

# Technologies for the Deaf and Hard of Hearing

Mada Center

Those who are deaf or hard of hearing often have several limitations in their daily lives in accessing technology. It is difficult for the deaf or hard of hearing community to communicate and perceive information compared to hearing people.

To receive and communicate information, people with hearing difficulties often rely on visual and tactile devices. The use of assistive technology provides this community with various solutions to their problems by providing higher sound (for people with hearing difficulties), tactile feedback, visual information and improved access to technology.

Assistive technology for the deaf either amplifies the sounds around the person or amplifies a specific sound that interests the person, or it provides an alternative way for accessing the information via vision or vibration. These technologies can be divided into 3 main categories:

1. Technologies that improve hearing.
2. Technologies that alert the individual.
3. Technologies for communication.

## 1. Hearing Technologies:

Hearing Assistive Technologies are the types of technologies that amplifies the sound around the person with a hearing difficulty. Hearing aids may have a telecoil to receive electromagnetic signals. When a person switches his hearing aid to a telecoil by pressing a button on the hearing aid, he or she can hear any signal transmitted via an induction loop, and they can be categorized further into:

### A. Assistive listening devices:

These includes induction loops that are used in public places like theaters, classrooms, meeting room, etc. For example, there are several venues that are looped, meaning that there is a large wire surrounding an area of seats that is connected to the sound system of that venue. So as long as the person with the hearing aid is seated inside the loop and the hearing aid is switched to the telecoil program, he or she will be able to hear the broadcasted signal clearly and comfortably. The person with hearing difficulty may also purchase a loop system to work with his television at home.

### B. Personal amplifiers:

Hearing aids provide great benefits in many environments, but sometimes the person will be in an environment where hearing aids cannot solve all the hearing problems. Situations where there is a lot of background noise or situations in which

the person has to hear across a large distance can be difficult for some even with hearing aids. Personal listening systems are useful in these situations to help the person hear the entire intended signal without the majority of the background music.

Personal listening systems can be used with the hearing aids by using a remote or neck loop system that communicates with the hearing aid directly, or without the hearing aids using headphones. Personal listening systems involve the speaker wearing a microphone that will transmit his or her voice to the hearing aid user with minimum interference.

## **2. Alerting Technologies:**

Alert systems can be used to notify you or your deaf child when action is needed. If someone rings the doorbell or if a smoke alarm has been activated for example, alert systems can be used to notify you. Depending on your preference, notifications range from flashing lights, vibration, or auditory.

Popular notification events may include phone or video call alerts, doorbell, baby cry, weather, smoke detectors and carbon monoxide alarms. Most of the mainstream mobile phones nowadays have built in alerting systems for deaf and hard of hearing people, and there are some applications on the app store that work with mobile phones and record some popular voice around the person and an alarm will be activated when that sound is detected. In addition to mobile phones, there are also smart watches and bracelets that are used by people with hearing loss as alerting devices.

## **3. Communication support technologies:**

The improvement of technology has eased the way people communicate, and for the deaf community, technology helped them communicate with each other and with hearing people. Following are some technologies used for communication by deaf and hard of hearing people:

### **1. Video Relay Services**

Video Relay (VRS) or Video Remote Interpretation (VRI) is a type of video telecommunication service that uses communication devices such as webcams or videophones to provide sign language and/or voice interpretation services.

In many cases, it may take some time to get an interpreter and they may not be available immediately. On the spot, the VRI will be providing an interpreter. The VRI has two parties, the deaf/hard hearing person who uses the VRI, and the on-screen interpreter.

The interpreter can be on a computer screen, videophone, web camera. The interpreter will use the audio while someone is speaking and the person is interpreting sign language to the deaf person, and then if the deaf / hard of hearing

wants to say something they will sign to the interpreter and the interpreter will use his / her voice to relay the message.

## **2. Real-Time Text**

Real-time text (RTT) transmits text that can be immediately read by the reader even before the sentence is finished. This is one of the ways the Deaf community uses to communicate. RTT enables the other person (receiver) to read the message immediately without waiting for the message to be written. The speaker will speak on an ongoing basis without interruptions and pauses. For a continuous conversation, the Deaf community uses RTT. TDD devices, sometimes called TTY devices, are commonly used for RTT via a regular phone call. Text over IP (VoIP) is a type of RTT that uses IP networks natively.

## **3. Sign language robots and bots**

There are couple of robots and bots in the market that make communication with deaf people easier. Some Robots and Bots were developed specially to teach children sign language. There are some bots which are used on websites or apps to communicate text messages by converting them into sign language using a library stored locally or on the cloud. One example is “Bu Hamad” a Qatari real-time sign language interpreter avatar.

“Mada” supports leading Arab technology initiatives to develop solutions that serve people with hearing impairments. Individuals with hearing impairments demand for technological solutions that support Arabic sign language. One of these solutions is the 3D technology called “Avatar”, which was used to develop the virtual character “Bu Hamad” with the support of Mada Center.