

**AN EXPLORATORY STUDY ON THE PREFERENCE OF THE TYPE
OF TEACHER FOR MASTER TRAINEES IN ANAESTHESIOLOGY AT
DIFFERENT TRAINING LEVELS**

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**FACULTY OF MEDICINE
UNIVERSITI MALAYA
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**DISSERTATION SUBMITTED IN FULFILMENT OF THE
REQUIREMENTS FOR THE DEGREE OF MASTER IN
ANAESTHESIOLOGY AND INTENSIVE CARE**

**FACULTY OF MEDICINE
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An Exploratory Study On The Preference Of The Type Of Teacher For Master Trainees In Anaesthesiology At Different Training Levels

WK Tan, YH Lee, SH Chaw, II Shariffudin, NH Md Hashim, F Sahar

Abstract

Objective

Postgraduate trainees in anaesthesiology require good clinical teachers to guide them on their path to become a safe anaesthetist. The purpose of this study is to have a comprehensive look at what constitutes a good clinical teacher in Anaesthesiology from the eyes of the trainees. We hypothesise that trainees from various training years may expect different characteristics from a clinical teacher to meet their learning needs.

Methodology

This study is carried out in two phases. In phase one, surveys in the form of questionnaires were conducted with all 158 registered students for Master of Anaesthesiology (Universiti Malaya), across different training years. The Maastricht Clinical Teaching Questionnaire (MCTQ) with its seven domains capturing various aspects of cognitive apprenticeship, is used as a template for the survey. Digital informed consent and participant data collection were performed via Google software. Respondents score each item on the questionnaire using a 5-point Likert scale. In phase two, focus group discussions were conducted with four groups of five to eight students. The four groups are comprised of trainees from year one to year four respectively. Selection of participants is via convenience sampling and participation is voluntary. Interviews of the focus groups were recorded and transcribed and thematic analysis performed.

Result

A total of 158 invites were sent to all University Malaya master trainees in Anaesthesiology. One hundred and one respondents participated in the questionnaire survey, yielding a response rate of 63.92%. Items “Created a safe learning environment”, “Helped student understand which aspects he needed to improve” and “Showed student respect” receive high score of >4.5 from respondents. “General Learning Climate” and “Scaffolding” domains were highly rated by trainees across all four training years. The domain “exploration” was considered less important for exam-year trainees. In the focus group discussion, we found that “modelling”, “coaching” and “scaffolding”, and “articulation” are useful methods in anaesthesiology education, but senior trainees prefer teaching that is more clinical focused. Themes regarding the need of a positive learning environment appear multiple times during the focus group discussion, cementing its importance from the viewpoint of the trainees.

Conclusion

Creating a safe, non-toxic, learning environment for trainees to become gradually proficient in anaesthesiology is crucial from the master trainees’ perspective.

Keywords: Cognitive apprenticeship model, Maastricht Clinical Teaching

Questionnaire, Safe environment

Kajian Eksplorasi Mengenai Keutamaan Jenis Guru Bagi Pelatih Sarjana Dalam Bidang Anestesiologi Pada Tahap Latihan Yang Berbeza

WK Tan, YH Lee, SH Chaw, II Shariffudin, NH Md Hashim, F Sahar

Abstrak

Objektif

Pelatih pascasiswazah dalam bidang anestesiologi memerlukan guru klinikal yang baik untuk membimbing mereka dalam laluan mereka untuk menjadi pakar bius yang selamat. Tujuan kajian ini adalah untuk melihat secara menyeluruh tentang aspek menjadi guru klinikal yang baik dalam Anestesiologi dari mata pelatih. Kami membuat hipotesis bahawa pelatih dari pelbagai tahun latihan mungkin mengharapkan ciri-ciri berbeza daripada guru klinikal untuk memenuhi keperluan pembelajaran mereka.

Metodologi

Kajian ini dijalankan dalam dua fasa. Dalam fasa satu, tinjauan dalam bentuk soal selidik telah dijalankan dengan kesemua 158 pelajar berdaftar untuk Sarjana Anestesiologi (Universiti Malaya), merentasi tahun latihan yang berbeza. Soal Selidik Pengajaran Klinikal Maastricht (MCTQ) dengan tujuh domainnya yang menangkap pelbagai aspek perantisan kognitif, digunakan sebagai templat untuk tinjauan. Persetujuan termaklum digital dan pengumpulan data peserta dilakukan melalui perisian Google. Responden menjangkan setiap item pada soal selidik menggunakan skala Likert 5 mata. Dalam fasa dua, perbincangan kumpulan fokus telah dijalankan dengan empat kumpulan yang terdiri daripada lima hingga lapan pelajar. Empat kumpulan tersebut terdiri daripada pelatih masing-masing dari tahun satu hingga tahun empat. Pemilihan peserta adalah melalui persampelan mudah dan penyertaan adalah secara sukarela. Temu bual kumpulan fokus telah direkodkan dan ditranskripsikan dan analisis tematik dilakukan.

Keputusan

Sebanyak 158 jemputan telah dihantar kepada semua pelatih sarjana Anestesiologi Universiti Malaya. Seratus satu responden mengambil bahagian dalam tinjauan soal selidik, menghasilkan kadar respons sebanyak 63.92%. Item "Mewujudkan persekitaran pembelajaran yang selamat", "Membantu pelajar memahami aspek yang perlu dipertingkatkan" dan "Menunjukkan rasa hormat pelajar" menerima skor tinggi >4.5 daripada responden. Domain "Iklim Pembelajaran Umum" dan "Perancah" dinilai tinggi oleh pelatih sepanjang empat tahun latihan. Domain "penerokaan" dianggap kurang penting untuk pelatih tahun peperiksaan. Dalam perbincangan kumpulan fokus, kami mendapati bahawa "pemodelan", "latihan" dan "perancah", dan "artikulasi" adalah kaedah yang berguna dalam pendidikan anestesiologi, tetapi pelatih senior lebih suka pengajaran yang lebih tertumpu kepada klinikal. Tema mengenai keperluan persekitaran pembelajaran yang positif muncul beberapa kali semasa perbincangan kumpulan fokus, mengukuhkan kepentingannya dari sudut pandangan pelatih.

Kesimpulan

Mewujudkan persekitaran pembelajaran yang selamat, tidak toksik, untuk pelatih menjadi mahir secara beransur-ansur dalam anestesiologi adalah penting dari perspektif pelatih induk.

Kata kunci: Model perantisan kognitif, Soal Selidik Pengajaran Klinikal Maastricht, Persekitaran selamat

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CHAPTER 1: INTRODUCTION

Students are a valuable source of feedback for teachers to acknowledge their quality and methods of teaching. (1). The learning styles and preferences may differ among medical students and medical postgraduates. (2) Although there are a few articles which are viewed from the perspective of medical students (3, 4), there is limited investigation from the view of postgraduate trainees, (5) who have clinical working experience and are independent learners.

Traditional apprenticeship involves trainees to observe, imitate, practice and reflect what the teacher does over a period of time. (6) However, the learning in postgraduate medical education is complex and involves elements which are not observable such as the reasoning behind decision making. (7)

The objective of this study is to explore the preference of the type of teacher for master trainees in Anaesthesiology at different training levels. We hypothesise that master trainees from different training years will prefer different types of teachers and teaching skills to meet their training needs.

