Chapter 5
Optimizing Medical Education With Instructional Technology:
Technology to Optimize Teaching Human Anatomy

George C. Chang Chien
Ventura County Medical Center, USA

Armen Haroutunian
Advocate Illinois Masonic Medical Center, USA

Bryant England
Advocate Illinois Masonic Medical Center, USA

Kenneth D. Candido
Advocate Illinois Masonic Medical Center, USA

ABSTRACT

Technological advancements and imaging evolution in contemporary medicine continue to change the ways medical education and clinical care are delivered. Historical methods of learning anatomy through human cadaveric dissection may be supplanted by three-dimensional renderings, injection models, and virtual reality simulations. The cost effectiveness of new imaging and study modalities may demonstrate major advantages in the logistics of information delivery, cost containment, and skills development in the current healthcare environment.

DOI: 10.4018/978-1-5225-6289-4.ch005

INTRODUCTION

Cadaveric dissection is widely considered the gold standard for learning gross anatomy of the human body. In medical schools, 2-dimensional artwork as an adjunct to dissection in anatomy lab is not only an integral part of learning about the three-dimensional anatomy and the concept of anatomic variations, but also a time-honored essential of the medical education curriculum bounded by heavy ethical and moral considerations. Through dissection, a student can experience the respective tissues and structures of the human body. However, restrictions related to specimen collection, availability of sufficient teaching funds, resources, as well as arguments related to learning outcomes has produced a shift toward other ancillary learning modalities. With the arrival of the 21st century, non-cadaveric models and phantoms, computer imaging, and affordable technological advancements have changed the standard of teaching and are beginning to implement themselves in schooling and professional curricula (Brown, Adhikari, Marx, Lander, & Todd, 2012).

TRADITIONAL APPROACH

Traditionally, cadaveric dissection has been at the foundation of the paradigm for teaching human anatomy. It provides the student a first exposure to the human body and helps them overcome their inhibitions (McLachlan, Bligh, Bradley, & Searle, 2004). Through the emotionally-charged task of human cadaver dissection, the principles of anatomically-based learning become instilled and allows students to implement values that can act as a foundation for future clinical care. The initial exposure to death also acts to desensitize the students. Dissection allows for improvement of manual dexterity while providing a pathway towards understanding the 3-dimensional structures and reinforces the didactic knowledge acquired in lectures. Working in the anatomy lab also allows for collaboration and teamwork between and among student partners.

Dissection also has many disadvantages. Dissection of a cadaver does not necessarily translate to the performance of surgical procedures on a living body, because by nature a cadaver is not responsive to movements such as percussion and palpation. Dissection does not promote understanding of cross-sectional views, which is often represented by different types of imaging encountered in clinical practice. There are questions regarding whether or not preclinical exposure has any educational benefit due to the lack of problem-based learning. The financial burden of cadaveric preparation and maintenance of a laboratory with staffing can question its cost-effectiveness. Infectious pathogens such as mycobacterium, Hepatitis, HIV,