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Virtual postgraduate exams and assessments: the challenges of online delivery and optimising performance

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Abstract

The COVID-19 pandemic has catalysed the computerisation and online delivery of postgraduate examinations. Social distancing regulations and lockdown measures resulted in many written and clinical examinations being cancelled during the initial surge of the virus. In an effort to reinstate the assessment of trainees and enable career progression, the UK medical regulator, the General Medical Council (GMC) has approved unprecedented changes to clinical examinations, including virtual assessment. We outline the changes made and the advantages and disadvantages of these new examination formats. We discuss ways for candidates and examiners to optimise their virtual environment and develop skills that can improve performance.

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Introduction

The COVID-19 pandemic has changed beyond recognition the delivery of medical and surgical training and assessment in the postgraduate environment.¹ Social distancing regulations prevent the congregation of groups in confined spaces. In addition, lockdown measures introduced to slow the spread of the virus have had implications on travel within the United Kingdom and abroad. These challenges have led to the development of novel virtual assessment methods in an effort to enable continued career progression for surgical trainees.

During the initial wave of the COVID-19 pandemic, postgraduate examinations were postponed in response to

logistical challenges, combined with a sudden increased need to mobilise clinicians for clinical duties.² Training organisations including Health Education England (HEE) and the various Royal Colleges worked to adapt assessment, recruitment, appraisal and certification processes to deal with the changing situation.^{3,4}

Written postgraduate examinations such as the Membership of the Royal College of Surgeons (MRCS) Part A, Diploma in Otolaryngology – Head and Neck Surgery (DOHNS) Part 1, Membership of the Royal College of Physicians (MRCP) Parts 1 and 2, Membership of the Royal College of Psychiatrists (MRCPsych) Papers A and B, Membership of the Royal College of Obstetricians and Gynaecologists (MRCOG) Parts 1 and 2 and Fellowship of the Royal College of Radiologists (FRCR) became computerised and delivered online.^{5–9} Postgraduate clinical assessments such as the Surgical Fellowship (FRCS) Section 2 examination were given approval by the General Medical

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Table 1

Potential disadvantages of virtual assessments.

Table 1. Disadvantages of virtual assessments

Potential for technical issues affecting candidates
Protocols required to deal with technical issues including potential compensation
Requires good computing facilities, audio quality and high bandwidth
Suitable personal venue may be hard to find
High initial cost to computerise examination
Requires invigilation of written examinations
Faculty may require training in the use of new technology
No assessment of hands-on clinical skills, patient examination and surgical skills
Loss of camaraderie and social support between candidates on the day
Less sense of occasion for some

Council (GMC) to continue without the standard physical examination of patients preventing the demonstration of certain hands-on clinical skills.¹⁰ Additionally, trainee national selection for many specialties is being conducted using portfolio scores combined with an online interview in place of traditional face-to-face interviews and clinical scenario assessments.¹¹ While the delivery of virtual assessments is not novel, it is relatively progressive in medicine and surgery, professions that have face-to-face inter-personal communication and the demonstration of clinical skills at their core.

With the continued rise in COVID-19 infections, it is increasingly likely that virtual assessments will remain for the foreseeable future. In this article, we outline the potential advantages and disadvantages of computerised postgraduate assessments. In addition, we discuss the impact of human factors (HF) and how both candidates and examiners can adapt to this novel assessment methodology to optimise their performance.

Computerisation of written examinations

Computerised written assessments are commonplace in medical schools, though many postgraduate examinations were paper-based prior to COVID-19. Online written examinations can be taken in the candidate's own home or personal space, reducing the risk of viral transmission that might occur at busy exam venues.

Adapting examinations to a computer-based format is not a simple task. It requires adherence to normal regulations that ensure exam rigour and reliability that have been approved by the respective regulator (such as the GMC). In addition, in order to ensure fairness, extra measures are required to ensure candidates are monitored for suspicious behaviour that may indicate cheating. Finally, it is not uncommon for changes in exam delivery to cause technical and logistical problems that may affect trainees as occurred recently with the delivery of the first online MRCS and MRCP examinations.^{12,13} This is not unique to the computerisation of an exam as paper-based answer sheets can also contain errors, be erroneously marked, or rarely, damaged or lost. Table 1 shows some of the

Table 2

Potential advantages of virtual assessments.

Table 2. Advantages of virtual assessments

No travel or overnight accommodation required
No examination venues required, reducing cost
More accessible for candidates who might also be more relaxed and calmer
Easier to deliver internationally
Less risk of marking errors than when using paper answer sheets
Less time away from clinical responsibilities means that it is easier to recruit faculty
Virtual clinical examinations test video and telephone communication skills
More robust and is less likely to be affected by the COVID-19 pandemic
Assessments can be recorded for examiner training purposes

potential disadvantages of virtual assessments. Despite the challenges of transforming written assessments to an online format, it represents the natural evolution of test delivery. This adaptation was likely to occur even without the COVID-19 pandemic, which has acted as a catalyst for change. After any initial teething problems have been rectified, computerised written examinations are likely to prove popular amongst all stakeholders.

