INTRODUCTION

The report that follows is an adjunct to a report being prepared by the Bureau of Educational Research, University of Utah. It includes observations, interpretations, opinions, and recommendations based on data gathered or analyzed for the Bureau report and on a limited investigation carried out by the author.

The sixteen policies under which the Utah School for the Deaf operates were adopted by the State Board on December 28, 1970. The first two policies have the most direct and pervasive effect on educational practices. Policy one implies that both the Oral and Total Communication programs shall be available to each student in accordance with school policy. Policy two, dealing with placement, implies that student and parent judgements shall be factors in determining placement, but that the most important consideration shall be the needs of individual students.

Much of the report that follows is presented in defense of the thesis that the programs are not equally available to each student and that placement of students is not based on professional diagnosis of student need. The first evidence presented below indicates that the PIP "Early Childhood Project" tends to inhibit the use of the Total Communication program. Second, the parent orientation and student placement practices are described, showing that the parent orientation materials are inadequate and that student placements are not based on professional diagnosis of their needs. Third, the additional handicaps and achievement of students in the two programs are compared, showing that they are different. Fourth, recommendations are made and discussed, and fifth, some technical details of the research methods are reported.

EARLY CHILDHOOD PROGRAM

Two early childhood programs for hearing handicapped persons operate in Utah, a school-based program which is an integral part of the School for the Deaf (See Policy seven) and PIP, a home based project which is federally financed. Most pre-school deaf children are now served by PIP and many are simultaneously served by both early-childhood programs.

The PIP project is described below to show how parents tend to be led to a commitment to the Oral Program. Later, it will be shown that parent orientation and placement procedures also tend to restrict the availability of the Total Communication Program.

The PIP project provides home based educational services for hearing handicapped children who are less than six years old. Parent advisors provide information and testing services and train parents in hearing aid management, listening training, and speech training. In some cases, instruction in the use of Seeing Essential English (SEE), a manual English sign language is provided. When the service to parents includes this component, it is referred to as the "Visual", "Manual", or "Total Communication" method.

Each child is evaluated at a staff conference each six months or less. An initial staffing is held as soon as enough information has been gathered to determine what services should be provided. All children are fitted with hearing aids unless some physical problem prevents their use. All parents are provided training in hearing aid management. When the parents are judged to be competent managers of the aids and the aids are in use during most waking hours, a six weeks test of their usefulness

is initiated. The parents are given instruction in listening training and the progress of the child is monitored by the parents and parent advisor.

If the listening training seems to be effective and, for older children, if some speech skills are mastered, the child is continued in the Oral method i.e., SEE signs are not taught or used. There is one major exception to this procedure: if the child has been diagnosed as profoundly deaf at Primary Children's Hospital, the parents are likely to have begun learning and using manual signs. If this is the case, PIP staff members assign the child to the Total Communication method, continuing the parent training in the use of signs. The other exceptions to the general procedure of assigning all incoming children to the Oral method are: 1)cases in which the parents much prefer to use signs and 2) cases in which the staff believes it is unlikely that speech training will be effective.

At subsequent staff conferences, staff members might make one of the following recommendations:

1) Continue services as presently prescribed.

2) Change hearing aids.

3) Begin new phase of parent training.

4) Change from Oral to Total Communication (or in rare cases from Total to Oral communication).

5) Graduate student from program.

The reasons advanced for not beginning parent training in signs at the beginning of the program are as follows:

1) Parents are usually unable to learn signs at the same time they are learning about hearing aids and adjusting to the idea that their child is handicapped.

2) Signing interferes with the evaluation of the effectiveness of the hearing aids.

3) Signing might not be necessary.

4) Signing might inhibit the development of listening skills, speech reading, and language or pre-language oral skills.

The PIP project tries to teach listening and oral language skills as early as possible and to as great an extent as possible. They prefer not to teach or use signs. However, if a child does not seem to be progressing rapidly enough or if audiological or psychological information seems to indicate that the child would not develop oral language, then manual signing is recommended.

The major factors which are believed to affect the liklihood of a child's learning oral language are: degree of hearing loss, age of onset of deafness, intelligence, and the presence of other handicaps.

The PIP director perceives the home based services to be an unbiased implementation of either the Oral or the Total Communication methods, using whichever is in the child's best interest. Each placement decision is based on a review of information believed to be relevant and each child's placement and progress is evaluated at regular intervals. The placement procedure is a well defined rational process. Most children are, however, being placed in an Oral program,.even though it is not referred to as such.

