AbstractID: 12162 Title: Designing Effective and Efficient Medical Imaging Physics Learning Activities

The clinically effective and safe utilization of the medical imaging modalities requires a staff of radiologists, technologists, and medical physicists with the education and training to select appropriate technology, evaluate equipment performance, optimize procedures, and manage patient safety. Educational activities (classes, conferences, self-study, interactive experiences, etc.) to develop these competences are characterized by their *effectiveness* and their *efficiency*.

 The effectiveness of a learning activity determines outcome and the ability to perform functions as defined by the learning objectives. Effective learning is generally enhanced by providing an *enriched learning environment* that engages the learner with the imaging technology and the associated clinical activities. Elements that contribute to an enriched learning environment include clinical images, graphics for visualizing the invisible, interaction with feedback directly or through simulation, appropriate organization and structure of the engagement (concept development before quantization), and the guidance by a medical physicist as the learning facilitator. The elements and activities of the learning process should be organized to activate *specific mental functions* that collectively contribute to effective learning.

In most cases the development and conduction of a highly *effective* and enriched learning activity are compromised by issues of *efficiency*. These include availability of: qualified medical physics faculty at the place of need, limitations on time to develop educational materials, logistical constraints imposed by scheduling and conflicting clinical activities, and adequate access to the imaging technology for educational purposes.

In this symposium we will work through the general process of developing an educational activity to produce specific outcomes taking into account the issues of effectiveness and efficiency. A review of certain mental functions will provide the background for designing and organizing enriched learning environments. Applications of technology will be integrated into the design and demonstrated to enhance human performance of both the learners (students, residents) and the medical physics learning facilitators (teachers, mentors).

Learning Objectives:

1. Establish appropriate learning objectives based on the needs associated with the learning activity.
2. Understand the various functions of the human brain that need to be considered in the development of learning activities.
3. Describe the characteristics and give examples of an enriched learning environment.
4. Design a learning environment that maximizes the effectiveness of the planned learning activity.
5. Include in the design appropriate utilization of technology to increase the efficiency of learning activities.
6. Apply the design principles developed in this symposium to your specific educational programs.