# Virtual humans help aspiring doctors learn empathy

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Credit: University of Michigan

For medical student Katie Goldrath, the first time delivering difficult health news came when she had to tell a young woman named Robin and her mom, Delmy, that Robin had leukemia.

As she broke the news, Goldrath was conscious of not only her words but also her body language: Was she leaning in, looking the patient in the

eye and expressing empathy?

The conversation, though, was just for practice.

Robin and Delmy were virtual humans on a computer screen—lifelike beings that are intelligent and conversational and have the capacity to interact using a wide range of communication behaviors shared in typical face-to-face dialogue.

Such intuitive interactions could help aspiring doctors better prepare for difficult and emotionally charged encounters with patients and hospital colleagues, according to a study recently published by researchers from Medical Cyberworlds Inc. and the University of Michigan in the international journal *Patient Education and Counseling*.

"Communication is the most important part of the doctor-patient relationship," says lead author Frederick Kron, M.D., adjunct research faculty in the department of family medicine at the U-M Medical School and founder of Medical Cyberworlds, the company that developed the virtual reality program.

"We found that virtual human simulation was an engaging and effective tool to teach medical students advanced communication skills and, very importantly, that skills in the simulation transferred into a more realistic clinical situation."

Research shows that poor clinician communication skills may contribute to lower levels of patient satisfaction, poorer health outcomes, and higher risk of complaints and malpractice claims. Poor communication is consistently among the most frequently identified root causes for sentinel events in hospital settings—events that can lead to preventable patient harm or even death.

"Finding an effective way to assess and teach advanced health care communication skills has been a long-standing challenge," says co-author and U-M family medicine professor Michael Fetters, M.D.

"Medical learners have a great need for practical, innovative methods to help them master the complexities of health care communication and develop excellent communication skills—both verbal and nonverbal. Ours is the first-ever research showing that it can be done effectively with virtual reality."

Researchers addressed this challenge using revolutionary virtual human technology called MPathic-VR. This Medical Cyberworlds application allows learners to talk with emotive, computer-based virtual humans who can see, hear and react to them in real time. The virtual humans use a full range of behaviors expected between two people talking together.

The system assesses learners' body language, facial expressions and communication strategies, then uses this information to produce real-time responses from the virtual human and provide personalized suggestions based on the learners' strengths or weaknesses. Learners also see their interactions with the virtual human on video, then get the chance to apply what they've learned.

The carefully designed structure of the learning experience, including the repeat interactions, improved the students' communication skills, the findings suggest.

The study was conducted among 421 students at three U.S. medical schools. Half the group used virtual reality, half used more traditional computer-based learning.

Goldrath, now in her fourth year of medical school at Michigan, says she benefited from the opportunity to practice scenarios in virtual reality,

and the video feedback helped her understand how others might perceive her role and reactions.

"Many times, patients don't initially absorb a doctor's explanations because of shock, denial, fear or other emotions," she says. "Factors like whether the doctor was standing over you or leaning in to comfort you, or whether he or she read from a piece of paper or looked you in the eye, leave a lasting impact on the patient. These actions represent to the patient what kind of support system the provider will be to him or her during these difficult times."

Current teaching methods typically include small groups of learners and focus on role-playing with each other or with simulated patients. But this method, the study's authors note, is very resource intensive, and different trainers may lead to discrepancies between groups.

## Improving outcomes

As part of the study, students also practiced their interprofessional communication to learn the importance of effective dialogue on health care teams.

In that scenario, learners had to manage an interaction with a virtual oncology nurse who was angry that the student inadvertently omitted her from a family meeting with a patient she was caring for.

The virtual human communication system underscores the value of clear dialogue between and across health care teams in providing safe, effective patient care, the authors say.

"Health care has long needed innovative learning methods to better engage students in constructing knowledge and produce better learning outcomes," says research collaborator Tim Guetterman, Ph.D., of U-M

Family Medicine. "We are hopeful that, through our work, we have taken a significant step in that direction."

Disclosures: Frederick Kron serves as president and Michael Fetters has stock options in Medical Cyberworlds Inc., the entity receiving grant funds for this project.

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