CHAPTER 10

ASSISTIVE TECHNOLOGY FOR DEAFNESS AND HEARING IMPAIRMENTS

Barbara L. Loeding

INTRODUCTION

A number of assistive technology (AT) devices have been developed to compensate for hearing impairments. While ear trumpets and speaking tubes date back to at least the 1700s (Public Broadcasting System [PBS], 2001), this chapter presents information on hearing impairments and outlines the current types of AT for individuals who are deaf or hard-of-hearing (HH).

Hearing ability exists on a continuum ranging from individuals who can easily detect and interpret speech and noises in their environment to individuals who respond to auditory stimuli primarily through vibrations. Hearing loss may be genetic (inherited) or acquired through infection, physical injury or trauma, ototoxic drugs, repeated exposure to loud noises, or the result of premature birth (Morton, 1991). When hearing loss is evident in neonatal screenings, it is referred to as a congenital hearing loss. When a person develops or acquires the hearing loss later in life, it is referred to as an adventitious hearing loss. Hearing impairment often is described in terms of severity – that is, mild, moderate, severe, and profound and in terms of whether the hearing loss was acquired before the development of oral language...

Individuals with some degree of hearing impairment (mild, moderate, or moderate-to-severe) who rely primarily on their hearing for valuable information are currently referred to as HH. Population numbers vary depending on how the question is worded. According to the US National Center for Disease Control (NCDC), approximately 34.8 million adults in the US “have hearing trouble” ranging from those who reported a little trouble hearing without hearing aids to those who consider themselves to be deaf (National Center for Disease Control [NCDC], 2008), with more than half in the age range 65 and above (Mitchell, 2005). Individuals who have a hearing impairment may benefit from the use of hearing aids, phone amplifiers, and assistive listening devices (ALDs), because they typically rely on auditory signals to learn new information. Individuals with a profound level of hearing impairment are typically referred to as deaf. In 2005, in the United States, there were nearly 1 million individuals who were functionally deaf; of this number, 400,000 are children (Mitchell, 2005). People who are deaf rely primarily on their visual modality to communicate and learn new information. Visual means of communication can involve facial expressions, gestures, sign language, and/or speechreading. Speechreading (commonly known as lipreading) refers to the use of visual cues from the lips, tongue, lower jaw, and facial expressions to supplement any residual hearing ability the person may have to figure out what is being said. Individuals who became deaf early in life are more likely to identify with the deaf culture than are individuals who are HH or individuals who lose their hearing late in life. Many individuals who are deaf communicate using American Sign Language (ASL) in the United States or its equivalent in other countries and have developed a unique history and culture consisting of famous deaf individuals, organizations, signed theater, jokes, idioms, and signed stories passed along from generation to generation (Gilliam & Easterbrook, 1997; Padden, 1989). Because of this rich history, members of deaf culture do not view deafness as a pathological condition; consequently, they do not view themselves as impaired. These individuals are more likely to benefit from AT incorporating a visual aspect, such as captioned television, the texting feature of cell phones, teletypewriters – TTY, also called telecommunications devices for the deaf (TDD), videophones, and webcams. A technology-related challenge for Deaf individuals is the increase in interfaces that rely on voice input (Loeding B., Sarkar, Parashar, & Karshmer, 2004).