☐ Interferes with night call duties ☐ Other
Specify other disadvantages of current afternoon tutorial time slots?	_____
Are you satisfied with the content covered in the afternoon tutorials?	◯ Yes ◯ No
What content type would you prefer for the afternoon tutorials?	☐ Preparation for short answer questions ☐ Preparation for multiple choice questions ☐ OSCE type preparations ☐ Paper case preparations ☐ Other
Specify other afternoon tutorial content preference	

What domains would you prefer to be covered in the afternoon tutorials?	☐ Domain 1: Fundamentals of anaesthesia and pain management ☐ Domain 2: Anaesthesia for major and trauma surgery ☐ Domain 3: Obstetric anaesthesia and analgesia ☐ Domain 4: Anaesthesia for cardiac, thoracic and vascular surgery ☐ Domain 5: Anaesthesia for neurosurgery ☐ Domain 6: Anaesthesia for ENT, Eye, Dental, Maxillofacial and Head and Neck Surgery, including airway management ☐ Domain 7: Paediatric Anaesthesia ☐ Domain 8: Intensive Care Medicine ☐ Domain 9: Pain Medicine ☐ Domain 10: Anaethesia in Remote Location ☐ Domain 11: Education, Self-direct learning and Research ☐ Domain 12: Professionalism and Ethics in Practice ☐ Domain 13: Quality, Safety, Management and Health Economics

Virtual teaching Post Covid 19 pandemic

Were you involved in the in-person teaching programme at some point in your training?	◯ Yes ◯ No
Select the teaching programme where you attended most tutorials.	◯ In-person teaching prior to Covid-19 pandemic ◯ Virtual teaching during Covid-19 pandemic ◯ Equal attendance
Do you prefer the virtual teaching platform to in-person teaching?	◯ Yes ◯ No
How would you compare your experience using virtual teaching platforms (e.g. Zoom) vs. in-person meetings?	◯ Virtual teaching platforms are more effective than in-person teaching ◯ Virtual teaching platforms are as effective as in-person teaching ◯ Virtual teaching platforms are less effective than in-person teaching
After the current COVID-19 crisis is over, would you want to continue with the virtual teaching programme?	◯ Yes ◯ No
Would you prefer a combined virtual and in-person teaching programme after the pandemic?	◯ Yes ◯ No

Registrar Updates Lectures

Are you satisfied with the subject updates offered by Wits Anaesthesia?	◯ Yes ◯ No
If you are not satisfied with the updates, please specify the reason for the unhappiness?	☐ Updates are too expensive ☐ Days of updates inconvenient ☐ Duration too long ☐ Topics not relevant ☐ Other
Please specify other reasons for your dissatisfaction with the updates	

Have you attended any of the updates?	◯ Yes ◯ No
If updates attended, please specify which ones?	☐ Neuroanaesthesia ☐ Paediatrics ☐ Obstetrics ☐ Physics ☐ Physiology ☐ Pharmacology ☐ Other
What subject areas would you like the updates to cover?	☐ Pain management ☐ Head and neck ☐ Intensive care ☐ Cardiothoracic and vascular ☐ Ethics ☐ Remote location anaesthesia ☐ Other
Specify other subject areas you would like the updates to cover	
Are there other challenges you experienced with virtual teaching during the pandemic other than COVID-19?	_____