Virtual patient simulation for learning and assessment: Superior results in comparison with regular course exams


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Tags

Clinical domain
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Curriculum
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Educational research

Background

The authors define virtual patient simulation (VPS) as “an interactive computer simulation of real-life clinical scenarios for the purpose of healthcare and medical training, education or assessment”. They highlight that although there are many publications on using VPS or simulation, “only 13 discuss assessment-related issues”.

Purpose

To observe the possible differences in assessment results between the web-based simulation of patients system (WebSP) and regular course exams in two topics of an Internal Medicine course (hematology and cardiology).

Type of paper

Research: Randomized Controlled Trial
Setting: 4 consecutive cohorts in a mandatory Internal Medicine Clinical Course

Population: 216 Medical students in clinical rotations

Intervention:
- Students in Terms 1 & 2: half students get access to WebSP cases, other half get traditional teaching (lectures, small group discussions and mannequin simulations)
- Students in Term 3: half students get access to WebSP plus traditional teaching, other half get traditional teaching only
- Students in Term 4: A paired design where all students get access to first WebSP and then subsequently get traditional teaching

Outcomes: All students were given an exam at the end of their courses with a virtual patient (VP) hematology/cardiology case, followed by a paper of hematology/cardiology case (virtual WebSP exams and paper cases matched for topic and difficulty). The same scoring rubric was applied to both assessment modalities.

Key Outcomes

Randomization appears successful. All 216 students participate in the study. WebSP exam scores and Regular exam scores were higher in term 1, 2 and 3 students taught by WebSP (effect size ranged from 1.1-2.9) compared to those in the traditional teaching arm. All students (including the students taught by traditional methods) scored higher on the virtual WebSP exams than the paper case exams.

Key Conclusions

The authors conclude that “using VPS both for learning and for assessment in the same course is a good way of supporting learning of the students and this is the setting where Web-SP assessment results were consistently superior to those obtained with regular course assessment.”

“…VPS might prove to be context sensitive and care should be exercised when generalizing results.”

“…Learning with VPS could lead to better assessment results with different examination formats and ultimately provide a transferable skill.”

Spare Keys – other take home points for clinician educators

The authors stress the importance of constructivist alignment in course design. This implies a purposeful consistency between teaching and assessment methods. However, they do not address the key danger of this approach: the educator is less able to assess the students’ ability to transfer knowledge to new settings. Transfer of knowledge to other settings is a critical skill and should not be overlooked. One wonders if use of WebSP in the course is allowing “teaching to the test”.
I feel unconvinced of the validity of WebSP as an assessment tool as both groups of students did better on the WebSP exams than the paper case exams. The WebSP exam validation was not mentioned or described and I wonder if it was simply too easy an exam despite their efforts to create equal difficulty.

Another concern relates to the manual scoring rubric. This would be time consuming for other programs to implement and was not described in full detail, making it difficult to replicate this study.

Finally I was disappointed regarding the authors’ choice to use a linear design in their VPS. The branched and nodal design of VPS systems is what gives these cases the flexibility to present a more authentic case compared to traditional paper cases.