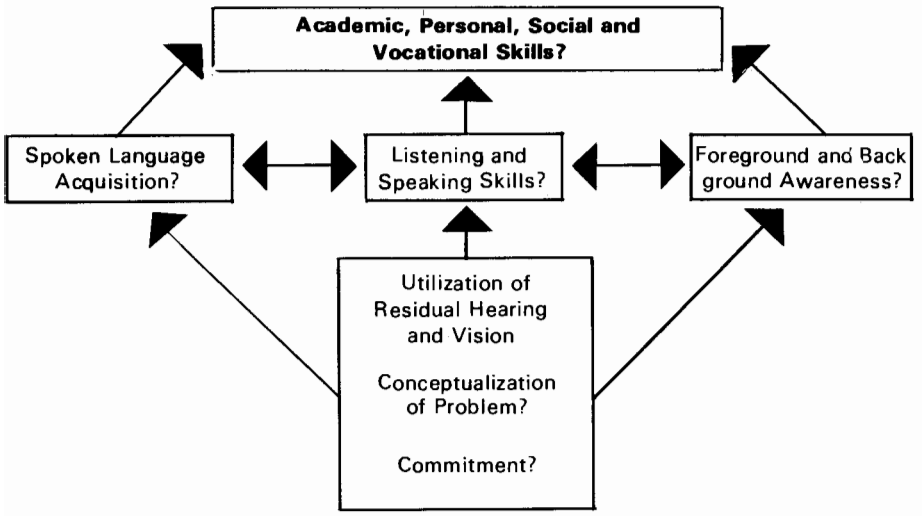
EDUCATIONAL AUDIOLOGY AT UTAH STATE UNIVERSITY

Frederick S. Berg
Utah State University

The educational audiology development at Utah State University (USU) may best be described under four interrelated topics: (1) a basic model, (2) curriculum development and evaluation, (3) supportive programming, and (4) students and graduates.

BASIC MODEL

Figure A: Areas Affected By Impairment Of Hearing



In Figure A an educational audiology model is presented to identify and clarify the profile of the hard of hearing child as well as the dimensions of the management problem. This multiparametric design reveals the existence of at least three levels of concern: (1) basic underlying factors, (2) resultant communication variables, and (3) end product considerations. The many parameters and the complex interactions among them serve notice to specialist and layman alike that educational audiology is an emerging profession that will challenge the researcher and attract the superior clinician or educator.

Considerable information on the specifics of the educational audiology model is illustrated and documented in a booklet entitled "Breakthrough For the Hard of Hearing Child" (Berg 1971). In this compendium of heretofore largely unrelated and even unavailable materials, particular focus is given to a coordinated description of the nature of

sound, the process of hearing, the profile of hearing loss, and the components of management including audiometry, medicine and surgery, sensory aids, and aural rehabiltation.

Within the educational audiology model all persons who can significantly affect the progress and adjustment of the hard of hearing child, or lack of it, are members of the aural rehabilitative team. The key responsibilities are assigned to numerous individuals: the child himself; his parents, teachers, siblings, and peers; the educational or clinical specialist, principal, nurse, school guidance counselor, psychologist and social worker; and the otolaryngologist, and clinical audiologist. The aural rehabilitative functions to be conducted are evaluation, design, remediation, facilitation, and counseling (Yater 1971). The rehabilitative strategy is crystallized in a definition of educational audiology.

> Educational audiology conceptualizes the characteristics and needs of the hard of hearing child. It seeks for each such child to isolate the educational and audiological parameters of hearing impairment, to identify the communicative deficiencies arising from hearing disability and lack of educational adjustments, and to design and implement an individualized and ongoing program of facilitative support.

Results of a recent national survey suggest that every school system in the country except the very smallest includes substantial numbers of hard of hearing children (Willeford 1971). Table 1 summarizes this data and provides categorization by degrees of loss and

Table 1. Number of hard of hearing children per 1,000 youngsters with varying unilateral and bilateral hearing impairment.

dB Loss	Unilateral	Bilateral
11- 25 (slight)	154	34
26- 45 (mild)	13	5
46-100 (moderate-severe)	3	2

Modified from Willeford, 1971

involvement of one or both ears. Totaling numbers and reducing to the lowest common denominator reveals that approximately one out of every five school-age children has a slight to severe unilateral or bilateral hearing loss. Seven out of 1,000 youngsters have bilateral auditory insensitivity of mild and moderate to severe degrees. It is these children, particularly the ones with 40 to 90 dB losses, that characteristically comprise the population referred to above as hard of hearing. The other 204+ per 1,000 children with slight bilateral losses and those with unilateral losses from slight to severe degrees are also hard of hearing but function often enough like normal hearing children to be of less educational concern.