To address the objective of this study, questionnaires and focus group discussions that have designs which are based upon the cognitive apprenticeship model were carried out.

CHAPTER 2: LITERATURE REVIEW

The Cognitive Apprenticeship Model was first developed by Collins et al. in 1989 by revising the traditional apprenticeship model. In cognitive apprenticeship, the teacher's thinking is deliberately made visible to the student and the student's thinking made visible to the teacher. A review article by Lyons et al (2016) shows that the application of this model is increasing in various disciplines of medical sciences, such as nursing, medicine, pharmacy, and veterinary. (8) The cognitive apprenticeship model consists of six teaching methods, which includes modelling, coaching, scaffolding, articulation, reflection, and exploration. (9)

In 2010, Dr Stalmeijer from Maastricht university applied the concept of cognitive apprenticeship and developed an instrument to evaluate clinical teachers known as the Maastricht Clinical Teaching Questionnaire (MCTQ). The MCTQ consists of seven domains (the six teaching methods derived from the cognitive apprenticeship model and "General Learning Climate" which was added by Dr Stalmeijer) in 24 items. (10) Various studies have investigated and established its validity and reliability as a tool for students to evaluate their clinical teachers. (11, 12)

Many researches on the cognitive apprenticeship model are linked with general education (13,14,15) and undergraduate medical education, (16) but few researches were done to investigate the preferred teaching methods from the view of postgraduate trainees, especially with regards to the individual domains in the cognitive apprenticeship framework. (17, 18) Moreover, different specialties in the field of medicine may require different training methods and as a result individual domains of the cognitive apprenticeship model may differ on an effectiveness scale. (19)

Identifying the type of clinical teacher for effective teaching delivery from the trainee's perspective would help the clinical teacher to pinpoint areas to improve on, and subsequently trigger concrete action plans to elevate the quality of the faculty development program as a whole.

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CHAPTER 3: METHODOLOGY

This study is divided into two phases.

In phase one, a survey in the form of a questionnaire was conducted with all registered students for Master of Anaesthesiology in Universiti Malaya. The Maastricht Clinical Teaching Questionnaire (MCTQ) with its seven domains capturing various aspects of cognitive apprenticeship, is used as a template for the survey. Participants rate each item on the questionnaire based on their perceived importance on a Likert scale of one to five. All members of the Department of Anaesthesiology of Universiti Malaya were identified from the departmental office name list. The investigators contacted the Master trainees by email and text messaging using Whatsapp application. Digital informed consent and data collection from the participants were performed via email and google software, with emphasis that personal data will be kept confidential, stored and viewed only by the primary investigator. Data is subsequently analysed using SPSS software and charted.

In phase two, focus group discussions were conducted with four groups of five to eight students. The four groups are comprised of trainees from year one to year four respectively. Selection of participants is via convenience sampling and participation is voluntary. A homogeneous focus group with participants coming from the same batch is thought to have the benefit of promoting participation and voicing out opposing thoughts in safety as there would be no obvious difference in terms of seniority. Informed consent were obtained prior to participation. The interviews were conducted by an appointed moderator who is well versed in qualitative research. Primary investigator also acted as a co-moderator/note-taker whose role is to coordinate

technology used in recording, take notes and ensure everything runs smoothly. Interviews were semi-structured. Prior to the focus group interview, moderator and primary investigator met up to discuss and produce a broad set of questions with the purpose of addressing the aim of the study. Questions were centered around the seven domains of the The Maastricht Clinical Teaching Questionnaire (MCTQ). Interviews were hosted inside the campus in one of the meeting rooms. Identities of the participants were kept confidential and participants were reminded not to use names to address each other during the discussion process. The focus group discussions were recorded and transcribed. Thematic analysis is then performed by the primary investigator which involves familiarisation of the data, forming and reviewing themes and subthemes. Analysis is reviewed by the moderator and the co-authors of the study and the themes are then finalised.

CHAPTER 4: RESULTS

CHAPTER 4.1: RESULT FROM QUESTIONNAIRE SURVEY

Table 1: Demographic characteristics of Master Trainees (N=101)

Demographic Characteristics	N (%)
Sex	
Male	51 (50.50%)
Female	50 (49.50%)
Years of Experience in Anaesthesia before entering the master programme	
1	3 (2.97%)
2	9 (8.91%)
3	47 (46.53%)
4	21 (20.79%)
5	12 (11.88%)
6	6 (5.94%)
7	1 (0.99%)
8	2 (1.98%)
Training level	
First	28 (27.72%)
Second	17 (16.83%)
Third	35 (34.65%)
Fourth	21 (20.79%)

Training level of respondents

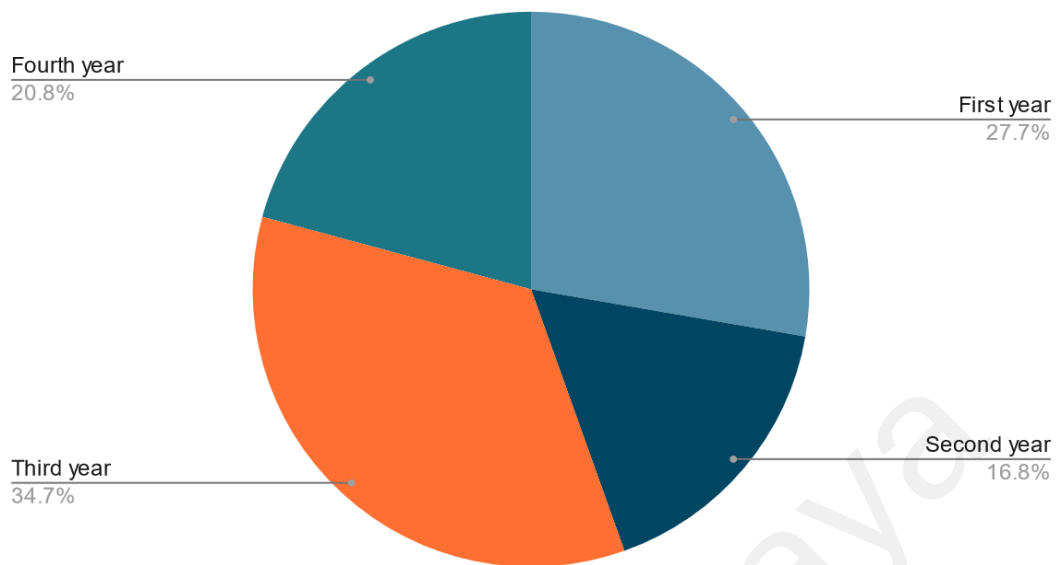


Figure1: Training level of respondents

A total of 158 invites were sent to all University Malaya master trainees in Anaesthesiology. 101 respondents participated in the survey, yielding a response rate of 63.92%. Table 1 shows that the respondents are equally divided in terms of gender, with 51 males (50.5%) and 50 females (49.5). Majority of respondents (67.32%) have 3 to 4 years of anaesthesia experience prior to joining the master programme. Figure 1 shows that first year trainees consist of 27.7% of respondents, second year trainees 16.8%, third year 34.7% and fourth year 20.8%.

