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ABSTRACT

The Communications Aids Lab at the National Technical Institute for the Deaf was designed for training the hearing impaired to participate in various telephone communication situations through the use of special equipment and learned strategies of communication. Approximately 44% of the students, having non-functional hearing and unintelligible speech, were trained to use visual telephone equipment; while the 22% having good speech and language skills with a limited range of hearing were taught to use auditory codes. Thirty-three students (approximately 25%) with potential to use the standard telephone were tested in the areas of hearing discrimination, average hearing level, frequency range of hearing, speaking ability, and English skills; and were enrolled in a third special course. These students were taught (1) to analyze their problems on the telephone; (2) to overcome those problems with six specific strategies such as asking for repetition of information and spelling of names; and (3) to gain confidence through use of the strategies in telephone practice with strangers. By the end of the course, 15% of the students were able to communicate using one or two strategies, 73% by adding one or two more strategies, and 12% relied on all six strategies. (IM)

TELEPHONE TRAINING FOR SELECTED DEAF STUDENTS

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For more than 100 years, young deaf people have been encouraged to develop speaking and listening skills as a way of communicating in a hearing world. Now, there is a new communication skill that can help deaf people in their job and their everyday life: the ability to use the telephone. Because the telephone is such an integral part of daily living, we at NTID are looking at ways deaf people can overcome telephone communication problems.

The Communication Aids Lab was designed with that thought in mind. There are eight individual telephone training stations. The Lab has three telephone booths; one has a pay telephone, two are for teleprinter equipment. A Vistaphone lets you see the person you are telephoning on campus. The Lab was built especially for the courses at NTID, and there is no room like it anywhere in the world.

Our objectives focus on innovative techniques to enable deaf people to participate in various telephone communication situations at work and socially. Not every deaf student at NTID can use the standard telephone because communication abilities may be different. For that reason,

three courses have been designed to focus on visual, coded, and acoustic telephone communication.

Approximately 44 percent of the NTID students have non-functional hearing and unintelligible speech. These students may take a course that trains them to use telephone connected equipment that presents a visual form of the telephone conversation. The equipment frequently used by deaf people includes the TTY, MCM, TV phone, and Magsat. In addition, students learn that many hearing people are using special equipment such as the Electrowriter to transmit written messages over the telephone. Also, vibrotactile paging devices make it possible to contact a deaf person by dialing a special phone number.

Approximately 22 percent of NTID students have good speech intelligibility and good language skills but a limited range of hearing. This group of students can be understood on the telephone but would not be able to understand the conversation spoken by the other person. The course would introduce these students to all of the devices mentioned earlier as well as training in use of restricted auditory codes for limited telephone communication, such as the use of a yes-no code that depends on phrasing appropriate questions.

A third course is for students who are capable of using the standard telephone. As a group they have good speech intelligibility and good language skills. They are highly motivated toward using the standard

telephone rather than other devices. Approximately 25 percent of our students have the potential communication skills to enroll in this course. Many of these students use the standard telephone for calling family or close friends. However, most of the students lack appropriate strategies to help them give and receive accurate information when talking with strangers. The students realize that the use of these varying strategies requires varying units of time.

This paper will focus on that group of students who can use the standard telephone for oral/auditory conversations.

LISTENING ON THE TELEPHONE

There are 2 pieces of equipment that will help deaf students succeed on the telephone: 1) their hearing aid, and 2) an amplified handset. Many hearing aids incorporate a special telephone setting. All students who used their hearing aid on the phone preferred to use the telephone setting.

Each telephone in the lab is equipped with an amplified handset that can increase the loudness of the incoming voice as much as 25dB. When the volume control on the amplified handset is set at minimum, it is comparable to the standard handset. A portable slip-on amplifier offers a convenience factor to the student who wants to be able to use different telephones without installing a built-in amplified handset.

During the course a student is able to compare both types of amplifiers in relation to his telephone needs. Ninety-five percent of the students consistently depended on the amplified handset for telephone communication.

COURSE REQUIREMENTS

When students first enter NTID, they receive a series of performance tests to determine their general expressive and receptive communication skill levels in various areas. In relation to telephone communication, these tests tell us how well the student can understand speech through hearing only and how well the student can be understood by the general public.

Which factors contribute to potential success on the standard telephone? The five areas taken into consideration were hearing discrimination, average hearing level, high frequency residual hearing, speaking ability, and English skills.

