Chapter 5.7
Potential Benefits and Challenges of Computer-Based Learning in Health

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ABSTRACT

Computer-based learning has been developed for the beginning medical student and the experienced practitioner, for the lay person and the medical expert. There are many advantages to online and computer-based learning when compared to traditional face-to-face courses and lectures. Information technologies are providing new opportunities for linking medical schools around the world for sharing computer-based learning materials. In this chapter, the authors present examples of actual programs that are being used to support medical education for each of these categories of learners.

INTRODUCTION

Information technology is an increasingly important tool for accessing and managing medical information: both patient-specific knowledge and more general scientific knowledge. Medical educators are aware of the need for all medical students to learn to use information technology effectively. Computers can play a direct role in the education process; students may interact with educational computer programs to acquire factual information and to learn and practice medical problem-solving techniques. In addition, practicing physicians may use computers to expand and reinforce their professional skills throughout their careers (Shortliffe & Perreault, 2001).

The application of computer technology to education is often referred to as computer-assisted learning (CAL), computer-based education (CBE), or computer-aided instruction (CAI).

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TYPES OF COMPUTER-BASED TRAINING

There are four levels of computer-based training (CBT), each based on the application's complexity and its level of interactivity with the user (Dulworth & Carney, 1996):

- **Level I. Customized Linear Presentation:** Training similar to a standard PowerPoint overhead presentation with little interactivity
- **Level II. Instructor-Led, Nonlinear Presentation:** Training by a facilitator accompanied by navigation through the information on a computer without the use of multimedia
- **Level III. Facilitator-Led Training:** A multimedia presentation accompanied by classroom-based training
- **Level IV. Self-Paced Training:** A multimedia presentation that trainees use independently with minimal assistance (also known as stand-alone training). Individuals can train at their own pace, either at an outside lab or on their own desktop computer, and complete the exam provided in the program.

Levels I, II, III, and IV are the types of computer-based training that would be most effective in addressing performance gaps among international health workers. To qualify for these levels, a computer-based training program must meet the following commonly accepted criteria (Dickelman, 1994).

- Be easy to enter and exit
- Provide a simple way to move forward and backward (i.e., from screen to screen)
- Be consistent in its key conventions
- Offer context-sensitive prompts and helps
- Provide tracking feedback (e.g., where have I been? Where am I now? How much more is there to go?)
- Offer bookmarks (i.e., quit now, resume later)
- Always offer a way out

COMPUTER-BASED TRAINING IN HEALTHCARE

In the health setting, CBT can be delivered in a preservice or in-service mode, as follows:

- **Preservice Training:** Computerized training delivered in health-education, nursing, and medical-school curricula through the use of software tutorials with or without professor facilitation, followed by examinations programmed in the computer program or given by an instructor
- **In-Service Training:** Health workers use CD-ROMs independently on their own computers for stand-alone training, meet at a computer lab where facilitator-led courses are coupled with the computer program, or attend the lab according to their own schedules and review the materials at their own pace

Research has shown that computer training is particularly well suited to visually intensive, detail-oriented subjects, such as anatomy and