Table 2: Means and Standard Deviation per MCTQ item.
 Note: **Bold** denotes the highest mean, **Bold*** denotes the lowest mean

Items	Mean	SD
Modelling		
1. Consistently demonstrated how different tasks should be performed	4.1386	0.6637
2. Clearly explained the important elements or the execution of a given task	4.3960	0.6493
3. Created sufficient opportunities for student to observe them	4.3366	0.6368
4. Was a role model as to the kind of health professional student wishes to become	4.4059	0.6660
Coaching		
5. Observed student multiple times during patient encounters	3.7525*	0.8051
6. Provided student with useful feedback during or following direct observation of patient encounters	4.3564	0.6416
7. Helped student understand which aspects he needed to improve	4.5842	0.5151
Scaffolding		
8. Adjusted teaching activities to student's level of experience	4.0594	0.7592
9. Offered student sufficient opportunities to perform activities independently	4.4257	0.6220
10. Supported student in activities they find difficult to perform	4.4950	0.5590
11. Gradually reduced the support given to allow student to perform certain activities more independently	4.1881	0.7030
Simulating Articulation		
12. Asked student to provide a rationale for his actions	4.1485	0.5547
13. Helped student to become aware of gaps in his knowledge and skills	4.3267	0.5497
14. Asked student questions aimed at increasing his understanding	4.2574	0.5942
15. Encouraged student to ask questions to increase his understanding	4.1485	0.7125
Stimulating Reflection		
16. Stimulated student to explore his strengths and weaknesses	4.2277	0.6765
17. Stimulated student to consider how he might improve his strengths and weaknesses	4.2376	0.6950
Stimulating Exploration		
18. Encouraged student to formulate learning goals	4.0594	0.6756

19. Encouraged student to pursue his learning goals	4.0891	0.6496
20. Encouraged student to learn new things	4.2277	0.7332
General Learning Climate		
21. Created a safe learning environment	4.5941	0.5134
22. Took sufficient time to supervise student	4.3663	0.5608
23. Was genuinely interested in the person as a student	4.0297	0.8883
24. Showed student respect	4.5644	0.5370

Table 2 presents the mean and standard deviation for each item across different domains. All items in the MCTQ questionnaire receive a mean score of 4 and above, with the exception of item 5: “Observed student multiple times during patient encounters” in the domain of coaching, which receive a score of 3.7525. Two items from the domain of general learning climate, namely “Created a safe learning environment”, and “Showed student respect” receive high score of >4.5 from respondents. The item “Created a safe learning environment” has the highest score of 4.5941 out of all items. Another item from the domain of coaching: “Helped student understand which aspects he needed to improve” also received a score of 4.5842. Standard deviation of scores of the items range from 0.5134 to 0.8883.

Mean of domain

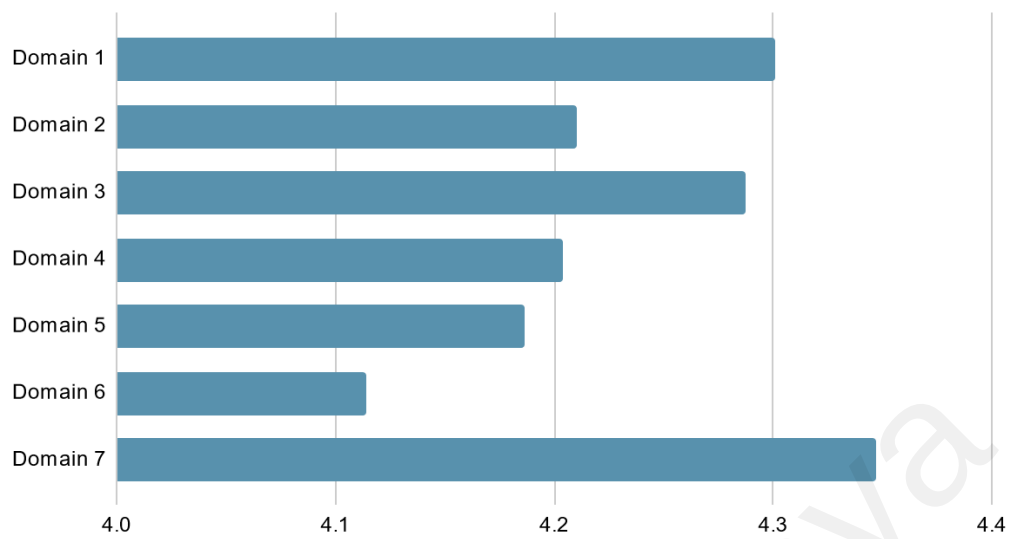


Figure 2: Bar chart showing mean score of MCTQ domain

Figure 2 shows that domain 7, “general learning climate” has the highest mean score (4.3473), and domain 6, “stimulating exploration” has the lowest mean score (4.1138). Domain 1, “Modelling” has the second highest mean score (4.3013) and domain 3, “Scaffolding” has the third highest mean score (4.2873).

Table 3: The MCTQ's mean score and standard deviation for each training year.

	Year 1		Year 2		Year 3		Year 4	
Item	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	4.1111	0.5774	4.1176	0.8575	4.2000	0.6774	4.0476	0.5896
2	4.5185	0.6427	4.4118	0.6183	4.3714	0.6897	4.2381	0.6249
3	4.3701	0.6293	4.3529	0.7019	4.4000	0.6039	4.1429	0.6547
4	4.5556	0.6405	4.4118	0.7123	4.4286	0.6081	4.1429	0.7270
5	3.8148	0.7863	3.8235	0.8090	3.8000	0.8331	3.5238	0.8136
6	4.5185	0.5092	4.4118	0.5073	4.4286	0.6547	3.9524	0.7400
7	4.7778	0.4237	4.6471	0.4926	4.6286	0.4902	4.1905	0.5118
8	4.0741	0.5774	4.1176	0.8575	4.0286	0.7470	4.0000	0.6325
9	4.4074	0.5007	4.4118	0.6183	4.4857	0.6585	4.3333	0.7303
10	4.7037	0.4653	4.4706	0.6243	4.4000	0.6039	4.3810	0.4976
11	4.0370	0.7586	4.1176	0.6966	4.3429	0.6391	4.2857	0.5606
12	4.1481	0.6015	4.2941	0.5879	4.1143	0.5827	4.0952	0.4364
13	4.3704	0.6293	4.4118	0.5073	4.3429	0.5913	4.1429	0.3586
14	4.2222	0.5774	4.3529	0.6063	4.3143	0.5298	4.0952	0.7003
15	4.1111	0.6980	3.8824	0.9926	4.3714	0.5470	4.0000	0.6325
16	4.1852	0.7357	4.1176	0.7812	4.4000	0.6508	4.0476	0.4976
17	4.3704	0.5649	4.0000	0.8860	4.3714	0.7311	4.0000	0.5477
18	4.0000	0.6794	4.1176	0.6966	4.2286	0.7311	3.7619	0.4364
19	4.1111	0.7061	4.2941	0.6860	4.1714	0.6636	3.8095	0.4024
20	4.1852	0.8338	4.3529	0.7019	4.2857	0.7504	4.0476	0.5896
21	4.1111	0.4921	4.6471	0.4926	4.5714	0.5576	4.5238	0.5118
22	4.4444	0.5774	4.2353	0.6642	4.4000	0.4971	4.2857	0.5606
23	4.0741	0.9971	4.0588	0.9663	4.0000	0.8402	3.9524	0.8047
24	4.6667	0.4804	4.5294	0.5145	4.4857	0.5621	4.5714	0.5976