HEARING DISCRIMINATION

On the telephone, the student has to learn to depend on auditory information alone. Hearing discrimination is the ability to understand speech through hearing only. This kind of information should suggest whether a hearing impaired person could be successful in getting a message over the telephone. Preliminary data analysis suggests that hearing discrimination is significantly correlated with amount of time it takes a student to successfully understand the message over the telephone.

AVERAGE HEARING LEVEL

The pure tone average at 500, 1000, and 2000 Hertz describes the hearing level in each ear. Preliminary data analysis for students who have taken the course suggest the more profound the hearing loss the more it will interfere with understanding the telephone conversation.

FREQUENCY RANGE OF HEARING

According to the Bell Telephone Laboratory, voice communication is transmitted over telephone lines within the frequency bandwidth of 200-3450 Hertz. This information suggests that students selected for training should respond to sound within that range in order to understand what others are saying. A more limited frequency range could suggest a limited understanding of the information coming through the phone. To date only a small number of students who have taken the course had a limited frequency range. We are continuing to gather data on the importance of this factor.

SPEAKING ABILITY

How well a student is understood by strangers over the telephone reflects his speech intelligibility for that type of communication. Factors such as loudness, rate, respiration, quality, and prosodic features impact on that listener unfamiliar with a deaf talker. In addition, the percent of consonant and vowel errors play a role in speech intelligibility.

ENGLISH SKILLS

Students are asked to take several English tests at the beginning of the course to suggest how well they would use English in telephone conversations with strangers. Students who can express their ideas in acceptable English or with some word ending or article errors have appropriate language skills for the course. Students who express their ideas with more severe grammatical errors will have difficulty expressing themselves spontaneously on the telephone.

COMMUNICATING OVER THE TELEPHONE

It is easier for most deaf people to understand family and friends on the phone but more difficult to understand a stranger. Many hearing people have problems understanding a stranger over the telephone, too. But, when the information is repeated or spelled, a hearing person will understand what is said. When a deaf person doesn't understand information said by a stranger, there is a great deal of frustration for both parties. Sometimes a stranger will say "Yes" or "That's right" when the deaf person has the wrong information. Sometimes a stranger will hang up. Hopefully, if a stranger understands about the hearing problem, he may be more patient during the conversation. For that reason, each student is encouraged to tell a stranger at the beginning of the conversation that he is hard-of hearing.

A deaf person needs special training to be successful in telephone conversations with hearing strangers. There are 3 goals for the course:

1. To help the student analyze his problems with strangers on the telephone;
2. To teach the student strategies to overcome those problems; and
3. To give the student confidence in using those strategies through extensive telephone practice with strangers.

ANALYZING THE PROBLEM

There are many different problems that can cause a communication breakdown on the telephone. Deaf students tend to categorize their problems with strangers on the telephone:

The stranger talks too fast or too softly.

The stranger's voice is too high pitched or too deep.

The stranger has an accent.

A word, a number, or the sentence is not understood.

There is too much noise.

There is a bad connection.

However, the deaf person tends to be less aware of the kinds of problems hearing people have in understanding them. Here are some reasons for their problems:

The deaf person may use a soft voice.

The deaf person may talk too fast.

The deaf person may use poor articulation.

The deaf person may use the wrong pronunciation.

The deaf person may use incorrect English.

The deaf person may talk when noise interferes with the conversation.

The deaf person may talk while hearing aid feedback occurs.

Each deaf person needs to be honest with himself about how well he can be understood by a hearing stranger. To be able to solve any of these problems, the deaf person must know the reason for the communication problem early in the conversation.

STRATEGIES FOR THE DEAF PERSON

The telephone operator understands that words, letters, and numbers can be misunderstood over the telephone. The telephone limits the range of speech sounds that can be heard. That is why the telephone operator uses five methods to be sure information is clearly understood over the telephone:

Information is repeated.

Names are spelled.

Code words are used to help understand the spelling.

Questions are asked about the information.

Numbers are said individually.

The deaf person needs to use some of these same methods for successful telephone communication.

A strategy is a plan or method for reaching a goal. The plan will be different for each student, but the goal will be the same: to have a smooth telephone conversation with no mistakes in understanding the information and no frustration for either person. These strategies can

help the deaf student succeed in giving and getting information over the telephone with strangers. Obviously, the more strategies that are needed the more time it will take.