For many parents, the PIP project provides the first introduction to educational programs for the deaf, and most parents are not informed of arguments which favor the Total Communication approach. The assumption that manual signing inhibits the learning of speech dominates the decision process but is contradicted by empirical research. The taboo against

manual signing pervades both parent and professional decision making. The long term effect is to make the Total Communication program seem less desirable, to be used mostly for students who are not expected to perform well, to have a smaller staff, and hence to be less available.

PARENT ORIENTATION AND STUDENT PLACEMENT PROCEDURE

The next section discusses the parent orientation and student placement procedures used by the Utah School for the Deaf.

The admissions officer provides parents of children who may be deaf with information about the school, tests the children to determine if they meet the admission requirements and supplies the parents with an application form. The parents are given a small "Welcome" pamphlet, describing services for the deaf and a booklet entitled "Education of the Hearing Impaired in Utah".

A previous edition of the booklet "Education of the Hearing Impaired in Utah", oriented parents to each program by listing the claims made by proponents of each program and by citing the research available to support these claims. The current edition of the pamphlet does not include a cummary of empirical research. If parents' preferences are to be a factor in placement decisions (See Policy Two), then parents should be provided with evidence of the probable effects of the programs. One way to partially meet this requirement would be to supply an annotated and current review of related research such as was done in the first edition of the pamphlet.

In addition, since the preponderance of evidence indicates that profoundly deaf students tend to perform better academically in Total Communication programs than Oral programs, parents should be clearly informed of the dangers inherent in the Oral program.

During the first contact with the parents, the admissions officer predicts when the child is likely to be admitted to the school and finds out in which program the parents would prefer their child to be placed.

This information is used by the superintentent to estimate staff requirements. Thus the first impressions of parents are used as a basis for hiring a faculty; and since the majority of parents prefer the Oral program, the majority of the faculty are trained and hired to serve in the Oral program.

If the parents file an application for admission, they are invited to an orientation meeting. At the meeting they are shown a film prepared by the State Board of Education and meet for one-half hour each with the program coordinators. Before the parents meet with the principal to indicate which program they prefer, they are informed of the staff recommendations. Most of the staff assume that signing inhibits oral language development, so they tend to recommend initial placement in the Oral program unless the child has multiple handicaps or the parents prefer the Total Communication program. Thus, in most cases, the child is initially placed in the Oral program.

Students remain in the program in which they re initially placed unless the parent or a member of the teaching staff thinks a change is needed. In that case, a staff conference is called and a decision made on whether to recommend a change. The ground for such decisions appears to be almost exclusively that the student is not making adequate academic progress, but other factors, such as social maladjustment and multiple handicaps are also considered. Participants in the conference are usually one or both curriculum coordinators, the principal, audiologist, and a teacher. Students are never invited to staff conferences and parents are rarely invited.

The kind of decisions issuing from staff conferences are as follows:

1) Continue in present program without change or with specified changes.

2) Change programs.

3) Integrate into public school.

4) Place in vocational training program.

5) Disciplinary action is recommended.

STUDENT HANDICAPS AND ACHIEVEMENT

The PIP program and the parent orientation and student placement procedures have been described. The next section deals with students' handicaps and achievement test scores.

The PIP project and the student placement procedures tend to place the more promising students in the Oral program and the more handicapped children in the Total program. Table 1 reports the frequency and severity of seven handicapping conditions within both programs. It is evident that the more severely handicapped students are found in the Total Communication program.

One might expect the two student populations to differ in academic performance. A test battery of academic achievement is routinely administered to all students. The scores were examined for all non-multiply handicapped students over 15 years old. Table 2 reports an analysis of covariance on a composite of all subtests and table 3 through 9 reports parallel analyses on each of the subtests. The analysis compares the relative academic gains in the two programs over a one year period. In spite of the fact that the non-multiply handicapped Total Communication students tended to be made up of those who had failed in the Oral program, no significant differences between the gains of the two groups were found in vocabulary, science, social studies, or spelling. Significant differences were found for mean gains in mathematics concepts, mathematics computation, and mathematics problem solving, students in the Oral program scoring higher. This suggests that the differences between the mathematics programs should be examined to determine how they might be improved. Figures 1,2, and 3 are graphic illustrations of the differences between means for the three mathematics tests.