Table 3 shows the MCTQ's mean score for respective training years. Item 5, "Observed student multiple times during patient encounters" consistently received the lowest score among all respondents from year one to year four. Item 7 "Helped student understand which aspects he needed to improve" received the highest score across year one to year three, although the mean scores are diminishing with each passing training year. Item 7

received an average score of 4.1905 by year 4 trainees, and they rated item 24, “showed student respect” the highest (4.5714). Year 2 to Year 4 trainees rated item 21, “Created a safe learning environment” highly with mean score of 4.6471, 4.5714, 4.5238 respectively, but year 1 trainees only give the item a score of 4.1111.

Table 4: Mean score of different domains according to training level

	Year 1	Year 2	Year 3	Year 4
Domain 1	4.3889	4.3235	4.3500	4.1429
Domain 2	4.3704	4.2941	4.2857	3.8889
Domain 3	4.3056	4.2794	4.3143	4.2500
Domain 4	4.2130	4.2353	4.2857	4.0833
Domain 5	4.2778	4.0588	4.3857	4.0238
Domain 6	4.0988	4.2549	4.2286	3.8730
Domain 7	4.3241	4.3676	4.3643	4.3333

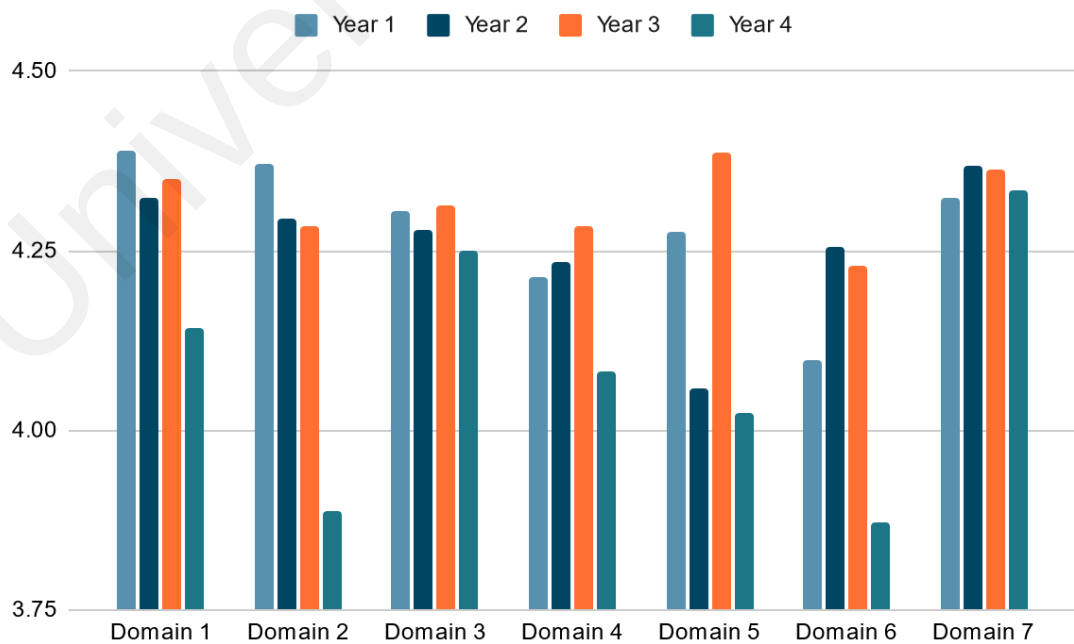


Figure 3: Mean score of different domains according to training level

Table 3 and figure 3 shows that domain 3 and domain 7 were deemed important by most trainees as they receive scores of >4.2 across all 4 training years. Domain 1 and 2 receive highest scores from first year trainee, but lower scores were given by their senior fourth year colleagues. Instead, fourth year trainee scores domain 3 and 7 the highest. Domain 6 saw that exam-year-trainees namely first and fourth year trainees giving lower score as compared to second and third year trainees. Another trend to note is that first and second year trainees gives diminishing scores, moving from domain 1 to domain 4.

CHAPTER 4.2: RESULT FROM FOCUS GROUP DISCUSSION

Description of a good clinical teacher

Trainees describe a good clinical teacher as one who is approachable and communicates well with the trainees. They are committed to teaching, knowledgeable and are capable of delivering their knowledge to the trainees efficiently.

“I guess a good clinical teacher should be one who is able to guide us, even when we try, when we make a mistake, they don't really apprehend in a direct manner in a sense that they don't scold you in front of others. They will take you to the side, maybe will tell you what you did wrong, what you can do right. I guess a good clinical teacher should be, for me, erm, able to actually, how do I say, help us grow.”

(Trainee focus group 1)

“Someone who is actually committed to teaching us, meaning that they, regardless of how busy they are, will give some time off their busy schedule to teach. That's

one. Number two, the person is very knowledgeable about the subject. They will come up with very creative ideas, being able to package such a vast amount of information and tailor it specifically to me so that I understand the topic, and describe the entire process of how they get from this point to that point, including various tips and tricks to memorise things.”

(Trainee focus group 2)

Teacher demonstrating the conduct of anaesthesia

Trainees generally agree that learning by observation from an experienced, qualified teacher is important, especially at the initial stages of training. They appreciate that teachers give explanations verbally while conducting anaesthesia or when performing certain procedures. Some commented that teachers do not explain their conduct to them frequently enough, citing time constraints from the teachers’ end.

“I think that is absolutely crucial for me, in terms of learning and picking up the skills. It is very important we learn the right steps from someone who is more experienced and also have gone through proper training, credentialing, privileging, to be guiding us rather than learning from someone who is not credentialed. So I think it is absolutely crucial for me.”

(Trainee focus group 2)

“I think it will depend on what stage the student is at. Everyone comes from different backgrounds, (and) we are not exposed to everything at the same level. So

if it is something new for us, it will be very good for someone to guide us and demonstrate how it's done at the first one or two times for us to roughly get an idea on what is going on. Then after that we will be much more confident in doing what we are doing. Rather than us not knowing anything and jumping into things and doing it straight away.”

(Trainee focus group 3)

“Not everyone would have the same experience, (but) some of the teachers, they...maybe because of time constraints, maybe because of other concerns, sometimes they don't express what they are doing well enough. They just do it, and somehow they expect us to...you know...get something from what they are doing, but a more thorough explanation would be better.”

(Trainee focus group 2)

Teacher as role model

Clinical teachers are considered by trainees as role models in regard to patient's care, professionalism and attitude. They are the trainees' source of motivation. They also learn soft skills from their teachers when dealing with patients and their family members.