Virtual clinical examinations

Many examining bodies are still discussing how best to deliver clinical Objective Structured Clinical Examinations (OSCE) in the COVID-19 era. However, as infection rates continue to climb, some institutions including the RCPsych have already adapted their clinical examinations to take place online.⁷ Other clinical examinations such as the MRCS Part B, DOHNS Part 2, and FRCS Section 2 have continued to run face-to-face but with universal face-mask use and without patients present or hands-on clinical examination stations.^{10,14,15} Running face-to-face clinical examinations in the COVID-19 era is no easy task requiring innumerable logistical adaptations to ensure adherence to social distancing regulations. Examining bodies delivering face-to-face examinations also have contingency plans to change exam delivery to a virtual assessment if required. Table 2 contains some potential advantages of virtual assessments for candidates and examining bodies.

National selection for specialty training will take place virtually for 2020/2021 using video communications programs such as Microsoft® Teams.¹¹ Online interviews will include the assessment of communication skills and candidate performance in the management of clinical scenarios, replacing the OSCE stations that were used previously.

Success in virtual clinical examinations requires the clinical application of knowledge and experience but also sound verbal and non-verbal communication skills. Remote assessment negates many non-verbal communication skills which are a vital component of clinical practice and successful inter-personal communication.¹⁶ As a result, candidates have to develop their video-telecommunication skills to ensure they remain concise and engaging in delivering their answers.

These skills may be relatively new for many trainees and will require refining in exam and interview practice. The development of these skills is timely and relevant as they will be increasingly utilised in clinical practice with the rise in remote clinic consultations.¹⁷

Optimisation of your environment

Unlike traditional face-to-face assessments, virtual examinations enable an opportunity to adapt surroundings to optimise performance. Both candidates and examiners should consider this a key component in their preparation for participating in virtual assessments, and as with other human factors (HF) they are sometimes overlooked or not seen to be important. Prior to the assessment, familiarisation with the set-up and in the exact location and environment on the day, is useful to help identify any potential problems.

Every effort should be made to ‘normalise’ the interaction which will improve communication between all participants. The height and angle of the camera should be adjusted and participants should look directly at this rather than themselves on the screen to enable good eye contact.¹⁸ The audio should be tested prior to starting the examination as background noise, interference, or poor hearing could be distracting and may be exaggerated if the internet connection is poor. We recommend using a dedicated headset to optimise sound and voice quality. Surprisingly, Bluetooth earphones rarely perform as well in this scenario.

Being interrupted and distracted can be a cause of error.^{19,20} Everything should be done to minimise interruptions (by family or friends) at the place of the examination by making other occupants aware that participants should not be disturbed. Other potential causes of interruption such as pets, the telephone, computer notifications, the doorbell should also be considered. Background noise can reduce performance and concentration.

Video-communication requires significant bandwidth to work effectively and enable good communication.²¹ Therefore, a suitable location to establish the best internet connection is important. If at home, we recommend that other broadband usage within the household is minimised where possible to reduce the chance of poor-quality or lost connections. Finally, for virtual clinical examinations and interviews, a well-lit room with a light source in front of the camera is good practice to reduce shadowing. A bland background is also recommended.

Optimising performance

Practice is the best method to improve performance. Adapting to this new assessment methodology is challenging for both candidates and examiners. There is little doubt that being examined or examining in a familiar environment by communicating using a computer is a very different scenario to



Fig. 1. One of the authors (PAB) promoting the importance of hydration while supervising a recent face to face MRCS examination.

being at a face-to-face examination centre. This new format will feel more comfortable for some than others and will require the development of new skills.

It can be difficult to maintain concentration for prolonged periods of time when using the computer. Lack of concentration can lead to error, poor performance, and missing valuable information.^{22,23} It is therefore important that regular breaks are scheduled for examiners and candidates and it is important that advantage is taken of these times. Hunger and dehydration can have a considerable impact on performance, so having readily-available food and drink to hand should be planned.^{24,25} Hydration is actively promoted by some exam bodies during face-to-face examinations (Fig. 1) to help optimise cognitive function.

Additionally, it is vital to read all preparation materials carefully prior to starting the assessment so that action can be taken if there are unexpected technical or other difficulties. As a result, it is likely that these can be identified more readily and can be resolved promptly with the least amount of anxiety or distress. Online delivery can never be 100% guaranteed as it requires many different systems from participants and the hosting organisation to all run simultaneously.

