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Interactive Amplification: One Step Closer to the User?

Tao Jiang, MicroDSP Hearing & Speech Lab; **John Moulton**, MicroDSP Hearing & Speech Lab; **Jungang Lin**, MicroDSP Hearing & Speech Lab; **Shixiong Xia**, MicroDSP Hearing & Speech Lab; **Xiaofang He**, MicroDSP Hearing & Speech Lab

Abstract:

Since 1996, digital technologies have transformed hearing aids in rehabilitation. Three stages of this evolution are identified: from dynamic transformation of analogue amplification to automatic development, and then to interactive technology today. A parallel path is seen in the roles of audiologists and the hearing impaired in fitting and using hearing aids. To understand the features of each stage helps clinicians maximize the advanced technology to the best of people with hearing loss.

Summary:

With the advent of the first digital hearing aids in 1996, we have witnessed an explosive development of hearing aid technologies in aspects of chip performance, design philosophies, real world applications and more importantly user acceptance. The latest data show that digital hearing aids have taken over 95% of the market, significantly having improved the user satisfaction. While in the past it took more than 10 years to launch a new hearing aid, today in comparison it has been reduced to less than 6 months to release more new instruments than expected. Another example is how the name of hearing aid is being interchangeably mixed up with others like hearing system which is believed to better reflect the functionalities and structures.

The technological advancement has transformed many aspects of fitting, verification and using, thus significantly influencing how amplification is viewed in the eyes of not only hearing professionals but also the hearing impaired. Therefore, it is of paramount importance to review

this fast and eventful process of evolution so that we can better appreciate new technologies and more effectively help our patients take the advantages of them.

The three stages of digital amplification development began in 1996, as the Dynamic Transformation of analogue amplification simply because all the traditional functions were digitally replaced and new features added on, such as noise reduction and feedback control. The most important development was the change of linear to nonlinear amplification using a series of digitally supported strategies from WDRC processing to DSL fitting. Its ending was marked by 63% of user satisfaction.

The second stage, the Automatic Development, was to tackle one of the greatest frustrations of users: understanding speech in noise, the problem clearly identified by MarkeTrak VII. From 2004 to 2006, the performance of digital amplification has so much improved that it can effectively address the real world problems vs. lab experiment. Multichannel directionality, various sound processing strategies, real time feedback management, datalogging and many others have made automatic amplification possible. Contextually based program switches and environmentally variable signal processing allow the user to focus on listening in noise without extra effort. Automation in amplification has altered user habits with the satisfaction rate up to 77.5%.

From 2006 onward, communications have continued to go through revolutionary changes thanks to internet and wireless technologies. Multimedia connection and accessibility have created a new amplification: the Interactive Technology. In this stage, the hearing system can learn to adapt to specific use patterns or communicate between two ears. Above all, interaction has turned amplification into part of extended sensory processing organs for the hearing impaired; consequently, it is possible now for hearing systems not to be viewed as a stigma symbol of disability but a way of active communication. As clearly seen above, the three stages of digital amplification evolution are marked by the increase of user satisfaction and also fitting strategies. Therefore, this paper will fully illustrate the outcomes of technological advancement in hearing aids along with their influence on the real world use.