“I am amazed with how our intensive care unit environment is, because that is exactly how our intensivists present themselves. Not only do they show vast knowledge in how we should take care of the patients, they are actually also very

kind to everyone, the nurses, the patient's family members, and very professionally. I think that is how the lecturer should present themselves, to hold everyone together as one unit."

"I think it is really important, especially this...we can see it might make a part of the soft skill, which we can't really learn from the book, and to have somebody demonstrate in front of us, like a role model, especially when we talk to the family members, like during family conference, especially in ICU care.... and also like attending to paediatric patients, like building rapport with paediatric patients and family. They will have a better experiences, and we are treating them as a human rather than just a case. So I think it is very important in terms of that."

(Trainee focus group 4)

Teacher observing trainees during conduct of anaesthesia/ when doing procedures

Trainees understand that it is important for clinical teachers to monitor them during work as it enables correction of mistakes and feedback to be given, as well as ensures patient's safety. However, final year trainees commented that there should be a balance between constant observation by clinical teacher and allowing freedom for trainees to run cases by themselves. Trainees also pointed out the uneasiness of performing a task with someone unfamiliar or even judgemental observing them, and it is crucial that trainees build a good rapport with the clinical teacher beforehand.

"One example that I can probably give is that from my previous experience when I was practising as a medical officer, I used to be guided by senior medical officers.

They just do (things) thinking that that has been the right thing because that has been done like all these while, but then here comes you know a lecturer or specialist that actually observes and then subsequently corrects the steps. And then you realize, actually what we are doing is not so good, there is actually a better way and also the rationale behind it, and we learn from there actually and I always tell like my juniors the best person to learn from is our specialist.”

(Trainee focus group 2)

“Depends on certain people I guess, if you have a good rapport with that person? Do you want that person to be able to observe you and to actually help you iron out things, (whether) you are doing things correctly or not? But if you don’t have a good rapport, so it might be your first encounter per say (with the teacher), you might be a bit nervous during that time, you’re not sure how he or she might react to how you do things, then at that time you might be more nervous. But there are some we know who are more leaning towards... in the sense that they may be more judgemental. Then those type of people... with them observing us... we might be a bit not so comfortable, per say. I guess it depends on who is observing us.”

(Trainee focus group 1)

Teachers giving feedback to the trainees

Trainees generally welcome feedback from their clinical teachers if they are given in a non-hostile, professional manner. Many trainees gave examples of inappropriate timing for giving feedback including in the presence of a conscious patient and during stressful

situations like an ongoing crisis in the operating theater. Some trainees appreciate feedback in the form of detailed discussion done especially at the end of a case, as opposed to superficial comments on how they do things. One particular trainee highlighted that feedback should be given in the universal language of English or the National language of Malaysia which is Malay.

“I think how they want to correct the trainee is that, need to be professional and very mature. I mean like, we all come from different background and experienced different kind of teaching before, so if they want to correct, I think, should be done in professional way, and mature adult way, not just like you know, sarcastically correcting and not straight to the point when they want to correct us. I mean like if they want to say something, just say so, no need to sarcastically say: “You came from here ah?” like that, this is not professional at all. (laugh) Usually it is like that right? (laugh)”.

(Trainee focus group 2)

“Of course as a student, we will welcome all the constructive feedback from them, especially they are the ones who are actually supervising us during a particular case, or handling a certain group of patients as a whole. What I would like to say is that the timing of the feedback and the choice of words are very important, determining how the students will accept the feedback. The points are very clear that they want to convey the message to us, however sometimes the timing, sometimes if given out of context or in a situation that was actually quite pressing, for example during a crisis situation or during an induction of a case, probably that would have affected

the morale of the person doing the particular procedure. So, a debriefing after a case would be a good technique to convey the important messages to the students.”

(Trainee focus group 4)

Teachers giving trainees opportunity to conduct cases independently

Trainees welcome the opportunity to run cases solo without their clinical lecturer as it can build confidence and help them develop independence. However many mentioned that this is to be done on a case by case basis, depending on the difficulty of the case and the trainee’s experience level. Final year trainees agree that good communication and shared responsibility between the clinical teacher and the trainee are key elements when allowing trainees to conduct cases independently.

“I think this is also very important to improve our confidence because sometimes when we do our procedures under supervision, we might be feel more comfortable and more secure, but if let's say if we are doing the cases alone then it’s like out of our comfort zone. It’s a very good step for us to grow and become more independent, but of course we need to know our limitations also. I mean, if let's say we think something is going out of our control then we need to inform our supervisor or specialist immediately.”

(Trainee focus group 3)

“...I think the issue is about how they handle the aftermath of the complication, that is more important and it will also affect the experience of the student because once you have such an experience of being blame on something, at the time you are not sure and someone superior than you is not taking shared responsibility, so it will further impede your own confidence in carry out similar cases in the future. So at the same time I think, the comfort level of the student to actually... able to take control and also run cases independently is also important. Imagine you are discussing a case with your lecturer and the lecturer just ask you to perform everything on your own, but at the same time the student might not be confident enough, the comfort level is not there, maybe he or she is doubting him or herself at that point... so, I think that is also part of the consideration, whether the liberty of giving the independence is not from the lecturer, is also from the student's perspective as well.”

(Trainee focus group 4)

Teachers asking trainees questions

Trainees see this as a positive characteristic of a clinical teacher and welcome questioning which helps them to discover knowledge or skills that they are lacking, prepare them for exams, and stimulate them to study further. Linking with the previous discussion on teachers giving feedback, some trainees re-emphasized that questioning is to be done in a healthy, non-hostile environment and the timing of questioning be appropriate and considerate.

“In an ideal working environment, yes I would very much prefer so, which again brings us back (to the previous discussion), in an ideal, healthy learning environment, yes, we would welcome all sorts of learning approaches and opportunities.”

(Trainee focus group 1)

“I like being questioned, because it can trigger my mind. Because a lot of times when they ask the questions, I forget or I do not know the answer. So later on when I go back home, i can read up on what I don’t understand.”

(Trainee focus group 3)

Teachers asking justification for trainees’ actions

Only final year trainees pointed out the potential benefits of justifying one’s decision/ action on a routine basis as training for the final conjoint examination of anaesthesia which focuses on a lot of clinical decision making on various scenarios. Again, the importance of timing and manner at which teachers ask for justification is re-emphasized.

”Sometimes I feel like the thing they ask actually is how the exam is going to be. So...at the end of the day we aim to pass the exam. So yeah...I feel like the way our lecturer asks things like “say your rationale”, or “what is the management and our consideration in the diagnosis”, something like this. That is exactly how the question in the exam actually came out. So yeah, I think that this is how it should be, to train

ourselves to pass the exam. To make what we do in our daily life, a mock exam that we have to go through.”

“I think it depends on how the questioning about your justification is being delivered. So, when we talk about justifying, the first thing I think of is like, did I do something wrong and that you are asking (for an) explanation for my actions? So, I think the way of how they convey the asking for the justification is very important. It needs to make the student feel that it is not...is not a session of finding your fault, which I think that actually makes you less likely to describe what you are thinking.”