Clarification of the problem of hearing impaired children with at

least moderate bilateral hearing loss has been advanced by Fellendorf (1966).

> The case for the deaf child is one thing: the case for the hard of hearing is another. The hard of hearing child is the youngster who fifty years ago might have been considered to be profoundly deaf, but today with modern techniques of diagnosis and modern hearing aids, is classed as hard of hearing. This is the youngster who years ago might have been contacted by shouting at him at the top of the lungs, but today can have his hearing loss reasonably compensated for by a good hearing aid. Few of our public school systems have provisions for the proper handling of these hard of hearing youngsters since their needs are not as profound as those of the more severely handicapped and not as easily identified. These hard of hearing youngsters can become deaf adults merely for lack of attention to their educational needs. (Statement of George Fellendorf before the Maryland Commission on the Educational Needs of Handicapped Children 1966).

Further insight into the problem of hard of hearing children in general is provided by Fletcher (1970).

> The hearing impaired child has the same physical appearance as his friends who have normal hearing; he also behaves essentially as they do. Even his disabilities may be easily misunderstood as merely negative variations of normal behavior. For example, when the teacher of a child with a hearing defect speaks to him one time, he may be watching her and—with what he receives from hearing reinforced by what he receives from sight—responds correctly. Another time when she speaks, the background noise may cover too much of what she says for him to decode the message correctly, or he may miss some of the essential cues from her face if it is turned away from him. This time he misunderstands and responds erroneously. His behavior is thus erratic depending upon such factors as the auditory characteristics of his hearing and of the background noises, manner with which the teacher speaks, and her position relative to his view, in addition to the random variations found in any child. But then, the child with normal hearing is often inattentive or distracted by other events and, therefore, is erratic in his response to spoken language. For this reason the teacher is likely to interpret the intermittency in performance of the hard of hearing child to lack of self-discipline. When he does "pay attention" he seems to "get along fine." (S. Fletcher, The Hard of Hearing Child, Grune & Stratton Publishers, 1970, p.4)

The areas of performance affected by hearing impairment are

identified in Figure 4. Characteristic and often subtle deficiencies occur in spoken language acquisition, listening and speaking skills, foreground and background awareness; and academic, personal, social and vocational skills. The educational achievement of 100 hard of hearing children in Kentucky, for example, revealed an average deficit of 2.24 years (Kodman 1963). This academic gap between the hard of hearing child and the normal hearing youngster characteristically increases with age. A one-year retardation in the fourth grade, for example, might become a two-year deficit in the eighth grade, and a three-year gap by the twelfth grade. At college age the academic deficiency may be so severe that the likelihood of successful adjustment to a university study program is low (Berg, et al., 1972).

The pervasive and deleterious influence of mild to severe bilateral hearing impairment is hardly recognized as a basis for educational supportive programming in the schools of our nation. Dyer's (1969) survey of educational programs for hearing impaired children in 60 large school systems revealed that itinerant and resource services typically are deficient at all educational levels. Fricke (1969) notes from another survey that educational personnel of the smaller school districts are generally unaware of the needs of special programming or adjustment for these youngsters. He also reports that only 28 of the 78 facilities for the deaf providing responses include separate programming for hard of hearing children.

UNIVERSITY CURRICULUM

The second section of this presentation will address itself to the development of the educational audiology curriculum at USU. A recognition by certain state leaders in Utah that a critical void existed in the educational management of the hard of hearing child permitted USU to move into a position of innovation in 1965. In contrast to university specializations that focus on the deaf child and the special classroom, the educational audiology specialty has encompassed the characteristics and needs of a much larger population of hard of hearing children and the much greater number of regular classrooms in which this latter group of hearing impaired youngsters are characteristically enrolled. Considerable training and special grant assistance from the Bureau of Higher Education and the Bureau of Education for the Handicapped, United States Office of Education, permitted the new specialty to become a reality in 1966.

Within the context of the educational audiology curriculum several sub-developments chronologically have occurred:

1. The emergence of a characteristics and needs of population referent or model.
2. The identification of operational objectives of the specific courses and internship areas.
3. The utilization of rating scales and computer analysis for the evaluation of the relevance of objectives.

