Point of View: Online assessment in medical education– current trends and future directions

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Online assessment in medical education offers many advantages over traditional forms of assessment: students can be provided instant feedback on their progress, tutors can more easily monitor learners' progress and achievement of milestones, and automated marking accelerates a once time-consuming burden for medical education institutions[1,2]. Online assessment is not a panacea, however, and downsides include its costs and its inherent reliance on technology, which is sometimes unreliable. Do the advantages outweigh the disadvantages? It is likely that they do, but what is not subject to debate is that online assessment in medical education is changing. This short article outlines some current trends in online assessment and discusses the impact these will have on the future of this modality.

One certain development in assessment in medical education is a move away from the artificial distinction between formative and summative assessment towards the philosophy of assessment for learning. Formative assessment is low-stakes assessment. Its purpose is to monitor learning and to provide feedback to the learner and evaluation information to the teacher[3]. Thus, it allows learners and teachers to find out areas of weakness and to work on these. Summative assessment is high-stakes assessment. It is an assessment that students will pass or fail, and its purpose is to decide if students are ready to move up to the next stage of their learning[4]. The concept of assessment for learning is based on using the best features of both formative and summative assessment and should result in more continuous assessment, more continuous feedback and, ultimately, more continuous learning. Online assessment has features that should enable the delivery of many of the outcomes required, including continuous assessment, continuous feedback, and continuous learning. The best features of formative and summative assessment that assessment for learning describes include the monitoring of learning; the provision of continuous feedback to learner and teacher; and the illumination of areas of weakness—all of which are meaningful dimensions of both learning and evaluation that enable the learner to demonstrate competence[5]. Online assessment enables the provision of continuous and real-time feedback; it can be delivered at a time and place that suits both the learner or the educator, and it can be combined with bite-sized chunks of relevant learning.

A second feature that is likely to emerge is that online assessment will start to make more use of the benefits that technology and the Internet can offer. In the early days of online assessment, paper-based assessments were largely transferred unchanged to a website, therefore text and simple assessment formats dominated. However, the Internet enables many more features than paper allows, and these features will be increasingly exploited in the future. In future, learners will be required to listen to a heart murmur or watch a clinical video online and then answer questions related to the multimedia[6]. This is an example of where the future is now—this specific scenario has already been implemented at some medical schools and will likely be rolled out in the majority of centres over the next ten years.

Online assessment is currently dominated by closed-answer type questions (that is, multiple-choice questions), but increasingly intelligent text recognition software will enable the delivery and marking of free-form text online[7]. Currently, online assessment is usually used to assess knowledge (ideally, applied knowledge); however, newer technologies will enable the assessment of simulated clinical skills online (perhaps by means of sophisticated laparoscopic simulators)[8,9].

At present, online assessment largely provides an alternative for the written examination that is used to assess a single candidate in isolation. But new technologies will soon enable assessors to break out of existing limitations. For example, real-time communications technology (for example, Skype) will enable *viva voce* or actual clinical examinations to be conducted online, with the examiner observing the clinical encounter from a distant location. This would eliminate many of the inconveniences of traditional clinical assessments, including the need for examination halls, printed paper, and accommodation, travel and subsistence for both invigilator and candidate.

It is currently a subject of controversy in the research literature as to whether or not online assessment is associated with higher or lower costs than traditional forms of assessment. A brief summary of this issue is that, like online learning, online assessment will enable the saving of certain costs (for example, printing costs) but will incur its own unique set of costs (for example, software costs)[10,11]. Whether there will be cost savings or more costs at the end will largely depend on the exact form of assessment provided and the technologies used. However, the costs of certain forms of online assessment will likely fall in the future, as recent trends over the past several years seem to suggest. Some educational software products are, in fact, available free of charge[12]. Online assessment is currently often conducted in computer-aided learning rooms; but as regulation and authentication systems become more secure and sophisticated, it will be conducted wherever there is an Internet connection—with significant savings as a result. As with other components of medical education, costs overall should fall and value should increase in the long term[13].

Online assessment will also transform the way we create examination content. Currently, creation of examination content involves question creation, question storage, question selection, and question testing. In the modern world much of this is done online already, but it often happens in a nonlinear manner and often the different steps are carried out on different software systems. In the future, seamless online systems will enable a much more efficient and coordinated process. Such systems will enable examiners to create questions, then immediately store them on a shared online system, then select such questions for the actual examination, and then finally test them prior to the examination. This will result in efficiencies within and between the different components of the online systems.

At present, one of the concerns related to online assessment is the reliability of online assessment systems. Unreliable systems undermine confidence in the system of assessment amongst both learners and tutors. This can be especially true in countries with poor network connectivity. Lack of reliability can relate to the hardware, software, or even the power supply. Newer and better technologies will make unreliability largely a phenomenon of the past. Even though today this might seem hopelessly wishful in some contexts, Internet connectivity is improving all the time. Reliability that approaches 100%, twenty-four hours a day is achievable in many territories. Online assessment may eventually become more reliable than traditional or paper assessments and will become the mode of assessment that all stakeholders have most confidence in.

Another trend in online assessment will be in security systems used to safeguard assessments. Online security has become more important in all walks of life, and it is clearly of vital importance when online assessment is used for summative purposes. As security systems gradually become more sophisticated, the trend goes that methods to undermine security will also become more sophisticated, meaning that while it is certain that security processes will improve, it is less certain that online assessment will be more or less secure in the future than it is now. Even though online assessment naturally suggests problems with online security, some problems may be caused by a lack of security in the physical setting. Assessments being carried out on large screens offer obvious temptations to candidates who might cheat; both physical and online security measures will need to be combined to prevent cheating. Such measures might span from physical screens separating candidates, to data analysis tools that enable assessors to see if candidates who consistently gave the same wrong answers to questions were located closely to each other in the examination hall.

Online assessment is still relatively new; however, it will become mainstream over the next decade. It will become mainstream in all territories; this includes the developing world, partly because the needs of developing countries will be too great to be satisfied by traditional means alone[14]. As with any technological innovation, it is difficult to define exactly where it will lead us, but in some ways online assessment will remain similar to traditional assessment in that, ultimately, it will have to deliver the same outcomes: assessment that is valid, reliable, acceptable, cost effective, and that has a positive effect on learners' behaviours[15]. Delivering these required outcomes while continuing to innovate will be the challenge for future practitioners in this domain.

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