

A special 'recipe' where PIE will get you TEE

Unique user-friendly modules developed by the Peter Munk Cardiac Centre provide state-of-the-art medical education, enabling students worldwide to learn about and develop skills in complex procedures without real patients

By **Chris Atchison**

MOST OF US ASSUME THAT WHEN A MEDICAL STUDENT COMPLETES A DEGREE IN ONE AREA OF SPECIALIZATION such as anesthesiology, that student is ready to work medical magic in a clinical setting. That's somewhat true, but with an important caveat.

Like any professionals doing complex work, doctors need time and practice to perfect their craft. But when it comes to mastering key technical skills in medicine, getting practice time can be complicated.

Simply finding patients on whom to perfect diagnostic testing skills requires a mixture of the right timing and the right cases.

"If you are working on a day when it's all coronary bypass surgeries, and there's no valve pathology, then you don't gain any experience imaging and analyzing abnormal valves," explains Dr. Wendy Tsang, a researcher, cardiologist and staff physician in the Echocardiography Lab of the Peter Munk Cardiac Centre (PMCC).

The challenge is even greater when it comes to practising procedures such as transesophageal echocardiography (TEE), where a tiny probe is fed down a patient's esophagus in order to gain a clear and unobstructed view of the heart.

An indispensable tool, TEE is relatively challenging to master, making practice time crucial for

the anesthesiologists tasked with conducting the procedure.

"You can't practise on people because sticking the probe down someone's throat isn't pleasant," says Dr. Gordon Tait, Assistant Professor of Anesthesia and Manager of Perioperative Interactive Education (PIE) at Toronto General Hospital.

"In cardiology, it's also not done commonly because you have to be heavily sedated, so the great majority of TEE is done in the operating room on patients about to have cardiac surgery."

About a decade ago, Dr. Tait took it upon himself to overcome that challenge.

His idea was simple: What if anesthesiologists had a virtual platform for practising TEE, rather than working on live patients? So the PIE team in collaboration with Toronto

General Hospital anesthesiologist Dr. Annette Vegas, Professor of Anesthesia, set out to create a virtual TEE website that would allow people to learn how to perform the procedure without patient involvement.

"My personal motivation for creating PIE was to provide a state-of-the-art, interactive medical education, free for anyone," Dr. Tait explains. "All over the world, people are using these modules as part of their training. PIE doesn't run courses, but we create resources for other people who do."

The user-friendly modules offer instructional videos and a 3-D model of the heart that users can drag and turn to view various angles and cross-sections of the organ, simulating real-world TEE. Various other modules allow students to learn about topics such as heart valve assessment, obstetric anesthesia and heart failure, while also using virtual tools to examine other areas of the body such as the liver and the spine.

The TEE Standard Views module is available in nine different languages, including English, and is used daily by over 1,500 people in 200 countries.

"The one thing I like about [the PIE website] is that it's very democratic," Dr. Tait adds. "Every country in the world, no matter how well off they are, has access to the Internet. They have the same access in India or African countries or South America as [they do] at Yale University or Johns Hopkins University in the United States.

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Because the platform is currently built in Flash Player



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01 The work of Drs. Gordon Tait, Annette Vegass, Dr. Massimiliano Meineri and Wendy Tsang involving PIE fills a major gap in helping doctors and students learn new technologies and techniques.

– the soon-to-be-obsolete multimedia software for viewing rich media on the Web – Dr. Tait is attempting to fundraise in order to upgrade the platform to HTML 5, the next generation software for playing online audio and video.

Dr. Tsang – who was a contributor to 3-D TEE imaging sections with anesthesiologist Dr. Massimiliano Meineri, Associate Professor of Anesthesia – points out that the website helps standardize TEE instruction and student experiences. And that includes showing students

of all skill levels the process in major detail, down to buttons being pushed and adjustments being made to the virtual TEE equipment in order to simulate a real-world experience.

Previously, she says, anesthesiologists or cardiologists learning TEE, or any diagnostic procedure, would be limited to the knowledge and experience of the doctor providing the instruction. The PIE website removes potential variance in the education process.

"To find the time to learn new technologies or techniques

is difficult, especially once physicians have finished their training," she says. "Trainees in smaller centres and individuals practising in the community may not be able to go or have access to a centre willing to offer them the time to learn and practise. There was a major gap that needed to be filled."

From Dr. Tsang's perspective, upgrading the technology is essential at a time when even the most complex medical instruction is migrating into the digital realm. She points to the plethora of detailed

YouTube videos demonstrating echocardiography that are free to the public as just one example.

"This is a step forward from someone thinking they have an interesting video and uploading it to YouTube," she says of the PIE website. "This has a more structured educational component.

"It also demonstrates how you can reach out to people who can't come [to your hospital or university] for training. It's free for anyone and has quality behind it. You can't necessarily guarantee that when you go online." ▽