4. The employment of specialists on the "firing line" as respondents to a field evaluation of the objectives.
5. The identification of verbal and performance competencies within sequences of courses and internship experiences.
6. The consolidation of educational audiology and clinical audiology sequences within one specialty of the Department of Communicative Disorders.

The curriculum encompasses basic underpining in acoustics, acoustic and motor phonetics, anatomy, clinical processes, communication and information theory, counseling, educational technology, electro-acoustics, human growth, learning and linguistics. It provides selected verbal and performance competencies derived from the areas of audiology and speech pathology, education of the hearing impaired, and general professional education. Table 2 details the curriculum subjected to the field analysis of the educational audiology specialty. Approximately 10 operational objectives were obtained from the instructors for each of these courses and internship areas.

Table 2. Course titles of educational audiology curriculum subjected to field analysis in 1971.

1. Psychology of learning
2. Phonetics
3. Language, hearing and speech development
4. Anatomy of speech and hearing
5. Clinical processes and behavior
6. Fundamentals of communication science
7. Introduction to audiology
8. Speech audiometry
9. Speech for the hearing impaired
10. Speech reading
11. Hearing aids
12. Auditory training
13. Dactylology
14. Language disorders and hearing impairment
15. Teaching language to the hearing impaired
16. The infant-young hearing impaired
17. Teaching reading
18. Curriculum for the hearing impaired
19. Education of the hearing impaired
20. Seminar in educational audiology
21. Internship in educational audiology—evaluation
22. Internship in educational audiology—remediation
23. Reading for the hearing impaired
24. Social studies in the elementary schools
25. Teaching elementary school math
26. Science in the elementary school

Crookston, 1971, p. 31.

The evaluative model utilized to determine the relevance of 276 objectives which resulted from this procedure may be seen in Table 3.

Table 3. Scales utilized by 63 school audiologists, itinerant specialists, and resource and segregated classroom educators of the hearing impaired to judge the relevance of the educational audiology curriculum.

A. Extent of use	B. Importance to a training program
To what extent do these objectives reflect the demands of your position?	Your professional opinion on how relevant or important these objectives are for training programs in this area.
0 No opinion or unfamiliar	0 No opinion
1 Never Use	1 No importance
2 Nominal/very infrequent	2 Very minor
3 Occasional	3 Low
4 Moderate	4 average
5 Considerable	5 High
6 Very substantial	6 Extreme

Modified from Crookston, 1971, p.32.

Means, standard deviations, and frequency distributions among respondents were the data for each objective. Derived means were computed also for each of the 26 courses and internship areas and for general areas of the curriculum. In this field analysis the educational audiology curriculum as a whole received wide acceptance both in usage on the job and importance to a training program, notwithstanding model of delivery of clinical or educational services represented by particular respondents (Crookston 1971). All general areas of the curriculum including internship, education for the hearing impaired, audiology, general professional education, and basic underpining content in that order of importance were endorsed by the respondents. The course "Language Disorders and Hearing Impairment" from the area of education of the hearing impaired generally received the highest usage and importance ratings of all courses. Within the area of audiology the course entitled "Hearing Aids" was rated as being very important. Within the latter course the objective rated of highest importance, for example, was knowing the course of action to take for a defective hearing aid. Looking at the entire curriculum, differential ratings between "usage" and "importance" substantiated that gaps exist in the professional preparation of individuals currently employed in the clinical and educational management of hard of hearing children.

The current USU curriculum in educational audiology characteristically spans 10 quarters of undergraduate and graduate study as noted in Table 4. Only Communicative Disorders Department coursework is listed. Considerable curriculum in psychology, general professional education, and special education is also included.

Table 4. Quarter-by-quarter registration in educational audiology during a three-year period of study at Utah State University (USU).

1. Introduction to communicative disorders

   Phonetics

   Fundamentals of anatomy for speech and hearing

2. Fundamentals of communication science

   Language, hearing, and speech development

   Clinical processes and behavior

   Apprenticeship in communicative disorders

3. Basic audiometry

   Hearing and speech management

   Disorders of articulation

   Apprenticeship

4. Speech audiometry

   Advanced hearing and speech management

   Language disorders and hearing impairment

   Internship

5. Structure, function and dysfunction of the hearing mechanism

   Teaching language to the hearing impaired

   Education of the hearing impaired

   Therapeutic methods in speech pathology
   Internship

6. Pediatric audiology

   Introduction to research in communicative disorders

   Teaching reading to the hearing impaired

   Internship

7. Hearing aids

   The young hearing impaired child

   Thesis

   Internship

8. Differential diagnosis of auditory disorders

   Curriculum for the hearing impaired

   Dactylology

   Seminar in educational audiology

   Internship

9. Externship

10. Medical backgrounds in communicative disorders

    Internship

    Thesis

Communicative Disorders Department coursework is listed. Considerable curriculum in psychology, general professional education, and special education is also included.