Table 1

Frequency of Additional Handicaps

Oral

Handicap	None 0	Mild 1	Moderate 2	Severe 3
Perceptual Motor	38	2	5	0
Cerebral Palsy	43	1	1	0
Visual	40	3	2	0
Mentally Retarded	40	2	3	0
Emotionally Dist.	41	2	1	1
Behavioral Prob.	43	1	1	0
Educationally Deprived	43	1	1	0
Learning Disability	38	2	3	2
Totals	--	14	17	3

Total

Handicap	None 0	Mild 1	Moderate 2	Severe 3
Perceptual Motor	30	3	4	4
Cerebral Palsy	34	1	3	3
Visual	36	1	4	0
Mentally Retarded	31	3	4	2
Emotionally Dist.	33	1	6	1
Behavioral Prob.	35	2	3	1
Educationally Deprived	35	1	4	1
Learning Disability	36	2	1	2
Totals	--	14	29	14

TABLE 2

ANALYSIS OF COVARIANCE

COMPOSITE SAT SCORE

Means and Standard Deviation

Oral

Pre-Test Mean = 0.371
Post Test Mean = 0.425
Post Test Adjusted Mean= 0.372

Pre-Test Standard Deviation = 0.628
Post Test Standard Deviation = 0.599
Sample Size = 24

Total

Pre-Test Mean = 0.136
Post Test Mean = 0.097
Post Test Adjusted Mean = 0.240

Pre-Test Standard Deviation = 0.508
Post Test Standard Deviation = 0.455
Sample Size = 9

Test of Homogeneity of Regression

Source	SS	DF	MS	F	P Less than
Within Cells	2.130	29	0.073		
Regression	0.011	1	0.011	0.146	0.705

Source of Variance

Source	SS	DF	MS	F	P Less Than	ω^2*
Within Cells	2.141	30	0.071			
Regression	7.752	1	7.752	108.634	0.001	
Oral vs. Total	0.111	1	0.111	1.552	0.223	.02

* Proportion of variance = Hays omega squared

Table 3

ANALYSIS OF COVARIANCE

MATH CONCEPTS SAT SCORE

Means and Standard Deviation

Oral

Pre-Test Mean = 0.530
Post Test Mean = 0.553
Post Test Adjusted Mean= 0.504

Pre-Test Standard Deviation = 0.944
Post Test Standard Deviation = 0.719
Sample Size = 24

Total

Pre-Test Mean = 0.251
Post Test Mean = 0.063
Post Test Adjusted Mean= 0.194

Pre-Test Standard Deviation = 0.433
Post Test Standard Deviation = 0.356
Sample Size = 9

Test of Homogeneity of Regression

Source	SS	DF	MS	F	P Less than
Within Cells	3.545	29	0.122		
Regression	0.277	1	0.277	2.264	0.143

Source of Variance

Source	SS	DF	MS	F	P Less Than	ω^2 *
Within Cells	3.821	30	0.127			
Regression	9.087	1	9.087	71.342	0.001	
Oral vs. Total	0.614	1	0.614	4.822	0.036	.10

* Proportion of variance = Hays omega squared

Table 4

ANALYSIS OF COVARIANCE

MATH APPLICATION SAT SCORE

Means and Standard Deviation

Oral

Pre-Test Mean = 0.384
Post Test Mean = 0.484
Post Test Adjusted Mean= 0.424

Pre-Test Standard Deviation = 0.904
Post Test Standard Deviation = 0.698
Sample Size = 24

Total

Pre-Test Mean = 0.010
Post Test Mean = -0.066
Post Test Adjusted Mean = 0.094

Pre-Test Standard Deviation = 0.623
Post Test Standard Deviation = 0.399
Sample Size = 9

Test of Homogeneity of Regression

Source	SS	DF	MS	F	P Less than
Within Cells	4.737	29	0.163		
Regression	0.170	1	0.170	1.041	0.316

Source of Variance

Source	SS	DF	MS	F	P Less Than	ω^2 *
Within Cells	4.907	30	0.164			
Regression	7.557	1	7.557	46.203	0.001	
Oral vs. Total	0.683	1	0.683	4.176	0.050	.09

* Proportion of variance = Hays omega squared.

