



## Case study 9: Assessing my own professional performance

### St George's, University of London

#### What this case study covers

- **Subject, mode and level:** Undergraduate and postgraduate courses in medicine
- **Assessment topic:** Adaptive, interactive formative assessment
- **Technologies:** Moodle™; OpenLabyrinth educational pathway authoring and delivering system; vpSim online virtual patient authoring and management system

#### Background

Using patient cases (a form of problem-based learning in which students make clinical decisions in response to an unfolding medical scenario), medical students at St George's, University of London are exposed to the complexity of clinical decision making before commencing work in the real world. Until recently, the cases available to students were largely paper based, linear and inflexible. Now, online interactive versions, known as virtual patients, offer more adaptive and authentic alternatives.

A virtual patient is defined as 'an interactive computer simulation of a real-life clinical scenario for the purpose of medical training, education, or assessment'. In the simpler linear version, students make decisions based on available clinical information and are given immediate feedback on the consequences of their choices. The more complex the design of the virtual patient, the greater the range of choices; in the most complex examples, each decision leads down different branches so that the information and choices available at a later stage depend on the choices the student made earlier – hence the description of this type of virtual patient as 'interactive' and 'adaptive'. If designed for collaborative group work as part of the mainstream delivery of the curriculum, the virtual patients at St George's are closely linked to learning objectives; those used for independent formative assessment are more broadly based.

In the last five years, virtual patients have become the subject of considerable international research and development, and St George's, University of London has taken a leading role in these initiatives. St George's is currently working in collaboration with eight other European universities to develop, repurpose and enrich existing virtual patients as part of the European Commission-funded eViP project. Another project involving St George's is the JISC-funded Generation 4 (G4) project which aims to explore how technology can help provide an integrated and interactive curriculum in medicine. Part of the 2009 JISC Transforming Curriculum Delivery through Technology programme, the G4 project involves (amongst other aims) the development of virtual patients for formative assessment.

#### Rationale

Boud and associates (2010) argue that effective learning is diminished by tasks that require one-off reproductive processes. Instead, assessment tasks can be viewed as 'significant learning activities in themselves' operating within a constructively organised learning experience which enable students to take responsibility for judging the quality of their own work. The aim should be to engage students as partners rather than as recipients of assessment, a viewpoint that accords with the approach to learning and assessment sought by the curriculum designers at St George's:

*'Students need confidence and competence in making informed judgements about what they produce. They need to develop the ability to evaluate the quality, completeness and/or accuracy of*

*work with respect to appropriate standards, and have the confidence to express their judgements with conviction.' Boud and associates (2010)*

Virtual patients – both as part of a problem-solving approach to curriculum delivery and as tools for independent learning – help students explore and evaluate their thinking processes at the same time as they acquire knowledge. As a result, a richer and deeper understanding is constructed, aided by self-assessment (as a result of working on the case), and by feedback from tutors and peers (if the virtual patient is designed for group work). In both cases, students acquire a greater capacity to set their own goals, monitor their own performance and make critical judgements about how to improve – and are far better prepared for their chosen profession.

### **Transforming assessment practice**

The move from paper-based cases to an integrated curriculum designed around virtual patients took place with student involvement: students were consulted during development as evaluators and co-designers, and their reactions to working with virtual patient cases are described in a paper by Poulton *et al* (2009). The results of these early trials were sufficiently positive for the course team to replace paper-based cases with virtual patients for the transitional year, a year during which students entering medicine through different routes are brought together for a combined year of problem-based learning and clinical experience.

Most students who took part in the initial trials appreciated the interactivity and flexibility of the virtual patients. Unlike the paper-based linear versions, the virtual patients (especially the branched versions) allowed students to explore different approaches to treating patients' symptoms and to see for themselves the consequences of their decisions. But from the students' point of view, the design needed to take full advantage of the affordances of the online medium. Simply transferring linear resources to the screen was not seen as an improvement: multi-route or branching narratives were strongly preferred.

Encouraged by these results, St George's took the innovative step of entirely replacing paper-based cases with online virtual patients for students taking the transitional year curriculum during 2009–2010. In addition, to reinforce and extend the directed programme of learning, 36 interactive virtual patients have been developed for independent formative assessment (two per week over an 18-week period). All the virtual patients, including those developed for independent use, are tailored to the learning objectives for each week of the curriculum and are thus an integral part of students' experience of the curriculum.

Student usage of the virtual patient resources date has made it clear how willing they are to use online resources to evaluate their own thinking processes, and how much they benefit from the freedom to self-correct, even to fail, in safety:

*'A widespread concern before the trial was that students would just click quickly and possibly randomly on options, and quickly move from option to option. This did not happen... Students clearly made every effort to get the "right answer" but then frequently chose to explore other, often poorer options.'* Poulton *et al* (2009)

The design of virtual patients for formative assessment is still evolving in the light of student feedback. For example, trials during the academic year 2009–2010 revealed that students like to test their clinical knowledge by means of multiple-choice questions embedded into the narrative providing immediate expert feedback. To embed this facility into the virtual patients, the team has adopted vpSim, licensed software for virtual patient development, which complies with the MedBiquitous virtual patient international standard, instead of the open source OpenLabyrinth which had been used to develop the earlier virtual patients.

