Chapter XIII

Military Applications of Adaptive Training Technology

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Inside Chapter

This chapter provides an overview of the use of adaptive training technology within the military domain. Throughout the chapter, we will discuss the use of intelligent tutoring, adaptive interactive multimedia instruction, and their combination to form closed-loop adaptive training. Frequently, the discussion of a particular approach will be illustrated with one or more case-studies. Moreover, we will explore impediments to widespread adoption of these interventions throughout the military, methods to overcome these impediments, and the migration of this technology into other domains. We will conclude by summarizing trends that are likely to characterize on-going development. Rather than providing a comprehensive review of technology-enhanced learning in the military, which is likely to be outdated before it is published, the author hopes that this illustrative review will open new avenues of thought for researchers, developers, and purchasers of these systems.

Introduction

The challenges facing military trainers are manifold. Among the most vexing are:

1. The need to take large numbers of individuals from very heterogeneous backgrounds and train them to uniformly high standards of performance, and
2. The need to do so under extremely tight financial constraints.

The use of adaptive training technologies is a very powerful way of addressing these two, seemingly conflicting, objectives. Adaptive training technologies consider the current state of a learner on one hand, and the goals of the course on the other hand, to craft an individualized training plan (ITP) for each learner. The creation and management of this plan addresses the first of the noted challenges. Moreover, adaptive training approaches are often quite well suited to address the students near the center of the "bell curve" without the need of much instructor intervention. This frees the instructional staff to address the needs of the students at either end of the performance spectrum through remediation or enrichment. Moreover, focusing the staff on these more targeted interactions allows a given number of instructors to manage a larger number of students without sacrificing instructional quality. In other words, adaptive training technologies allow training commands to leverage instructional resources to cope with the second challenge, small and shrinking budgets.

In this chapter we offer an abbreviated survey of the application of adaptive training technology in military settings. We will begin by reviewing three classes of adaptive training technology. Adaptive multimedia training technology is generally used to achieve knowledge outcomes, intelligent tutoring systems are generally used to achieve skill outcomes, and closed-loop systems are used to dynamically achieve both classes of outcomes. For each category of training technology, we will briefly review the technology itself and then examine ways in which that technology has been applied in a military training context.

In the second section, we will discuss some impediments to further adoption of intelligent tutoring technology. We will review some of the cost pressures that limit adoption and then suggest ways in which a convincing business case may be produced. We will then briefly review some of the technology challenges limiting adoption and offer some suggestions on how they may be overcome.

In the third section, we will explore the ways in which this technology can transfer from the military domain to the public sector. We will first consider classroom applications of this technology. This includes typical K-12 applications as well as applications in higher education settings such as community colleges and universities. Second, we will discuss industrial applications of this technology.