Strategy Name	Explanation
REPEAT	Say it again
SPELL	Say each letter in the word
CODE WORDS	Use a familiar word that starts with the letter spelled
ALPHABET	Say the alphabet until you reach the correct letter
DIGIT	Say each number individually
KEY WORD	Spell the important word in the sentence

In order to use the strategies effectively, the students must be able to analyze the reason for the specific communication problem. Each student works with the instructor individually on the telephone. Together they try to analyze the specific problems encountered during telephone conversations and which strategies appear to be effective. Students are discouraged from consecutively using the same strategy again and again. Instead, the student needs to learn when to shift to another strategy that gives more specific help.

DEVELOPING CONFIDENCE

Many students call the Lab a "confidence room" because they develop confidence in their ability to communicate over the telephone. The confidence is achieved through frequent use of strategies on the telephone with strangers. Using the telephone directory as a guide, students are encouraged to do comparison shopping and to obtain various kinds of service or product information as a means of practice. The phone calls are made in the Lab with the instructor listening to the conversation on an extension phone. When the call is over, the student and instructor compare notes on how well the information was understood. In this way, each student has an opportunity to build confidence in himself and in his ability to obtain correct information with the use of appropriate strategies.

WHICH STRATEGIES ARE MOST HELPFUL?

Strategies help the student succeed in receptive and expressive telephone communication. Each student needs his own sequence of strategies in the event his first or second attempt at giving or getting information fails. The absence of a hierarchy of strategies creates problems for the deaf student. When a student says "pardon me" or "I don't understand", he is not explaining what the other person should do to solve the communication breakdown. However, when a student says "Was that 5, f-i-v-e?" or "Was that B as in Baseball?", he is demonstrating a method that can be followed by the other person.

Repeat and spell are used most often by students when trying to understand the other person. When a student knows he has difficulty discriminating among certain letters over the telephone, he relies on code words. For example, some students tend to confuse the letters d and e, t and v. In addition, the students rely on digits when they are faced with commonly confused numbers such as 15 and 50; 50 and 60; etc. As a group the students do not have as much trouble discriminating among numbers as they do understanding words. By the end of the course, each student has selected a sequence of strategies to aid his success in telephone communication. Table 1 shows the strategies used by students.

Table 1. Strategies used by students (N=33) in their telephone conversations with strangers.

% STUDENTS	STRATEGIES
15	Repeat and/or Spell
73	Repeat, Spell, Code Words, Digits
12	Repeat, Spell, Code Words, Alphabet, Digits, Key Word

By the end of the course 15 percent of the 33 students were able to understand information on the phone when using the strategies of repeat or spell. This group of students took less time to understand the message and needed to use the strategies less often than those who used more strategies.

Seventy-three percent of the students added the strategies of code words and/or digits. The amount of time it took to understand the information depended on how often during the conversation they used each strategy.

Twelve percent of the students depended on the multiple strategies of repeat, spell, code words, alphabet, digits and key word. These students had to use each of the strategies more often and therefore it took more time to understand the information. Despite these limitations they wanted to be as independent as possible in their telephone communication.

At present, data are being collected to determine the relationship among the strategies used and the communication skills of the students.

IMPLICATIONS FOR TELEPHONE COMMUNICATION ON THE JOB

Students who use appropriate strategies during telephone communication will obtain accurate information but at the expense of the time involved. The need for combinations of strategies will increase the amount of time it takes the deaf person to understand the message. For certain jobs, telephone communication must be rapid and encompass an unlimited range of information. Only a small percentage of students can give and get critical information on the phone without the use of repeat, spell, or code words to verify some item.

In other jobs, telephone communication is restricted to a very limited set of information without any time pressures. Most students who can

use oral/auditory telephone communication can give and receive information under these circumstances because time is available for any combination of strategies.

Perhaps there are many jobs for which our students train where the time and message demands in relation to telephone communication could be analyzed. If students were aware of these varying demands, each could determine for himself his ability with respect to telephone communication on the job. Hopefully, we can begin to demonstrate how the telephone or various telephone connected devices can help the deaf employee fulfill the requirements in his job description rather than restrict his job. Here is another area in which there are opportunities to break down some of the barriers related to employment of deaf persons.

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