

# **Auditory Training Systems: A Survey**

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## **Introduction**

Effective rehabilitation of the hearing handicapped involves coordinated programs of speech and language training, speech reading, counseling and auditory training. The extent to which a person benefits from such a program, however, depends partly upon the amount of residual hearing that person has, his ability to use amplification and the performance characteristics of the amplification system used.

Traditionally, amplification systems for the hearing handicapped would include the individual hearing aid and, for auditory training, the group amplifier, portable auditory training, the group amplifier, portable auditory trainers and magnetic induction loop systems. More recent developments in the instrumentation of auditory training units include radio frequency amplification systems and wireless transmitter-receiver systems.

The purpose of this study was twofold; first, to identify those amplification systems that are being used presently by programs for aural rehabilitation and second, to obtain subjective evaluations concerning the performance of these electronic systems.

## **Survey**

The following material represents the results of a survey in which 108 administrators of programs for the hearing handicapped were questioned regarding their use of auditory training equipment. The programs surveyed were chosen from the 1971 Directory of Educational Services of the American Annals of the Deaf and were limited to those located in Illinois, Indiana, Michigan, Wisconsin, Iowa, Ohio and New York. Each administrator was sent a two page questionnaire, and 77.7 percent (84) were returned.

## **Results**

Each participant was asked to identify the type of program that he was coordinating. This information and the number of each type represented in the survey responses can be seen in Table 1.

**Table 1**  
**Programs Identified In The Survey**

<i>Type of Program</i>	<i>Number of Responses</i>
Day School for the Deaf	
Public.....	65
Private.....	8
Residential School for the Deaf	
Public.....	4
Private.....	0
Aural Rehabilitation Center	
Public.....	4
Private.....	3
Other Programs .....	0
	<b>84 Total</b>

A count of students represented in the survey return revealed a population of 6,702, all of whom were reported to have been fitted with individual hearing aids. A computation of the number and type of hearing aids used by these students can be found in Table 2.

**Table 2**  
**Hearing Aids Reported In Use**

<i>Type of Aid</i>	<i>Percentage In Use</i>
Conventional (Body Worn) Hearing Aids.....	67.5
Ear Level Hearing Aids .....	25.2
Other i.e., (Binaural, CROS) .....	7.3

In response to the question, "What type and make is the auditory training equipment used in your program?", 98 percent of the respondents indicated a combination of models. The remaining stated only a manufacturer. Of the 98 percent, the vast majority indicated the use of either loop systems or radio frequency wireless systems. Systems in the order of frequency reported appear in Table 3.

**Table 3**  
**Auditory Training Equipment Most Often Reported**

<i>Type of System</i>	<i>Percentage Reported</i>
R. F. Wireless Systems.....	43.1
Induction Loop Systems (ILA).....	27.3
Loop Systems (FM) .....	20.8
Group Auditory Trainers .....	6.4
Portable Auditory Trainers .....	2.3

The systems listed in Table 3 are defined as follows:

1. **GROUP AUDITORY TRAINER**—The group auditory trainer commonly called a “hardwire” system consists of a power amplifier with microphone and auxiliary inputs. The output stage consists of several receivers for use in group training. These receivers are usually coupled to stationary control units where students can adjust both volume and tonal quality.
2. **PORTABLE AUDITORY TRAINER**—The portable auditory trainer is a transistorized unit with a small battery operated amplifier. One or two microphones are coupled to the amplifier with a set of headphones attached to the output channel.
3. **MAGNETIC INDUCTION LOOP SYSTEM**—This system requires the use of an individual hearing aid containing a tel-coil circuit. Magnetic loop systems or “ILA” systems use a power amplifier that transmits magnetic induction signals through a loop of wire which is usually installed around a small classroom. The tel-coil circuits contained within the individual hearing aids detect these signals and conduct them via the hearing aid system to the ear.
4. **RADIO FREQUENCY SYSTEM**—Radio frequency systems are similar to ILA systems with the exception that high frequency (FM) radio waves are transmitted through a wire loop antenna. These signals are detected by the receiving unit worn by a student and are converted by that unit into acoustic signals.
5. **WIRELESS RF SYSTEM**—These systems utilize a wireless battery operated transmitter microphone. Its operation is similar to that of the RF loop system.