Virtual clinical examinations can make the use of non-verbal communication difficult, though not impossible. The use of subtle changes in body position when practising for the live event, include learning slightly forwards when emphasising a point before returning to a relaxed body position. Facial expressions convey a great deal and can be used to add

emotion and emphasis to verbal communication. Few doctors will have had professional voice coaching, though learning to make subtle adjustments to their tone and volume whilst delivering an answer can make a speaker far more engaging. Delivery can be improved immeasurably by controlling the speed of speech as well as and adding well timed pauses. These skills all require development and practice.

It is more difficult for examiners to interrupt candidates during virtual assessments to move them on to the next question. It is therefore important that candidates deliver answers concisely and effectively to avoid wasting valuable time. At the end of an assessment station or interview, if time permits it may be helpful for candidates to ask examiners whether they would like anything clarified. This may not be allowed depending on the rules of the assessment but is important to consider, as virtual assessments should have more leeway for having missed information as a result of poor internet connections, sound quality or distractions. This approach is not unlike techniques used by the military, aviation industry and in the operating theatre where requests and instructions are repeated back to ensure mutual team understanding.

Tiredness is detrimental to performance and is a cause of error so the importance of adequate rest before an assessment cannot be emphasised enough.²³ The first impression is also important hence dressing appropriately just as with a face-to-face examination. Professionalism can sometimes be difficult to convey in a virtual setting but a good first impression should help to convey that both parties have taken time and effort to prepare for the event.

Finally, it is worth having a plan for after the examination or assessment.

Whether face to face or virtual, professional exams are the culmination of months and sometimes years of hard work, so candidates might experience an anti-climax after finishing an online examination and then logging off. For generations, candidates have benefitted from the camaraderie and debriefing offered by socialising with fellow candidates after the assessment is finally over. Equally, this is a highly valued part of exams for examiners who usually network and catch up with colleagues from around the country. Although face-to-face socialising may be limited or prevented by social distancing rules during the COVID-19 pandemic, the importance of a ‘catch up’ with peers and colleagues after the assessment has finished is a sound idea and should not be underestimated.

Conclusion

The development of virtual postgraduate assessment methods in response to the COVID-19 pandemic has been challenging for candidates and examining bodies alike. There are both advantages and disadvantages to these new formats of assessment delivery but despite the challenges, it has enabled career progression for trainees working through this period of uncertainty. While it is impossible to predict what format

examinations will take in the future; it is likely that at least written ones will remain computer based. As a result, candidates would benefit from learning how to optimise their own environment and develop new skills that can improve their performance in these assessments.

Authorship

RE wrote the manuscript. RO and PB edited the manuscript and PB supervised throughout. All authors have seen and approved the final manuscript for publication.

Conflict of interest

We have no conflicts of interest.

Ethics statement/confirmation of patient permission

Not required.

References

- White EM, Shaughnessy MP, Esposito AC, et al. Surgical Education in the Time of COVID: Understanding the Early Response of Surgical Training Programs to the Novel Coronavirus Pandemic. *J Surg Educ* 2020;(July), <http://dx.doi.org/10.1016/j.jsurg.2020.07.036>. S1931-7204(20)30270-1. ePub ahead of print.
- James HK, Pattison GTR. Disruption to Surgical Training during Covid-19 in the United States, United Kingdom, Canada, and Australasia: A Rapid Review of Impact and Mitigation Efforts. *J Surg Educ* 2020;78(June (1)):308–14, <http://dx.doi.org/10.1016/j.jsurg.2020.06.020>.
- COVID-19 Statement for applicants recruitment update. Health Education England; 2020 [cited 2020 Sep 24]. Available from: <https://www.hee.nhs.uk/sites/default/files/documents/COVID-19%20Statement%20for%20applicants%20recruitment%20update.pdf>.
- Oeppen RS, Rutherford E, Sadler P, et al. Virtual ARCP assessment and trainee feedback meetings: facilitating the best experience and practice. *Br J Oral Maxillofac Surg* 2020;58(October (10)):1240–4.
- Remote delivery of DOHNS Part 1 September 2020. Intercollegiate Committee for Basic Surgical Examinations; 2020 [cited 2020 Nov 18]. Available from: <https://www.intercollegiatemrcsexams.org.uk/announcements/remotedelivery-of-dohns-part-1-september-2020/>.
- Remote delivery of MRCS Part A in September 2020. Intercollegiate Committee for Basic Surgical Examinations; 2020 [cited 2020 Nov 18]. Available from: <https://www.intercollegiatemrcsexams.org.uk/announcements/remotedelivery-of-mrcs-part-a-in-september-2020/>.
- MRCPSych examinations this Autumn. Membership of the Royal Colleges of Psychiatrists; 2020 [cited 2020 Nov 18]. Available from: <https://www.rcpsych.ac.uk/training/exams/special-notice>.
- MRCPUK - New UK online exam. Membership of the Royal Colleges of Physicians of the United Kingdom; 2020 [cited 2020 Nov 18]. Available from: <https://www.mrcpuk.org/mrcpuk-examinations/part-1/uk-online-exam>.
- RCOG to transform the way it delivers exams to doctors worldwide. Royal College of Obstetricians and Gynaecologists; 2020 [cited 2020 Nov 18]. Available from: <https://www.rcog.org.uk/news/2020/11/18/rcog-to-transform-the-way-it-delivers-exams-to-doctors-worldwide>.