Table 5

ANALYSIS OF COVARIANCE

MATH COMPUTATION SAT SCORE

Means and Standard Deviation

Oral

Pre-Test Mean = 0.477
Post Test Mean = 0.675
Post Test Adjusted Mean= 0.647

Pre-Test Standard Deviation = 0.918
Post Test Standard Deviation = 0.850
Sample Size = 24

Total

Pre-Test Mean = 0.338
Post Test Mean = -0.014
Post Test Adjusted Mean = 0.061

Pre-Test Standard Deviation = 0.840
Post Test Standard Deviation = 0.446
Sample Size = 9

Test of Homogeneity of Regression

Source	SS	DF	MS	F	P Less than
Within Cells	3.717	29	0.128		
Regression	0.590	1	0.590	4.600	0.040

Source of Variance

Source	SS	DF	MS	F	P Less Than	ω^2*
Within Cells	4.307	30	0.144			
Regression	13.886	1	13.886	96.725	0.001	
Oral vs. Total	2.234	1	2.234	15.558	0.001	.31

* Proportion of variance = Hays omega squared.

Table 6

ANALYSIS OF COVARIANCE

SPELLING SAT SCORE

Means and Standard Deviation

Oral

Pre-Test Mean = 0.157
Post Test Mean = 0.211
Post Test Adjusted Mean= 0.160

Pre-Test Standard Deviation = 0.783
Post Test Standard Deviation = 0.773
Sample Size = 24

Total

Pre-Test Mean = -0.104
Post Test Mean = -0.078
Post Test Adjusted Mean = 0.060

Pre-Test Standard Deviation = 0.905
Post Test Standard Deviation = 0.745
Sample Size = 9

Test of Homogeneity of Regression

Source	SS	DF	MS	F	P Less than
Within Cells	7.467	29	0.257		
Regression	0.001	1	0.001	0.004	0.951

Source of Variance

Source	SS	DF	MS	F	P Less Than	ω^2 *
Within Cells	7.468	30	0.249			
Regression	10.724	1	10.724	43.076	0.001	
Oral vs. Total	0.064	1	0.064	0.258	0.615	--

* Proportion of variance = Hays omega squared.

Table 7

ANALYSIS OF COVARIANCE

VOCABULARY SAT SCORE

Means and Standard Deviation

Oral

Pre-Test Mean = 0.133
Post Test Mean = 0.356
Post Test Adjusted Mean= 0.336

Pre-Test Standard Deviation = 0.781
Post Test Standard Deviation = 0.632
Sample Size = 24

Total

Pre-Test Mean = -0.003
Post Test Mean = 0.058
Post Test Adjusted Mean = 0.111

Pre-Test Standard Deviation = 0.799
Post Test Standard Deviation = 0.679
Sample Size = 9

Test of Homogeneity of Regression

Source	SS	DF	MS	F	P Less than
Within Cells	7.106	29	0.245		
Regression	0.196	1	0.196	0.798	0.379

Source of Variance

Source	SS	DF	MS	F	P Less Than	ω^2*
Within Cells	7.302	30	0.243			
Regression	5.577	1	5.557	22.912	0.001	
Oral vs. Total	0.329	1	0.329	1.352	0.254	--

* Proportion of variance = Hays omega squared.

Table 8

ANALYSIS OF COVARIANCE

SOCIAL STUDIES SAT SCORE

Means and Standard Deviation

Oral

Pre-Test Mean = 0.444
Post Test Mean = 0.452
Post Test Adjusted Mean= 0.389

Pre-Test Standard Deviation = 0.760
Post Test Standard Deviation = 0.589
Sample Size = 24

Total

Pre-Test Mean = 0.008
Post Test Mean = 0.190
Post Test Adjusted Mean = 0.357

Pre-Test Standard Deviation = 0.738
Post Test Standard Deviation = 0.504
Sample Size = 9

Test of Homogeneity of Regression

Source	SS	DF	MS	F	P Less than
Within Cells	5.135	29	0.177		
Regression	0.025	1	0.025	0.140	0.711

Source of Variance

Source	SS	DF	MS	F	P Less Than	ω^2 *
Within Cells	5.160	30	0.172			
Regression	4.857	1	4.857	28.236	0.001	
Oral vs. Total	0.006	1	0.006	0.038	0.847	--

* Proportion of variance = Hays omega squared.