Responses to the question, “What percentage of your school day is involved in the use of auditory training equipment?”, indicated that the majority of programs rely heavily on the use of their equipment. (See Table 5).

**Table 5**

Percentage of Daily Use of Auditory Training Equipment

<i>Programs</i>	<i>Percentage of Daily Use</i>
Day Schools.....	75 (approx.)
Residential Schools.....	75 (approx.)
Aural Rehabilitation Schools.....	45 (approx.)

Each survey participant was asked, “How long have you had this equipment?” Most respondents estimated the time in service and the results are listed in Table 6.

**Table 6**  
Average Number of Years of Equipment Use

<i>Programs</i>	<i>Equipment</i>	<i>Average Use</i>
Day Schools	Hardwire	10 Years
	ILA	8 Years
	FM	3 Years
Res. Schools	Hardwire	15 Years
	ILA	8 Years
	FM	3 Years
Aural Rehab. Cntr.	Hardwire	8 Years
	ILA	6 Years
	FM	1 Year

Responses to the question, "Does this equipment hold up well under general use?", indicated that 87 percent of the respondents felt that their equipment did and 8 percent did not. The remaining percentage made no response to this question.

Responses to the question, "What has been your your experience with respect to frequency of repair of your equipment?" indicated that 93 percent stated they had what they considered to be more than a normal number of repairs on their units.

In response to the question, "Is your equipment more useful in group or individual training?" the majority of respondents indicated more usefulness for group training. (See Table 7).

**Table 7**  
Type of Training Situation in Which Auditory  
Training Units Were Found Most Useful

<i>Program</i>	<i>Response</i>	
Day School.....	Group	90 percent
	Indiv.	10 percent
Residential School.....	Group	75 percent
	Indiv.	25 percent
Aural Rehab. Center.....	Group	30 percent
	Indiv.	70 percent

In response to the question, "Is the power output of your equipment adequate for your student's needs?" 90 percent gave a positive response while only 7 percent indicated some dissatisfaction. The remaining percentage made no comment. There were some reports of children, however, who did not benefit from the units regardless of make or power output.

Orientation to the operation of the auditory training equipment was reported to have been received from a variety of sources. A salesman oriented 77 percent of the respondents to the operation of the equipment, whereas, 15 percent stated that they taught themselves. Only 8 percent were given some instruction by some other teacher, technician or audiologist.

The final question of the survey asked, "What design improvements would you like to see in auditory training equipment from a teaching or therapy standpoint?". No answer to this question was obtained from 8 percent of the respondents. The remaining 92 percent submitted suggestions and improvements that were quite similar. These responses were concerned primarily with improvements in unit design for increased comfort and durability. Such suggestions as "elastic straps for harnesses," "stronger cords," "lighter and smaller wearable units" were common remarks. A few comments were made concerning electro-acoustic characteristics. Some individuals requested increased fidelity, others asked for systems that provided binaural amplification.

The majority of respondents made additional comments regarding the price of auditory training systems. Many were critical of the expense for such units.

### **Discussion and Conclusion**

The auditory training systems identified in this survey varied considerably in terms of design and operation. However, the majority of respondents reported very little difficulty in operating the various systems.

It is readily apparent, based upon these results, that radio frequency units are the most popular systems in present use. This is not surprising, especially in light of the number of recent developments in the field of electronics.

More important than this, however, is that the majority of respondents reported few complaints concerning the performance of their systems. These findings would indicate that auditory training systems of the types identified in this survey are providing satisfactory service.

As aural rehabilitation programs continue to develop and the use of auditory training systems increases, both objective and subjective methods of them should be developed and utilized to assess the adequacy of the instrumentation. In this way professionals, manufacturers, and most importantly, the hearing handicapped, can be assured of reliable auditory training systems.

### **REFERENCES**

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