Assistive Technology

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INTRODUCTION

Given today's technological advancements, technology produced by one individual can easily be copied and used by others. This copying of technology is most likely a consequence of the fact that technology is costlier to produce from scratch, in terms of time and money, than it is to simply duplicate or imitate. This copying of technology can be viewed as the interaction between individuals who produce the technology and those who simply use it. This interaction can be otherwise regarded as a *producer/scrounger* game. In this game, the *scroungers* make use of the behavioral investment of the *producers* (Barnard & Sibly, 1981; Giraldeau, Caraco, & Valone, 1994). More often than not, the technology developed by producers might be copied by scroungers, thus interaction between the two can also usefully be regarded as an *individual/social* learner interaction.

In this kind of interaction, the *social learners* copy or imitate the behaviors or artifacts that have been generated by the individual learners, through trial-and-error learning, insight, or deduction (Boyd & Richerson, 1995; Enquist & Ghirlanda, 2007; Roger, 1988; Stephens, 1991; Wakano, Aoki, & Feldman, 2004). The evolution of technology, and the origins of economic growth, can thus be framed in terms of the producers/scroungers game, as well as in terms of the co-evolution of individual learning and cultural transmission, in which technology can be regarded as a suite of cultural practices. Throughout human evolution, technology is also likely to have increased the longevity of individuals, that is, its adaptability.

The purpose of this article is to examine the history of technology and its founding purposes. In so doing, this article presents the history of assistive technology (AT), the history of disability, and the Americans with Disabilities Act as it applies within the U.S. only. In other words, this article covers the state of AT in the past, present, and future in the United States, and according to Berven and Blanck (1999), how the ADA is fostering innovation and economic opportunity for AT developers, manufacturers, and retailers. The United States was chosen because it is not only a technology Mecca of innovation and the home of companies, such as Google™, Yahoo™, Microsoft™, Cisco Systems™, but an international leader in enacting legislation advocating for those with disabilities, and consequently, on the global forefront of AT. The article also addresses the relationship between AT and mainstream technology in the high-tech industry, presented from the perspective of an AT instructor, job developer, career and academic counselor.

BACKGROUND

The field of AT and rehabilitation engineering has its roots in the years following World War II. From the beginning, it was a needs-driven specialty area. The polio epidemic of the 1950s, birth defects resulting from the use of thalidomide by pregnant women in the 1960s, and injuries incurred by those who served in the Vietnam War all resulted in new forms of disability, each presented with unique challenges for accommodation. The United States Department of Health, Education, and Welfare and the Veterans Administration responded to these societal needs by forming a number of Rehabilitation Engineering Centers (RECs) around the country throughout the 1970s. The RECs typically had unique areas of specialization, which range from wheeled mobility and seating, to prosthetics and orthotics, to environmental control. A separate group of engineers and clinicians, whose focuses was on augmentative communication and computer access, also began meeting in the mid-1970s at the self-organized Systems and Devices Conferences (Hobson, 1996).

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THE HISTORY OF ASSISTIVE TECHNOLOGY AND MEANINGS

The technology Related Assistance for Individuals with Disabilities Act of 1988 as amended in 1994 and again in 2004 [Assistive Technology Act (ATA), 2004[1]; Public Law 108-364, 2004[2]] has played an important role in providing necessary technology and devices to individuals with need. The ATA (2004) defined AT devices as "any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities" (Baum, 1998; Cook & Hussey, 1995; Lupton & Seymour, 2000). This definition encompasses any device or item that helps an individual with a disability to complete tasks of daily living, and to participate in education, the workforce, and community life (O'Day & Corcoran, 1994; Seelman, 1993). AT devices may include durable medical equipment (DME), mobility devices (wheelchairs, canes, or walkers), prosthetics and orthotics, environmental controls, home modifications, and seeing, listening, and communication devices. Assistive technology is meant to improve functional independence by circumventing environmental barriers, maximizing personal independence, and increasing activity participation. This, in turn, then affords greater opportunity for societal participation and integration, including institutions of higher education and the workforce (Copley & Ziviana, 2004; Hedrick, Sugrue, Kaestner, & Loar, 2004; Pell, Gillies, & Carss, 1999). As such, the universal definition of AT is any item piece of equipment or product that is used to increase, maintain or improve the abilities of individuals with disabilities: tools to promote independence across all areas of daily living.

ASSISTIVE TECHNOLOGY: PRESENT AND FUTURE

Assistive Technology is an umbrella term that includes assistive, adaptive, and rehabilitative devices for people with disabilities and also includes the process used in selecting, locating, and using them. AT promotes greater independence by enabling people to perform tasks that they were formerly unable to accomplish, or had great difficulty accomplishing, by providing enhancements to, or changing methods of interacting with, the technology needed to accomplish such tasks (Tran, 2014). There are various AT software programs and adaptive devices that are available to individuals with various disabilities. The most commonly known and used AT software programs out in the market are: Inspiration™, Kurzweil 3000™, Dragon Naturally Speaking™, ZoomText™, and JAWS™ 11.

Assistive Technology in the Present

Presently, the U.S. has three up-and-coming AT innovations[3], the Livescribe SmartPen™, the SMART Classroom™, and Google Car. First, the Livescribe SmartPen™ is presently the latest AT device. Livescribe™ is located in Oakland, California, and Livescribe™ has developed a new low-cost mobile computing platform that enhances productivity, learning, communication and self-expression for anyone that uses pen and paper. The Echo™ and Pulse™ smartpens revolutionize the act of writing by recording and linking audio to handwriting, so users never miss a word (Livescribe, Inc. 2012). Second, the SMART classroom™, commonly known as SMART™, is designed for computer-enabled classrooms. SMART Classroom™ Suite interactive learning software provides teachers with the essential tools to manage classrooms, assess students, and encourage collaboration. SMART Classroom Suite is designed to easily integrate with your existing classroom technology and your school's wireless or wired network (SMART, 2012).

Third, the Google Car, commonly known as the Google Driverless Car, is a project by Google that involves developing technology for autonomous cars. The software powering Google's cars is called Google Chauffeur (Fisher, 2013). Lettering on the side of each car identifies it as a "self-driving car." The project is currently being led by Google engineer Sebastian Thrun, director of the Stanford Artificial Intelligence Laboratory and co-inventor of Google Street View. Thrun's team at Stanford created the robotic vehicle Stanley which won the 2005 DARPA Grand Challenge and its US$2 million prize from the United States Department of Defense (Markoff, 2010). The team developing the system consisted of 15 engineers working for Google, including Chris Urmson, Mike Montemerlo, and Anthony Levandowski who had worked on the DARPA Grand and Urban Challenges (Thrun, 2010).