SUPPORTIVE PROGRAMMING

The third section of this presentation is a description of local programs for the hearing impaired that support the educational audiology training specialty at USU. Many clinical and/or educational facilities provide relevant internship opportunities including:

1. Audiology facilities of the USU Speech and Hearing Center, local school districts, the state residential school for the deaf, the Intermountain Indian School, and hospitals.
2. Educational facilities of the USU Speech and Hearing Center including a unique college facilitative program for the hard of hearing; the on-campus University Affiliated Center for Exceptional Children including two units for hearing impaired children; and off-campus supportive programs for hearing impaired children.
3. Homes of infant hearing impaired children being served under a new Office of Education funded Early Education project.

These internship resources enable staff and senior clinicians of USU to conduct evaluation, design, remediation, facilitation, and counseling functions for hearing impaired individuals who range in age from infancy to adulthood, with special focus on the hard of hearing child.

USU STUDENTS AND GRADUATES

The final section of this presentation will address itself to the twenty five students who have majored in educational audiology at USU and graduated into positions of professional responsibility. From the inception of the program the study design required that the student complete an M.S. degree within the Department of Communicative Disorders before receiving endorsement from the university as to readiness for professional employment, thus conforming to the standard of the American Speech and Hearing Association. Study programs in educational audiology began at USU in 1966. The first graduates emerged in 1968.

From 1966 to 1972 experimentation has been conducted with study programs encompassing one, two, and three year durations, depending upon the prior professional preparation of the student and the desired completeness of the training. The early graduates had completed undergraduate preparation in other specializations at USU prior to switching over into the Department of Communicative Disorders. They spent two additional years with us. Current students typically begin study programs in educational audiology at the Junior year level and complete the sequence of coursework and internship experience at the termination of a one-year M.S. program. Non-resident students with B.S. degrees in communicative disorders from other universities are also coming to USU for graduate work in educational audiology. This past year we have experimented with one year M.S. programs for three such students.

In the past, and by design, the educational audiology specialization at USU has not conformed to the certification standards of either the American Speech and Hearing Association (ASHA) in audiology or the Conference of Executives of American Schools for the Deaf in education of the hearing impaired. With the recent consolidation of the educational audiology and clinical audiology study sequences at USU, however, many of our students can now meet requirement for the ASHA Certificate of Clinical Competence in Audiology. Currently we are also exploring the possibility of obtaining program accreditation in the education of the hearing impaired from the newly organized Council of Organizations Serving the Deaf. It is anticipated that the student will have to make a choice of one certification or the other by the last two quarters of the graduate year because of the difficulty of programming individually sufficient internship experience in both professional areas.

Notwithstanding the professional certification problem, the breadth and depth of the USU curriculum has opened many occupational "doors" to our graduates. Very few states have been off limits for securing jobs, and these vocational barriers are breaking down as state requirements become more flexible and realistic. Jobs presently held by our graduates vary from school or district audiologist to itinerant or resource room specialist to classroom teacher of the hearing impaired to infant-preschool clinician educator. In keeping with a major goal of educational audiology at USU many of our graduates are now moving into leadership positions as supervisors, university instructors, and the like. All are continuing to work with children, and the great majority in the public school setting. Current job locations include Alaska, California, Idaho, Iowa, Minnesota, Nevada, New York, Oklahoma, Utah and Virginia.

SUMMARY

In resume, four statements capsulate pertinent developments in educational audiology at USU:

1. A multiparametric model or design is emerging to describe the profile of the hard of hearing child and the resultant management components.
2. Considerable progress has been made in the development and evaluation of a curriculum based upon this model.
3. Graduates of the USU educational audiology program are increasingly developing into professional personnel who can contribute substantially to the clinical and educational management of hearing impaired children, particularly hard of hearing youngsters.
4. Local supportive programs are providing a breeding ground for improvements in the state of the art.

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