While there has been clear consensus in favour of building in feedback, student advice has been less consistent about where feedback should be given in the structure of the virtual patient, and how scoring should be included, if it is used at all – some students preferred negative scoring (losing marks from a perfect score for each incorrect answer); others preferred to gain marks for right answers; some opted to see feedback as they progressed through the different branches of the narrative; others preferred to receive holistic feedback after completing the whole exercise. The content of individual virtual patients may have had a bearing on these preferences, and no one approach is seen as dominant.

What has clearly been of value, however, is that students are closely involved in perfecting the design of the virtual patients. With this developmental work completed, trials of virtual patients in low-stakes summative assessment will take place during the academic year 2010–2011.

Virtual patients at St George's are now integrated into the curriculum and available for independent study. Each week, students access a new virtual patient from the VLE, Moodle, and work in groups under the guidance of their tutor to resolve the medical issues raised by the case. The design of each case is linked closely to learning objectives for each specific part of the curriculum and introduces skills that would be required in a real-life clinical context, including the skill of synthesising information from a range of sources. In students' own time, additional virtual patients are available for independent formative assessment. In both cases, decision making takes place safely in a simulated environment in which wrong moves do not result in real-world consequences.

### **Lessons learnt**

Different approaches to the design of resources such as virtual patients may be required in different contexts; trials with students are key to ensuring that the design is fit for its intended purpose.

While the virtual patient modelling software is not difficult to use, devising the content is time-consuming and therefore expensive; expert clinicians must agree to devote their time to author content and/or check that content is accurate and up to date. Another dimension can be added through the use of multimedia elements such as sound and video; although these elements significantly increase the authenticity of the resources, they add further to the time and cost of production. The solution devised by the St George's team is to keep virtual patients relatively simple: for example, allowing only two or three wrong decisions before it making it evident that a mistake has been made.

Repurposing existing virtual patients for use in another context, although desirable, still presents challenges. There are often cultural, medical and linguistic differences between virtual patients produced in overseas universities and those generated in the UK. As a result, the number of freely available virtual patients for use in medical education remains low. However, the move towards sharing of resources as exemplified by the eViP project and the 2008 JISC REVIP project suggests that adoption of virtual patients is likely to increase in the next decade.

### **Advantages gained**

Virtual patients offer something additional to medical education: a means of developing and assessing skills that cannot be acquired or assessed in any way other than in real-life practice – the process of clinical decision making. Students are able to combine knowledge, reasoning and clinical skills in a safe environment with the freedom to learn from both 'good' and 'bad' decisions. In doing so, they acquire the confidence to manage and assess their own learning against agreed standards – one of the most important components of effective learning.

Virtual patients can even provide advantages over learning in a real-life context. Students can:

- Gain exposure to unusual medical conditions they may not experience during clinical placement

- Replay a scenario as many times they wish and pursue different options for the sake of experience
- Learn from the consequences of the decisions they make, including errors of judgement, without incurring real-world consequences

### Key points for effective practice

- **Simulations of real-world practices offer innovative opportunities for assessment and self-assessment in vocational and professional education**
- **Learners have a greater stake in their learning if able to co-design aspects of assessment and feedback**

### Learner perspective

*'We tried hard, and we still killed the patient! I will never, ever, forget that!'* Medical student, St George's, University of London

### Tutor perspective

*'Failing is a powerful tool. The richest learning experience comes from getting things wrong.'* Sean Hilton, Deputy Principal, St George's, University of London

### References

Boud, D. and associates (2010) [Assessment 2020: Seven propositions for assessment reform in higher education](#), Sydney: Australian Learning and Teaching Council  
Poulton, T *et al* (2009) '[The replacement of 'paper' cases by interactive online virtual patients in problem-based learning](#)', *Medical Teacher* 31, pp 752–758

### Further reading

Szwelnic, A. (2010) [Assessment Enhanced through the use of Technology](#), The Higher Education Academy

### Key words

Virtual patient, formative assessment, self-assessment, problem-based learning

### Links

[eVip](#) project

JISC [REVIP project](#)

JISC [Transforming Curriculum Delivery through Technology](#) programme

St George's, University of London, [Generation 4 project](#)

St George's, University of London, [Virtual patients](#)

### Reflect and discuss

How might you use technology-enhanced assessment to promote self-evaluative, active learning in your context? How can technology help design more authentic assessments so that students can develop the skills required in real-world contexts?

See also: University of Leicester, [SL-tivities for psychology students](#) (oil rig disaster simulation in Second Life®) and a podcast by [Professor David Nicol](#), University of Strathclyde