- cologists; 2020 [cited 2020 Nov 18]. Available from: <https://www.rcog.org.uk/en/news/rcog-to-transform-the-way-it-delivers-exams-to-doctors-worldwide/>.
10. *Intercollegiate Specialty Board Examinations Section 2 – November/December 2020*. Joint Committee on Intercollegiate Examinations; 2020 [cited 2020 Nov 18]. Available from: <https://www.jcie.org.uk/Utils/DocumentGenerator.aspx?Type=CMS&docID=a71caedc-ad9b-46c5-9bb1-95946d5470ec>.
 11. *COVID-19: JCST Statement update VI*. Joint Committee on Surgical Training; 2020 [cited 2020 Oct 2]. Available from: https://www.jcst.org/-/media/files/jcst/key-documents/covid19_jcst-statement_update_vi_-1-october-2020.pdf.
 12. *Online delivery of Part 1 exam*. Membership of the Royal Colleges of Physicians of the United Kingdom; 2020 [cited 2020 Nov 18]. Available from: <https://www.mrcpuk.org/news/online-delivery-part-1-exam>.
 13. *Statement on MRCS Part A September 2020 Diet*. Intercollegiate Committee for Basic Surgical Examinations; 2020 [cited 2020 Nov 18]. Available from: <https://www.intercollegiatemrcsexams.org.uk/announcements/mrcs-part-a-delivery-issues/>.
 14. *MRCS Part B OSCE October 2020 Confirmation of method of delivery*. Intercollegiate Committee for Basic Surgical Examinations; 2020 [cited 2020 Nov 18]. Available from: <https://www.intercollegiatemrcsexams.org.uk/announcements/mrcs-part-b-osce-october-2020-confirmation-of-method-of-delivery/>.
 15. *DOHNS Part 2 OSCE October 2020 Confirmation of method of delivery*. Intercollegiate Committee for Basic Surgical Examinations; 2020 [cited 2020 Nov 18]. Available from: <https://www.intercollegiatemrcsexams.org.uk/announcements/dohns-part-2-osce-october-2020-confirmation-of-method-of-delivery/>.
 16. Calderone J, Lopez A, Schwenk S, et al. Telepsychiatry and integrated primary care: setting expectations and creating an effective process for success. *mHealth* 2020;**6**(July), 29–29.
 17. Fonseka T, Ellis R, Salem H, et al. The effects of COVID-19 on training within urology: Lessons learned in virtual learning, human factors, non-technical skills and reflective practice. *J Clin Urol* 2020;(August), <http://dx.doi.org/10.1177/2051415820950109>, 2051415820950109. ePub ahead of print.
 18. Muhlbach L, Bocker M, Prussog A. Telepresence in Videocommunications: A Study on Stereoscopy and Individual Eye Contact. *Hum Factors J Hum Factors Ergon Soc* 1995;**37**(June (5)):290–305.
 19. Drews F. The frequency and impact of task interruptions in the ICU. *Proc Hum Factors Ergon Soc Annu Meet* 2007;**51**:683–6.
 20. Rivera-Rodriguez AJ, Karsh B-T. Interruptions and distractions in health-care: review and reappraisal. *Qual Saf Health Care* 2010;**19**(August (4)):304–12.
 21. Fernández C, Saldana J, Fernández-Navajas J, et al. Video conferences through the internet: how to survive in a hostile environment. *Sci World J* 2014;**2014**, 860170.
 22. Oeppen RS, Shaw G, Brennan PA. Human factors recognition at virtual meetings and video conferencing: how to get the best performance from yourself and others. *Br J Oral Maxillofac Surg* 2020;**58**(July (6)):643–6.
 23. Oeppen RS, Davidson M, Scrimgeour DS, et al. Human factors awareness and recognition during multidisciplinary team meetings. *J Oral Pathol Med* 2019;**48**(8):656–61.
 24. Parry D, Oeppen RS, Gass H, et al. Impact of hydration and nutrition on personal performance in the clinical workplace. *Br J Oral Maxillofac Surg* 2017;**55**(December (10)):995–8.
 25. Brennan PA, Oeppen R, Knighton J, et al. Looking after ourselves at work: the importance of being hydrated and fed. *BMJ* 2019;**364**(6):1528, <http://dx.doi.org/10.1136/bmj.1528>.