



Helping the Vocally Impaired Speak in Their Own Voice

Thanks to voice banking, digitized speech retains the essence of the original speaker

Fran Drescher. Winston Churchill. James Earl Jones. My grandma. With the exception of my grandma, you'd probably recognize each of these voices just by hearing them. And if you knew my grandma, you'd recognize hers, too.

Each person's voice is distinctive, offering a glimpse into the identity of the speaker, so much so that we can use our voice for biometric authentication.

"Our voice reveals so much about us—where we grew up, where we were educated," says Julia Nicholls, speech-language pathologist and professor at California State University, Los Angeles. "We use inflection to convey interest, enthusiasm, passion, pain, disappointment."

When we lose our voice, we lose the ability to show others these very personal characteristics. It changes the way people interact with us, the way they prejudge us. It's why it's so important to have meaningful options to preserve our voice when it is at risk of disappearing.

It is difficult to extrapolate the number of people in the United States who require augmentative and alternative communication (AAC) devices because, while there are an estimated 40 million Americans who have communication disorders, not all of them require assistive technology.

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Approximately 20,000 to 30,000 people in the United States have amyotrophic lateral sclerosis (ALS) at any given time, with an estimated 450,000 people living with the disease worldwide.

ALS is a progressive neurological disease resulting in the death of neurons that control voluntary muscles such as those used for talking, so most people with ALS will eventually lose the ability to speak. So will most of the estimated 53,000 people in the U.S. who will be diagnosed with oral and pharyngeal cancer in 2019.

Communication disorders cost the U.S. an estimated \$154 billion to \$186 billion annually. Intervention is likely to be more effective and less costly—and the sooner it is provided, the greater the benefit.

Yet, synthesized voices, those that use computer-generated speech, sound, well, computery. And they certainly aren't individualized to the user. That's where voice banking comes in.

Voice banking is a process where the person who risks losing his voice records a series of phrases, which are then

used to create a digitized voice. While the digitized voice may not sound exactly like the user, it keeps the essence of the original voice in terms of timbre, accent, and intonation, sounding much closer to the person's actual voice and allowing the user to engage in social interaction and maintain greater independence.

Because in many cases it is impossible to know who will lose the ability to speak, voice banking is an insurance policy. Ideally, voice banking should occur when speech and voice is totally normal, but the aftermath of the diagnosis can be chaotic; voice banking may seem an easier decision to defer.

"Digitizing a patient's voice is often more important to family members than to the patient himself," says Naomi Weiss, speech-language pathologist at the Cedars-Sinai ALS clinic. "The person who's going to miss hearing your voice is your wife, your kids," adds Heather Thompson, speech-language pathologist at the Cedars-Sinai head-neck cancer unit.

Weiss starts by asking her patients what they understand about their diagnosis and prognosis to get a feel for how receptive they might be to voice banking. "It often depends on their coping skills and how they received the news."

"ALS takes so much away from you," Thompson says. "I can't make you walk. I can't give you your voice back. But I can preserve it; your voice is the one thing ALS can't take away from you if you do this."

A handful of companies offer voice banking services. Cerproc and Acapela let people try banking their voices before they are required to pay, while prices to begin the process range from free at Lyrebird.ai to \$1,499 at VocalID.

All of the voices banking services except for Lyrebird are compatible with PRC and Tobii Dynavox AAC devices and eye tracking software. Lyrebird is currently only available directly from its website. While AAC devices may be covered by insurance, voice banking is not, but organizations like the Gleason Foundation assist with funding.

These therapists agree that the quality of the voices is fairly uniform, but believe that shortening the enrollment process; allowing all bankers to record at no charge, paying only when they are ready to use their digitized voice; and encouraging insurers to cover the cost of voice banking would go a long way to accelerate the use of this transformative technology. ☒

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