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The WWW of e-learning: What, When, Why?

We live in a world of IT systems and electronic communication. We have PACS, HIS, and RIS, the personal digital assistant and the PC, the World Wide Web, e-commerce, and e-health. The question is, Can we use modern technology and e-learning when teaching undergraduate medical students and updating the knowledge and skills of trainee or qualified radiologists? Yes, we can. So how can we do this, and why should we do this?

Classic teaching methods will always have a place when teaching undergraduate medical students the basic principles of radiological anatomy and pathology. E-learning, however, is a very useful tool as well. In addition to improving students' knowledge, e-learning tools expose them to more imaging studies and can teach them how to analyze images of many diseases on different imaging modalities.

Most universities now use an electronic teaching platform that allows students to access course handouts, the agenda, related documents, web links, a message board forum, electronic exercises, and so on. Students can study radiology from high-quality PowerPoint presentations of their lectures, in addition to their textbooks.

Dedicated e-learning programs have been developed that create web-based electronic exercises. These provide new radiological cases for the students, helping to improve their knowledge of radiology and developing their interpretation skills. This dedicated software uses different types of questions, including the multiple choice format with one or more correct answers, sections of text where one or more words have to be filled in, and problems that require the student to indicate an anatomic or pathologic structure on an imaging study.

This type of e-learning gives students access to numerous cases. They can work on problems anywhere that has Internet access, whenever they want, and give automatic feedback.

E-learning systems can also be used to examine students. We now have more than five years of experience in e-learning and e-testing. Our department issues more than 3000 electronic examinations per year and thousands of exercises. This means that an element of radiology is present in every medical student's training, every year. The result has been an improvement in knowledge and interpretation skills. Students also ask for more cases and show significantly greater interest in radiology as a future profession.

A more interactive way of e-learning involves the teacher posting images of selected cases to students, together with a few additional questions, via the electronic learning platform. Students have a limited time, perhaps two or three weeks, to make the diagnosis and respond to the queries. They are additionally asked to discuss the cases in small groups on a dedicated radiology discussion forum. The teacher can follow their progress by reading the forum and intervene when they are having difficulties or appear to have reached the wrong conclusion.

PACS can also provide an opportunity for e-learning. Students who visit a radiology department can be shown how to use the web-based PACS application and how to access imaging studies sent on CDs from other hospitals. Being able to open imaging studies, enlarge images, adapt gray-scales, measure distances, etc., is an important practical skill. Hundreds of didactic anonymized cases can be made available on the web-based PACS for self-study during training.

The publicly accessible part of the Internet does not offer many opportunities for e-learning at the undergraduate level, except for a few sites on radiological anatomy and easy pathology. The web is a valuable resource for postgraduate trainees and qualified radiologists, however, with sites such as Yottalook (www.yottalook.com), Medcyclopedia (www.medcyclopaedia.com), and Eurorad (www.eurorad.org) providing images and articles on more rare diseases for comparison and further reading.

Many trainees and radiologists still like to buy books for further reading, despite the widespread availability of e-learning tools. Yet e-learning still has many advantages and will gain more importance in our daily practice. E-learning is certainly a giant leap forward for undergraduate teaching, and it should improve knowledge and interpretation skills, as well as increasing the interest of medical students in radiology as a future specialty. ■

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