



IF WE BUILD THEM,

WHO WILL COME?

Over the past decade, medical educators have been busy creating virtual patients. Now all they have to do is figure out how to best find an audience.



Naveed Saleh, M.D.

Current medical students and recent graduates are probably all too familiar with virtual patients. A virtual patient is a computer-based patient simulation that typically takes the form of an online program with a user sitting in front of a computer screen. Virtual patients are commonly used to teach medical students and other health care providers clinical interviewing skills, bioethics, patient communication, history-taking and clinical decision-making skills.

As many could probably imagine, the topic of virtual patients is complex. But what makes the issue complicated is not only virtual patient theory and development but also the dissemination or distribution of virtual patients. Currently, the virtual patient arena is fragmented. "The virtual patient world as it exists," says Michael Saleh, senior project manager of the Association of American Medical Colleges' (AAMC) MedEdPORTAL, "is pockets of individuals and teams with highly specialized expertise."

Dr. James B. McGee of Decision Simulation, a commercial endeavor that develops and distributes virtual patient authoring software which he likens to PowerPoint for virtual simulation, notes that virtual patients can manifest a gamut of forms, from a case report to "a full immersive environment where you suspend disbelief and interact with a computer-based patient as if you're interacting with a real person."

On its cutting edge, virtual patient technology can seem a bit surreal. Terry Poulton, head of the e-learning unit at St. George's University of London, is pioneering virtual patient second-life technology which immerses the user in a 3-D interactive world. Poulton is excited about the future of such technology and predicts that someday students will be able to assume a digital clone or e-human identity as seen in the movie "Avatar."





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Today’s virtual patient cases are perhaps most easily divided into linear versus branching. Linear cases proceed in one direction and may or may not have options. Branching cases offer multiple decisions with multiple outcomes. Think of linear cases as a board game like Monopoly and branching cases as a role-playing game like Dungeons & Dragons. In Monopoly, a player progresses along a set path, whereas with a role-playing game like Dungeons & Dragons, a player makes choices that beget different scenarios with different consequences.

As with much virtual patient practice, there isn’t any definitive research that proves the effectiveness of linear cases as compared to branching, and different experts have different takes. Poulton believes that the consequences of branching cases make for a better learning experience for medical students. “Doing and failing is important,” says Poulton. “If you go down the wrong route, that is often more memorable than doing it right. Generating reasons for the failure and then moving on, that is the essence of it: the ability to make decisions and live with the consequences of that thereafter.”

Of note, at St. George’s University of London, the curriculum is designed around problem-based learning, and as one expert mentions, this means it’s easier to substitute branching virtual patients into the curriculum than in most American medical schools, where curriculum is systems-based.

Dr. Norman Berman, co-founder of the Institute for Innovative Technology in Medical Education (iInTIME), a major nonprofit developer and distributor of linear virtual patients, believes that both linear and branching patients can be effective teaching tools, but branching cases are much more difficult to create well. “Whether linear or branching is better is a really interesting, very educational psychology kind of a question,” Berman says. “They have different strengths and weaknesses, but deciding what’s better depends a lot on what you value to be better.”

“It’s very easy to make the branching stuff do some really annoying things,” says Berman, “like forcing students into loops, which tends to happen in branching. It’s much, much more challenging to write a good branching case.”

Experts contend that as an educational tool, virtual patients offer plenty of potential advantages, including the ability for students to engage in “deliberate practice.” McGee states that when a student is engaged in deliberate practice, she’s able to make decisions and get feedback on those clinical decisions in a safe environment and in a way that can be practiced over and over again in order to refine skills before progressing on to managing actual patients.

McGee also points out that virtual patients can be used to give learners a broader experience and fill in gaps in knowledge, patient exposure and skill sets. Virtual patients can teach important—potentially critical—clinical concepts that may not routinely present during the course of a clinical experience but are nevertheless important to recognize quickly and manage appropriately, such as a ruptured abdominal aortic aneurysm.

Virtual patients have their disadvantages, too. “If you’re using virtual patients because you’re modeling decision-making reasoning clinical skills in context,” says Rachel Ellaway, assistant dean of informatics at Northern Ontario School of Medicine, “they will absolutely do that. But you have to put in quite a lot of work to make sure what you’re representing is a valid, reliable, meaningful way of assessing those skills. In terms of its cost-effectiveness, it’s still questionable whether [using virtual patients is] the best way. It can certainly do it, but is it the cheapest, most efficient way?”

Additionally, medical curricula shouldn’t become overly dependent on virtual patients. “[We should] work hard to make sure that students get a broad clinical exposure,” says McGee. “We’re at a stage right now where virtual patient authoring software is becoming much easier to use. It’s just like when PowerPoint first came out: Some people are very good at making slides and, in the beginning, a lot of people needed a little bit of coaching [about] how to use the software in a productive way. And I think that’s the stage we’re in right now, and we’re working [to teach others how to properly use virtual patient authoring software].”

Furthermore, it’s unclear whether virtual patients make valid and reliable assessment tools. By 1999, the National Board of Medical Examiners vetted virtual assessment and included virtual patients in the USMLE Step 3 examination, but Ellaway says the process was very expensive, and the “details of how the system works are kept secret.”

In order to create virtual patients that suspend disbelief and evoke emotion the same way a real patient can, compelling narrative is playing a larger role in the development of virtual patients. “We’re finding that narrative storytelling is actually way more powerful than we have ever given it credit for as an educational medium,” says Ellaway. “Stories have the sense of being somehow unscientific and, therefore, medicine somehow shield away from it, at least officially.” Experts like Ellaway and McGee say that a well-designed virtual patient narrative can compare to a good novel or short story. Ellaway also explains that elements of digital gaming can be incorporated into virtual patient design in order to make virtual patients more engaging to and educational for the user.

