

Computer-Based Simulations Summary Report

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Background

Over the past two decades, the use of computer-based simulations in medical education has become increasingly common. Testing organizations such as the National Board of Medical Examiners (NBME) have computer-based simulations as a standard part of their assessment model. Simulations are designed to mimic the actual practice environment, greatly increasing an assessment's fidelity. With computer-based simulations, examinees can be presented with a variety of scenarios and then asked how they would proceed. Examinees decide what treatments to initiate while monitoring the patient responses throughout the cases. The ABP is investigating the use of computer-based simulations in its examinations as an additional format to the standard multiple-choice examination.

Key Points from Presentation

Dr. William McGaghie began by referencing a 2009 article by Dillon and Clauser that described NBME's experience with computer-based simulation on the United States Medical Licensing Exam (USMLE). He had provided this article to the conference participants prior to the meeting as suggested reading.

Dr. McGaghie identified several possible advantages to using computer-based simulation. One main advantage is the potential for more authentic scenarios (better clinical realism) that examinees may find to be more engaging. This format can also provide a more authentic assessment of diagnostic decision-making skills, therapeutic intervention skills, and skills related to developing and implementing a patient management plan.

He also pointed to some fairly significant disadvantages: (1) the simulations are difficult to score; (2) the per-unit-of-testing-time efficiency using computer-based simulation is less than it would be for multiple choice questions (MCQs); (3) MCQs are more cost effective; (4) the infrastructure required to support computer-based simulation is substantial; and (5) accurate and timely reporting of results is difficult. He also pointed out that if there is only a small number of case simulations available, there may be a security risk of the simulations becoming generally known to the examinees prior to testing.

Key Points from Breakout Session

It was noted that what might be included in this category of computer-based simulations is rather diverse. Some simulations used branching strategies, others used Bayesian networks, and others were perhaps more like advanced innovative item types.

When considering what specific advantages simulations hold for ABP, the list included many of those noted in the earlier presentation such as:

- reacting to spurious test results
- evaluating the timing of actions
- assessing behavioral practice skills and communication
- assessing how a physician responds to a bad decision
- providing a better sense of clinical reality (MCQ makes you choose the best answer, but lacks finesse of real practice)
- having better capability to evaluate complex situations
- potentially increasing diplomate satisfaction by more closely resembling clinical practice
- potentially providing better feedback to examinees

The group also discussed several disadvantages that accompany simulations, such as:

- issues with scoring (is there only one right answer or should there be partial credit scoring?)
- how to justify the correct answer(s)
- higher test development costs than for multiple-choice questions
- greater development time to develop than MCQs
- hard to explain, making it seem opaque to diplomates and the public

Conclusions

When considering computer-based simulations, given the cost in both time and money, the ABP should be clear on what specific problem they think computer-based simulations will solve before committing to it. First, an overall plan is needed. Then, one should build an overall program of assessment. Finally, it was noted that computer-based simulations may be good for evaluating process and may be better suited for training purposes.