(Trainee focus group 4)

Teachers encouraging students to ask questions

None of the trainees explicitly identified this as a positive trait of a clinical teacher. Instead discussion veered towards the importance of a healthy, non-hostile environment where the clinical teacher is approachable and trainees feel comfortable asking questions.

“Honestly, it depends on the lecturers, Some can be very sarcastic. So with that kind of lecturer, I try to avoid asking questions. Yeah, but with those that are very approachable, and we know that they really want us to learn, I will ask a lot of questions.”

(Trainee focus group 3)

Teachers helping trainees to reflect on their learning

Opinions are split with some trainees commented that reflection should be of their own initiative rather than prompted by the clinical teacher. Others felt that reflecting past mistakes together with their clinical teacher can help them get through the traumatic experiences and learn from their past mistakes. Some trainees appreciate that when clinical teachers are helping them to reflect, it is a sign that the teachers care for them. Majority agree that their teachers do not encourage them to reflect on their learning on a routine basis, but concur that reflection is nevertheless an important component in continuous learning, whether self-initiated or prompted.

“I feel that self reflection is a very important thing in self improvement and it should be done constantly from a day to day basis, more frequent than that if needed. But oftentimes your self reflection may not be the best for yourself especially when things go the wrong way. When you reflect on yourself, you tend to think that “Why do I do this”, “Why did I actually do this”...”That’s why things happened”, so sometimes it is actually giving a very negative feedback on your emotions and confidence. Having somebody as a third party, if possible a clinical lecturer for that matter, if (he or she is) approachable and also understanding and you are actually close enough in terms of your interpersonal relationship with that person, can allow you to open up to that particular person to actually explore and discuss on that particular incident or to relive any trauma that potentially has affected your emotions...”.

“...I think at some point it allowed me to see the nurturing side of my clinical teacher which I felt that to a certain extent they are actually concerned for our

wellbeing as well as our emotions, and what you have learnt for the day. So I agree it is not necessary but if it is a part of a clinical teacher's practice and initiative, it would show...it is actually a bonus."

(Trainee focus group 2)

Teachers encouraging students to explore knowledge beyond scope of examination syllabus

First year trainees while acknowledging the importance of gaining knowledge outside of examination syllabus, prefers exam-oriented teachers to guide them to pass the primary examination of anaesthesia. Second and third year trainees consider the opportunities to gain knowledge inside and outside of examination syllabus as equally important and hope that clinical teachers can provide them the best of both worlds. Some final year trainees pointed out that preparation for examination helps build a strong foundation of knowledge and innovation can come at a later stage. Others commented that a broader horizon of learning approach does not help them in their upcoming exam.

"I would like to have the best of both worlds, a group of lecturers who are exam oriented because ultimately the endpoint of our training is examination and the endpoint is to graduate from passing examination, so I would love to have that group of lecturers who are super technical and focused on exams. On the other hand, our work revolves around clinical work, so, that is again not always based on textbook, and whatever that is being taught in textbook, most of the time is not applicable in our clinical work from a day to day basis. So, a lecturer who is more

flexible in the sense that encourages you to try new things or new approaches, that would be ideal for personal growth, in terms of our skills, thinking and judgement in terms of clinical management...”.

(Trainee focus group 2)

“I think this is probably the core of postgraduate training, it’s more of a building self learning experience rather than following a certain curriculum because things change every single year and every time, there is always new advancement and different things and the approach of learning new things is way more important. But unfortunately it is not always the case, especially when we are all facing exams. Exams don’t stress on such things. I mean it’s kind of like two different approaches when we look at it, the way we work, the way we learn new things and what is expected from exams. (Exams) They go by marks or how many points you write down, and then give you tiny points for whatever answer you wrote. The exam requirement doesn’t reflect how we are supposed to actually practise learning new things from a clinical perspective. So, for me, I like the experience of a...more of a clinical approach, the way of exploring new things and also...it is much more practical than the rigid exam system and the schemes, one by one you go through this this this. So, I think that part is important, but it is not reflected in our curriculum exam system, so...yeah...I am not sure how that is going to help with passing our exams...”.

(Trainee focus group 4)

Teachers building a safe learning environment

All trainees concur that a safe environment is important for learning and that it is a positive trait expected from a clinical teacher, to be able to create such an environment. Approachable, non-judgemental, present when needed, are some of the key characteristics that trainees hope to see in their clinical teachers.

“It is very important because it creates an environment where students feel safe and comfortable to ask questions and not feel judged, and as a result, able to continuously improve on himself and also learn new things.”

(Trainee focus group 4)

“They should be around in a high risk case and even (when) not in a high risk case, they should be available when we are in trouble. So yeah, basically, a safe environment means that our lecturer is around whenever we need them, and is approachable.”

(Trainee focus group 3)

“...when we are in a training centre, what more in a university, by definition it should be a safe ground for us to actually speak our thoughts and discuss what we think. We may be wrong but that’s when we learn, that’s why, it is a safe space for us to actually say what we want to say and present our ideas and then discuss it and see whether we should keep that idea, renew it, enhance it, or just you know, throw

it out the window. That's why safe is very very important and I believe every lecturer should be able to create that environment."

(Trainee focus group 2)

Changes in preference of type of teacher as trainees progress in their training

As trainees progress from year one to year four of training, they prefer clinical teachers that are more clinical focused and appreciate bedside teaching more than classroom education. While the trainees' preference for the style of teaching of a clinical teachers may evolve over the years of training, some trainees feel that a clinical teacher who is approachable and provides good guidance will always be favoured.

"I think it has changed, like when we are preparing for first year primary exam, it's more on theory part, so we are more keen on like sitting down and have class and teaching. Now we are going towards more clinical, to a specialist, I think bedside teaching is rather more important, and case to case discussion about how to handle the patient pre, peri and post operatively, I think it certainly (has) changed."

(Trainee focus group 4)

“For me my preference is still the same. I prefer someone who is approachable and being able to guide us through whatever we are doing, and tailoring to our needs. So that part has not changed.”

(Trainee focus group 3)

Changes trainees would like to see in their clinical teachers

Several old themes from previous discussion were repeated such as those on creating a safe environment for learning and adopting more bedside teaching in preparation for examination. However, new themes also emerged when trainees were allowed to freely express their preference of the type of clinical teachers. Some suggested that teachers can adopt a more flexible, online approach when it comes to classes and have it recorded so that those on duty and were unable to attend the classes, can still benefit from them. Final year trainees who are doing research and writing up their thesis appreciate that teachers assist them in starting their research earlier, in order to have more time to prepare for the upcoming final year examination. They also mentioned that the supervisor's role could be extended to monitoring trainee's progress of learning in general as opposed to just focusing on trainee's conduct of research and thesis writing. Few trainees wish that their clinical teachers are not burdened with a high workload so that they have more time and are able to focus more on teaching activities.

