Chapter 4
Augmented Reality:
Panacea or Pandora's Box?

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ABSTRACT

Augmented reality technology holds great promise for extending and enhancing users' capabilities across numerous applications in both work and personal life. It would be easy to see AR, then, as a panacea, but thoughtful design is required if the benefits are to be realized without also realizing the nascent technology's great potential for harm. Current applications in commercial, military, and education and training settings are herein reviewed, along with consideration of potential future directions. This chapter also identifies hazards posed by poor design or haphazard application and provides recommendations and best practices for those engaged in the design of AR that seek to maximize the human utility of this rapidly maturing technology.

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INTRODUCTION

Left in the care of a vessel beyond her comprehension, Pandora unleashed on the world all manner of evils and became the oft-invoked personification of the law of unintended consequences. That she did so with good intentions, seeking blessings for all humanity, makes hers an especially apt lesson for those engaged in shaping and applying emerging technologies. With each leap forward in immersive technological capability, such as augmented reality (AR), comes the promise of great reward alongside the potential for unexpected, unforeseen, and possibly harmful consequences. Like Pandora, we may find ourselves able to do – but unable to undo. Unlike Pandora, however, we are not condemned to ignorance, as our idiomatic "box" is of our own making and its contents at least partly predictable. Though we don't now and may never fully know the consequences of novel technologies and their applications, we have the luxury of time for planning and evaluation. With thoughtful design and measured implementation, we may be able to harness AR creations for greater good, reaping the benefits they afford while minimizing potential adverse impacts.

BACKGROUND

Augmented reality is an emerging immersive technology that allows people to view digital content superimposed on the physical world (Cabero & Barroso, 2016). In contrast to virtual reality (VR), which creates a self-contained world via which users are insulated from the real world, AR augments perception of the real world through digital, multisensory overlays (Milgram & Kishino, 1994). The rise of enterprise and consumer AR is as exciting as it is inevitable, and even now, in its early stages of adoption, AR has made a substantial impact in industrial, retail, and training sectors (Akçayır & Akçayır, 2017; Flavián et al., 2019). The applications are potentially limitless; for example, home mechanics may "see" as experts do, diagnosing and repairing complex automotive problems despite lacking experience. One can imagine a future in which every item purchased, and every trip taken are accompanied and guided by an augmented avatar. These are just a couple of the endless possibilities. The promise and utility of AR across a variety of applications is readily apparent, yet those adopting AR technology have an obligation to do so in a manner that maximizes benefits while minimizing risks and harm. The next section provides an overview of current AR applications in three main areas: commercial applications, education and training, and military uses, and considers challenges and complications that may lie ahead.