Chapter 3.2
Augmented Reality and the Future of Virtual Workspaces

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ABSTRACT

Until recently, Augmented Reality (AR) technology has rarely been discussed outside of the computer science world. It has taken years for this technology to become closer to a stable existence, and will most likely take several more years before it will be used by average citizens. However, the technology does exist, it has been applied in several areas, and research is being done to create even more stable systems that are adaptable to various environments. For this reason, it is necessary for decision-makers in establishments where education and training, knowledge distribution, and individual and collaborative task completion are essential to be aware of this technology, its abilities, and the possible impacts to common workspaces and workers. The purpose of this chapter is to inform decision-makers of AR's history, the completed research and current applications of AR, possible impacts to managers and workers, and the future trends of the technology.

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INTRODUCTION

As humans we have an amazing ability to use whatever items available to complete a task, and if an appropriate item does not exist, we attempt to invent a technology to assist us. For example, we understand that, although possible, it is not practical to memorize the name and location of every body of water on Earth or every mountain range. Instead, we create a drawing that represents

the location and name of every body of water or mountain range. We place this information on a large piece of paper that may be displayed on a wall, or smaller versions that may be rolled or folded for travel purposes. Then, during a task-solving situation where it is necessary for us to recall a specific locale, we check the inscription on the map for an appropriate answer. Here, the map works as a mnemonic device for solving a simple task. In the case of using a map for travel, we open our map, check our location, envision our place on the map in contrast to the destination, possibly take a few notes to assist our memory, and plan our voyage with a higher level of understanding of our location in comparison to our destinations. A document with inscribed symbols has allowed us the ability to simply recall information, or more importantly as a task-solving traveler, it has shown us multiple ways to envision our path to our destination. The information needed to solve our task, the location and possible routes, has been enhanced, and thus, so has our mind. The microscope, telescope, and x-ray machine are other examples of technologies that enhance information and allow us to better understand and conceptualize our world. Without them, we would struggle to envision solutions or possible pathways to solutions in scientific and medical applications. With Augmented Reality (AR) technology, enhancement of information in a variety of workspaces is possible.

Great technological inventions allow us to not only complete tasks in more efficient and less error-filled ways, they also allow us to "see," categorize, and understand the task at hand in multiple new ways that we were once unable to envision. Engelbart (1963, p. 1) explains his plan for a program aimed at developing means to augment the human intellect. These methods or devices can include many things, all of which appear to be but extensions of those developed and used in the past to help man apply his native sensory, mental, and motor capabilities.

Engelbart's (1963) view was to develop technologies, namely computer technologies, that assisted in augmenting the human mind. Personal computers and the Internet have followed. Technologies that augment of this sort are needed in the workplace, and this chapter discusses Augmented Reality as such a device that as Engelbart (1963) believed, can be used for "increasing the capability of a man to approach a complex problem situation, gain comprehension to suit his particular needs, and to derive solutions to problems" (p. 1).

It is imperative for those of us that research the interactions of humans, technology, and communication, or manage in industry those complex interactions, to be at the forefront of advanced technological equipment information. Augmented Reality Systems hold promise of impacting workplace environments as drastically as the Internet did in the 1990s and continue to do so today. Similarly to early publications that explained and defined the possibilities of the Internet, its impacts on education, workplace settings, and information distribution for humans worldwide, this chapter takes similar aim.

It is true that information on Augmented Reality has been contained mainly in computer science journals and in editorials forecasting new technologies in popular tech-related magazines. Because of the limited number of stable systems, the lack of widespread use in industry, and the lack of collaboration across academic departments on most campuses, information on this technology has yet to find its exit from computer science literature. However, Augmented Reality systems are being used in several areas. The military has used Heads Up Displays in fighter jets for years assisting pilots in finding targets and providing additional information. BMW is likely the most popular car manufacturer that has conducted research into how the systems may be used to assist while driving and in engine repairs. There are several examples of systems designed for use in the field of medicine. These systems provide doctors additional information overlayed on a patient's body to assist in surgery, and provide a type of x-ray vision into the patient's body. This