“In UM here we have our own supervisor, but for me, I feel like our supervisors are specifically assigned for our conduct of research. They don't really like follow up on our studies, our progress and learning at all. So like the role of that specific

supervisor for every student... cause every student has their own supervisor, so probably that supervisor should play the role of following up on the student's progress of learning, instead of this role being played by the daily clinical teachers that we get to work with. This is my suggestion.”

(Trainee focus group 4)

“Now that we have (already previously) discussed the ideal characteristics (of a clinical teacher), I think we can just gear towards whatever that we have discussed. But lecturers are also human, I understand that, and to have all of them to change, everyone to change everything might be a little bit too far fetched. Balance is also important, too much of one side also is not good. But whatever we discussed I think if they can actually incorporate what we felt and what we have expressed that we want to see, definitely it will be a very very nice environment to work in.”

(Trainee focus group 2)

CHAPTER 5: DISCUSSION

Our results from both the questionnaire survey and focus group interview concur that Master trainees in anaesthesiology appreciate a safe learning environment where they are not afraid to approach their clinical teacher when problems arise, free to speak up and express their thoughts, and feel respected. Undesirable features in the medical learning environment include public belittlement, fear of personal inadequacy and denial of uncertainty. (20) Going into the result of the focus group interviews, we can see that the domain of general learning climate is closely intertwined with many other domains where trainees see a positive learning environment as a prerequisite for effective teaching and learning activities to take place. High level and prolonged stress can have a negative effect on learning and memory. (21) In addition, postgraduate medical trainees are working adults who not only have to study to pass their postgraduate examinations but are also engaged in the daily work routine in the hospital. Lases et al (2019) reported that a positive learning climate was associated with higher residents' work engagement and job satisfaction. (22) Llera et al found that there is a negative correlation between working environment and exhaustion and depersonalization in working residents. (23)

Addressing the hypothesis of this study, our results from the questionnaire show that first, second and third year trainees rated "modelling" and "coaching" teaching methods higher compared to final year trainees whereas "scaffolding" method is appreciated by trainees from all four training years. Our results also indicate that trainees rated "modeling", "coaching" and "scaffolding" higher compared to "articulation", "exploration" and "reflection". This is consistent with the study done by Shaddel et al (2016). They reported that postgraduate trainees in psychiatry identify "modelling" and

“coaching” as the best method and trainees prefer apprenticeship teaching methods (modeling, coaching, scaffolding) more than training methods that focus on self-growth (articulation, exploration, reflection). (18) Interestingly, in contrast to our study result, Tariq et al (2020) compared learning strategies of medical student versus in-house residents during ward rounds and found that medical students rated the domain of “modeling”, “coaching”, and “scaffolding” as most effective, but residents, on the other hand rated “articulation”, “exploration” and “reflection” higher than the medical students. (17) From the result of the focus group discussion, we find that the shift of preference of trainees as they progress in their training is not in terms of teaching methods stated in the cognitive apprenticeship model (e.g: modelling, coaching, scaffolding, articulation), but in terms of the content and focus of the teaching and learning process, with senior trainees preferring clinical-focused lessons that occur inside the operating theatre or the bedside of the intensive care unit.

Our study results from the questionnaire also indicate that “exploration” is rated the lowest by trainees. Subsequent focus group interviews revealed that many trainees’ believe that their learning goals are inseparable from their exam curriculum and they feel that passing the postgraduate examination is the “endpoint” of their training programme. Particularly, first and fourth year exam-going trainees prefer teachers who use an exam-oriented style of teaching to guide them to pass their upcoming postgraduate examination. From primary education to tertiary education, exams play a vital role in Malaysia’s education system and an exam-oriented education system has its pros and cons. (24) Ke et al (2023) and Liu (2023) in their papers stated that while exam-oriented education is effective in increasing the overall mean knowledge of students from a statistical standpoint, it will also hinder the progress of top students who are outliers, by limiting the acquisition of deeper knowledge, discourages the spirit of

exploration and restricts the development of creativity. (25,26) When translated to the field of anaesthesiology education, exam-oriented style of teaching and learning could be seen as a method that is capable of training and producing safe anaesthetist with a strong basic foundation of knowledge, but falls short in terms of cultivating invention and innovation to ensure consistent advancement in the field.

“Reflection” was rated second lowest by the trainees based on results from the questionnaire. Even during the focus group discussion, we found that opinions were divided with regards to the importance of guided reflection and many trainees pointed out that reflection on learning should be self-initiated and it is not the role of clinical teachers to prompt the trainees to do so. Similarly, Tariq et al (2020) in their study, “reflection” was rated the lowest by both medical students and residents. This does not mean that reflective practices are not important. Reflection on learning experiences may be necessary, due to the variability and complexity of clinical cases managed by medical practitioners on a daily basis. (27) Guided reflection by a peer or a supervisor allows own beliefs and presumptions to be questioned and discussed, which may lead to a different viewpoint and a fresh mindset. (28) Findings from the focus group discussion point towards a lack of guided reflection taking place between trainees and their clinical teachers or supervisors, which may indirectly lower the perceived importance of the process.

During the focus group discussion, trainees commented that clinical teachers are burdened with high workload and working under time constraint. Clinical teachers of Anaesthesiology in University Malaya are not only tutors for undergraduate students and postgraduate trainees, but also working doctors, organizers of workshops and conferences, examiners for various anaesthesiology examinations, researchers

conducting numerous studies and administrators in the department. Pimmer et al (2012) used the cognitive apprenticeship model to analyze inter- and intradisciplinary referrals and found that limited time and heavy workload have a negative impact on “modelling” and externalisation of thinking. (29) Raksamani et al (2019) studied the learning experience of health care professionals working in the operating theatre and found that the high stake nature of the work in the operating theatre together with time constraint limit learning opportunities. (30)

Our study also finds that trainees welcome the use of online video meeting applications such as “zoom” to host classes for teaching. This process allows recording to be done with ease and it can be replayed in the future and trainees who miss the classes can also benefit from the recordings. Lai and Yen (2018) studied the use of mobile phones in clinical nursing practice and found that mobile technology can effectively support cognitive apprenticeship, especially with regards to “reflection”, “scaffolding”, “articulation”, and “coaching” processes. (31) Kalet et al (2007) presented the use of “Web initiative for surgical education” (WISE-MD), an online teaching module that is based on the cognitive apprenticeship model. The study found that usage of the module increases the knowledge of students regarding the field of surgery and improves clinical reasoning. (32) Future research is needed to explore the optimal tools and methods in integrating technology for anaesthesiology training.

Limitations

This study was limited to our institution which is University Malaya and the study population is also limited to trainees in Master of Anaesthesiology. We cannot claim that the findings of this study can be generalised to trainees from other Universities or trainees of other specialties.

CHAPTER 6: CONCLUSION

This current study supports the fact that a safe, non-toxic learning environment is crucial from the master trainees' perspective. Methods described in the cognitive apprenticeship model especially "modelling", "coaching" and "scaffolding" are especially useful in anaesthesiology training. Findings also suggest a need for clinical teachers to foster guided reflective practices in their trainees and promote the sense of exploration in the field of anaesthesiology. A faculty education programme would be beneficial in informing the clinical teachers regarding the optimal teaching practices and facilitating changes in anaesthesiology education. In addition, teaching and learning are two way processes, complementing each other. (33) Future research could cover the ideal learning methods, motivation, and attitudes of a good clinical student or trainee in anaesthesiology from the clinical teacher's standpoint.