The open-source model

Different researchers and developers of virtual patients have different ideas on how to best distribute them for use. The open-source model, which is prevalent in Europe, is a means of providing free access to both source material and finished product, thus allowing adaptation and redevelopment.

Many proponents of the open-source model for virtual patient dissemination are embracing standards developed by the MedBiquitous Consortium, a not-

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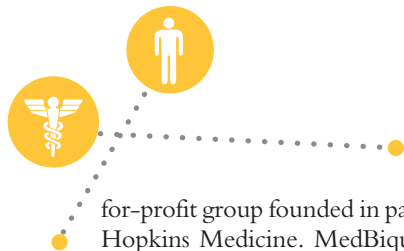
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for-profit group founded in part by Johns Hopkins Medicine. MedBiquitous provides a blueprint for professional health care education. This blueprint allows integrated access to educational resources.

In Europe, there exists eViP, an open-source repository with more than 320 virtual patients freely available to the public and co-funded by the European Commission, the executive body of the European Union. “eViP changed the nature of virtual patients,” says Poulton, who was a key player in its development. “eViP was so successful in changing the interest in virtual patients...the development of virtual patients...that really eViP became the motor across the world for virtual patient development around about 2007 to 2010.”

In the United States, we have MedEdPORTAL, which is a peer-reviewed open-source repository and publication service provided by the AAMC. MedEdPORTAL currently offers 79 virtual patients donated by various medical schools and institutions. Currently, MedEdPORTAL is in talks with eViP and would like to include eViP’s virtual patients in its repository at some point in the future.

It’s probably easiest to think of eViP or the MedEdPORTAL repository of virtual patients as “grocery markets” that offer virtual patients as “raw ingredients.” Medical educators can “shop” freely at these grocery markets, but it’s up to these medical educators themselves to figure out how to best prepare the virtual patients into a “meal” suitable for their medical students.

In addition to open-source repositories, there are also open-source authoring tools and platforms, including Open Labyrinth from the Northern Ontario School of Medicine and the Tufts University Sciences Knowledgebase out of Tufts University.

The collaborative model

The collaborative model stands in stark contrast to the open-source model and is best represented in both American and Canadian medical education. It’s the brainchild of Berman and Dr. Leslie Fall, who are founders of iInTIME, which distributes peer-reviewed virtual patients that they develop via a subscription service. Although iInTIME offers virtual patients in a variety of flavors, includ-

ing internal medicine, family medicine and surgery, it’s best known for its Computer-assisted Learning in Pediatrics Program (CLIPP), which was originally developed at Dartmouth using federal funding. Currently, almost all U.S. medical students and more than half of all U.S. residents have used CLIPP.

“The reason this [model] works,” states Berman, “is that the people who develop the virtual patients are the people who use them, so all of the authors are clerkship directors. We have 100 virtual patients authored by a hundred different clerkship directors at about a hundred different schools.... Basically every case is authored at a different school, and the collaboration that that creates is completely fundamental to the reason people adopt it.”

In addition to paying their staff, founders, authors and editors, iInTIME pours much money into the development, cataloguing, maintenance and seamless integration into the curriculum extant at many medical schools. The resulting product is a bank of virtual patients that’s readily useable by clerkship directors and faculty.

Whereas eViP or the MedEdPORTAL repository of virtual patients can be compared to a grocery market, iInTIME can be compared to a “catering service” that sells already prepared meals to medical educators intent on “feeding” their students. Even though using iInTIME’s services comes at a price, the virtual patients iInTIME serves up don’t require preparation on the part of medical educators.

Berman questions whether a free-flowing repository of virtual patients like eViP or MedEdPORTAL will ever work, since these libraries lack consistent pedagogy and organization, are redundant, and are neither vigilantly maintained nor updated. Furthermore, even if an educator were able to piece together open-source virtual patient resources to meet clerkship requirements, it would take too much time and effort.

“Our model says that their model is never going to work,” Berman says. “The reality is that educators, clerkship directors and course directors in medical education don’t have the time and, for the most part, don’t have the interest to take all these different things and put them together. The reality is that that’s

a lot more work than people recognize.... If in fact you do the work of putting all the stuff together for them, then they’ll say that this is valuable and makes sense to me.”

Open-source and U.S. medical schools

In the United States, at least, pockets of people independently working on and developing virtual patients is only one barrier to their dissemination via open-source means. Other problems include what Ellaway characterizes as a “commercially oriented” sentiment among many American researchers and what Berman calls “NIH” or the “not invented here” mindset: resistance by educators at different institutions to incorporating extrainstitutional innovation. Finally, as proven by the success of iInTIME, any viable American open-source model may require significant investment in collaboration, development, maintenance, peer review and integration that can only be provided by an institution like the AAMC, which currently only houses virtual patients created by others.

Another solution, as proposed by Ellaway, may be a mixed model (like Google), where basic access to virtual patients is free or open source and added services or consultations come at a price, in other words, starting with a comprehensive commons model and “layering on commercial services.” According to Ellaway, this initial open-source model would provide “a common set of standards and infrastructure (like railroad tracks) that commercial entities can build upon so as to keep the whole viable and sustainable.”

With advances in technology, we’ve been able to realize what was once only a medical educator’s dream: the creation of virtual patients. Ultimately, we still have more work and research to do before we can truly realize the potential of virtual patients. “I think the creation of virtual patients was the last 10 years,” says MedEdPORTAL’s Saleh. “I think the next 10 years is really going to be the interoperability, the sharing [and] the adaptation. So that arena is still to be tapped.” ■

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