References

1. Mandouit L. Using student feedback to improve teaching. *Educational action research*. 2018 Oct 20;26(5):755-69.
2. Samarakoon L, Fernando T, Rodrigo C, Rajapakse S. Learning styles and approaches to learning among medical undergraduates and postgraduates. *BMC medical education*. 2013 Dec;13:1-6
3. Chen JY, Chin WY. Using Student Feedback to Enhance Teaching and Learning in an Undergraduate Medical Curriculum: The University of Hong Kong Experience. In *Enhancing Learning and Teaching Through Student Feedback in Medical and Health Sciences 2014* Jan 1 (pp. 21-41). Chandos Publishing.
4. Wisener K, Hart K, Driessen E, Cuncic C, Veerapen K, Eva K. Upward feedback: exploring learner perspectives on giving feedback to their teachers. *Perspectives on Medical Education*. 2023;2(1):99.
5. Myers KA, Zibrowski EM, Lingard L. A mixed-methods analysis of residents' written comments regarding their clinical supervisors. *Academic Medicine*. 2011 Oct 1;86(10):S21-4.
6. Chen YL, Ma MY, Wang HC, Shi GT. Exploring an innovative apprenticeship model in design education: a case study in transportation design.
7. So HY. Postgraduate medical education: see one, do one, teach one... and what else. *Hong Kong Med J*. 2023 Apr 1;29(104):e1-9.
8. Lyons K, McLaughlin JE, Khanova J, Roth MT. Cognitive apprenticeship in health sciences education: a qualitative review. *Advances in Health Sciences Education*. 2017 Aug;22:723-39.
9. Collins A, Brown JS, Holum A. Cognitive apprenticeship: Making thinking visible. *American educator*. 1991 Dec;15(3):6-11.
10. Stalmeijer RE, Dolmans DH, Wolfhagen IH, Muijtjens AM, Scherpbier AJ. The Maastricht Clinical Teaching Questionnaire (MCTQ) as a valid and reliable instrument for the evaluation of clinical teachers. *Academic Medicine*. 2010 Nov 1;85(11):1732-8
11. Al Ansari A, Tabbara KS. Evaluating the reliability and validity of the Maastricht clinical teaching questionnaire in Bahrain. *Oman Medical Journal*. 2019 Sep;34(5):427.
12. Rodino AM, Wolcott MD. Assessing preceptor use of cognitive apprenticeship: is the Maastricht clinical teaching questionnaire (MCTQ) a useful approach?. *Teaching and Learning in Medicine*. 2019 Oct 20;31(5):506-18.
13. Putica K, Trivic DD. Cognitive apprenticeship as a vehicle for enhancing the understanding and functionalization of organic chemistry knowledge. *Chemistry Education Research and Practice*. 2016;17(1):172-96.
14. Kuo FR, Hwang GJ, Chen SC, Chen SY. A cognitive apprenticeship approach to facilitating web-based collaborative problem solving. *Journal of Educational Technology & Society*. 2012 Oct 1;15(4):319-31.
15. Tsai CY, Jack BM, Huang TC, Yang JT. Using the cognitive apprenticeship web-based argumentation system to improve argumentation instruction. *Journal of Science Education and Technology*. 2012 Aug;21:476-86.

16. Stalmeijer RE, Dolmans DH, Wolfhagen IH, Scherpbier AJ. Cognitive apprenticeship in clinical practice: can it stimulate learning in the opinion of students?. *Advances in health sciences education*. 2009 Oct;14:535-46.
17. Tariq M, Iqbal S, Haider SI, Abbas A. Using the cognitive apprenticeship model to identify learning strategies that learners view as effective in ward rounds. *Postgraduate Medical Journal*. 2021 Jan;97(1143):5-9.
18. Shaddel F, Ghazirad M, O'Leary D, Quinlan KM, Hafferty J, Bajorek T. Cognitive apprenticeship in clinical practice; Can it be extended to postgraduate psychiatry training programmes?. *Mathews Journal of Psychiatry and Mental Health*. 2016 Aug 3;1(2).
19. Tsukube T, Matsuo M. The impact of cognitive apprenticeship on the perceived growth of junior doctors. *Journal of Workplace Learning*. 2020 Oct 1;32(7):489-99.
20. Benbassat J. Undesirable features of the medical learning environment: a narrative review of the literature. *Advances in Health Sciences Education*. 2013 Aug;18:527-36
21. Rimmele U. Centre for Educational Research and Innovation-CERI A Primer on Emotions and Learning.
22. Lases LS, Arah OA, Busch OR, Heineman MJ, Lombarts KM. Learning climate positively influences residents' work-related well-being. *Advances in Health Sciences Education*. 2019 May 1;24:317-30.
23. Llera J, Durante E. Correlation between the educational environment and burn-out syndrome in residency programs at a university hospital. *Arch Argent Pediatr*. 2014 Feb 1;112(1):6-11.
24. Zulkurnain A, Abdullah A, Abdullah F, Abdullah A, Abdullah A. Exam-oriented in Malaysia's education system. *E-JOURNAL OF MEDIA AND SOCIETY (E-JOMS)*. 2019 Jul 1;2(2):50-68.
25. Ke Z, Liang C. Research on the relationship between exam-oriented education and students' creativity. *Journal of East China Normal University (Educational Sciences)*. 2023 Apr 1;41(4):72.
26. Liu M. An overview on the impact of the exam-oriented education in China. *InSHS Web of Conferences 2023 (Vol. 180, p. 02036)*. EDP Sciences.
27. Soemantri D, Mccoll G, Dodds A. Measuring medical students' reflection on their learning: modification and validation of the motivated strategies for learning questionnaire (MSLQ). *BMC medical education*. 2018 Dec;18:1-0.
28. Sandars J. The use of reflection in medical education: AMEE Guide No. 44. *Medical teacher*. 2009 Jan 1;31(8):685-95.
29. Pimmer C, Pachler N, Nierle J, Genewein U. Learning through inter-and intradisciplinary problem solving: using cognitive apprenticeship to analyse doctor-to-doctor consultation. *Advances in Health Sciences Education*. 2012 Dec;17:759-78.
30. Raksamani K, Stalmeijer RE. How postgraduate trainees from different health professions experience the learning climate within an operating theater: a mixed-methods study. *BMC medical education*. 2019 Dec;19:1-1.

31. Lai CY, Yen YC. Using mobile devices to support cognitive apprenticeship in clinical nursing practice—a case study. *Interactive Technology and Smart Education*. 2018 Dec 10;15(4):348-62.
32. Kalet AL, Coady SH, Hopkins MA, Hochberg MS, Riles TS. Preliminary evaluation of the web initiative for surgical education (WISE-MD). *The American journal of surgery*. 2007 Jul 1;194(1):89-93.
33. Abbas SA. Teaching and Learning-A Complementary Study on Effective Teaching and Learning. *Asian Education Studies*. 2016 Sep 27;1(2):87.

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