Table 9

ANALYSIS OF COVARIANCE

SCIENCE SAT SCORE

Means and Standard Deviation

Oral

Pre-Test Mean = 0.387
Post Test Mean = 0.342
Post Test Adjusted Mean= 0.324

Pre-Test Standard Deviation = 0.952
Post Test Standard Deviation = 0.665
Sample Size = 24

Total

Pre-Test Mean = 0.233
Post Test Mean = 0.130
Post Test Adjusted Mean = 0.180

Pre-Test Standard Deviation = 0.722
Post Test Standard Deviation = 0.794
Sample Size = 9

Test of Homogeneity of Regression

Source	SS	DF	MS	F	P Less than
Within Cells	9.875	29	0.341		
Regression	0.265	1	0.265	0.779	0.385

Source of Variance

Source	SS	DF	MS	F	P Less Than	ω^2 *
Within Cells	10.140	30	0.338			
Regression	5.063	1	5.063	14.979	0.001	
Oral vs. Total	0.133	1	0.133	0.394	0.535	--

* Proportion of variance = Hays omega squared.

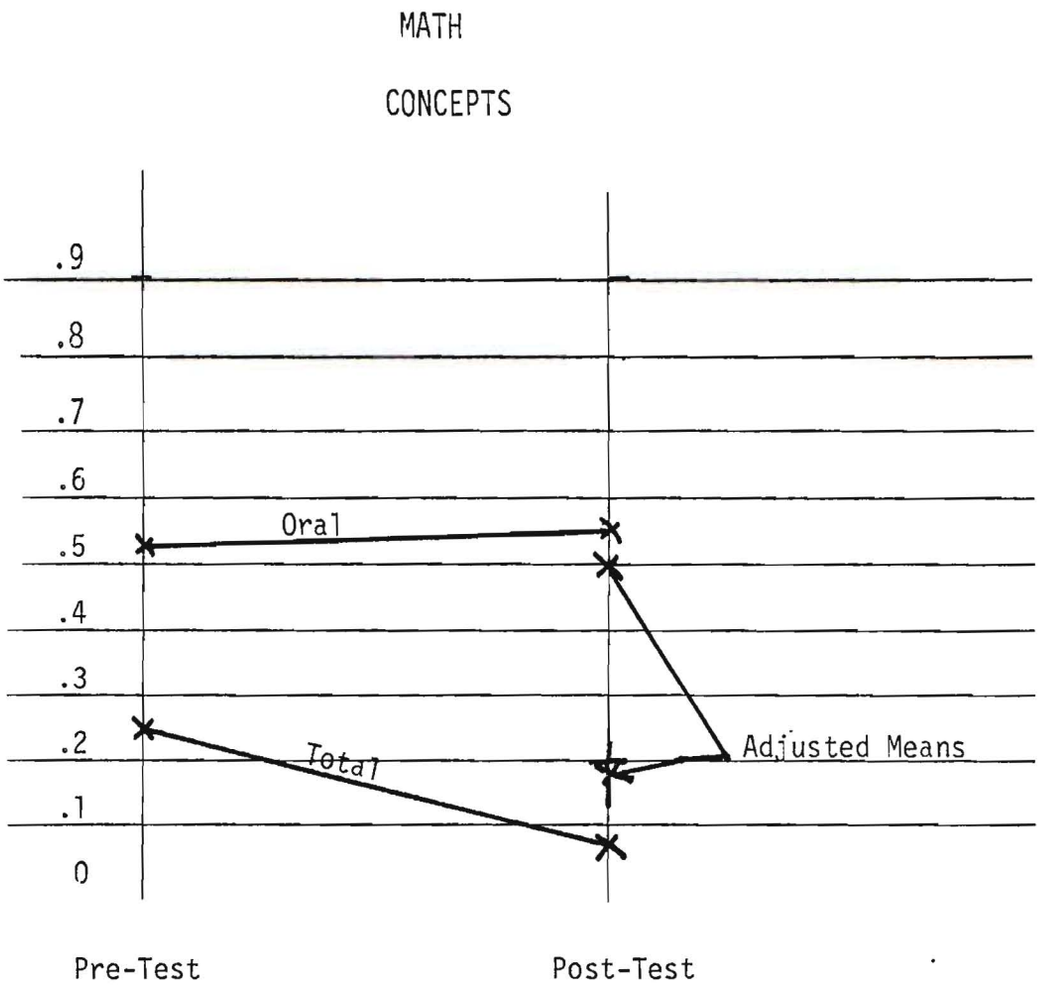
MATH
CONCEPTS
.9
.8
.7
.6
.5
.4
.3
.2
.1
0
Oral
Total
Adjusted Means
Pre-Test
Post-Test

Figure 1

MATH

COMPUTATIONS

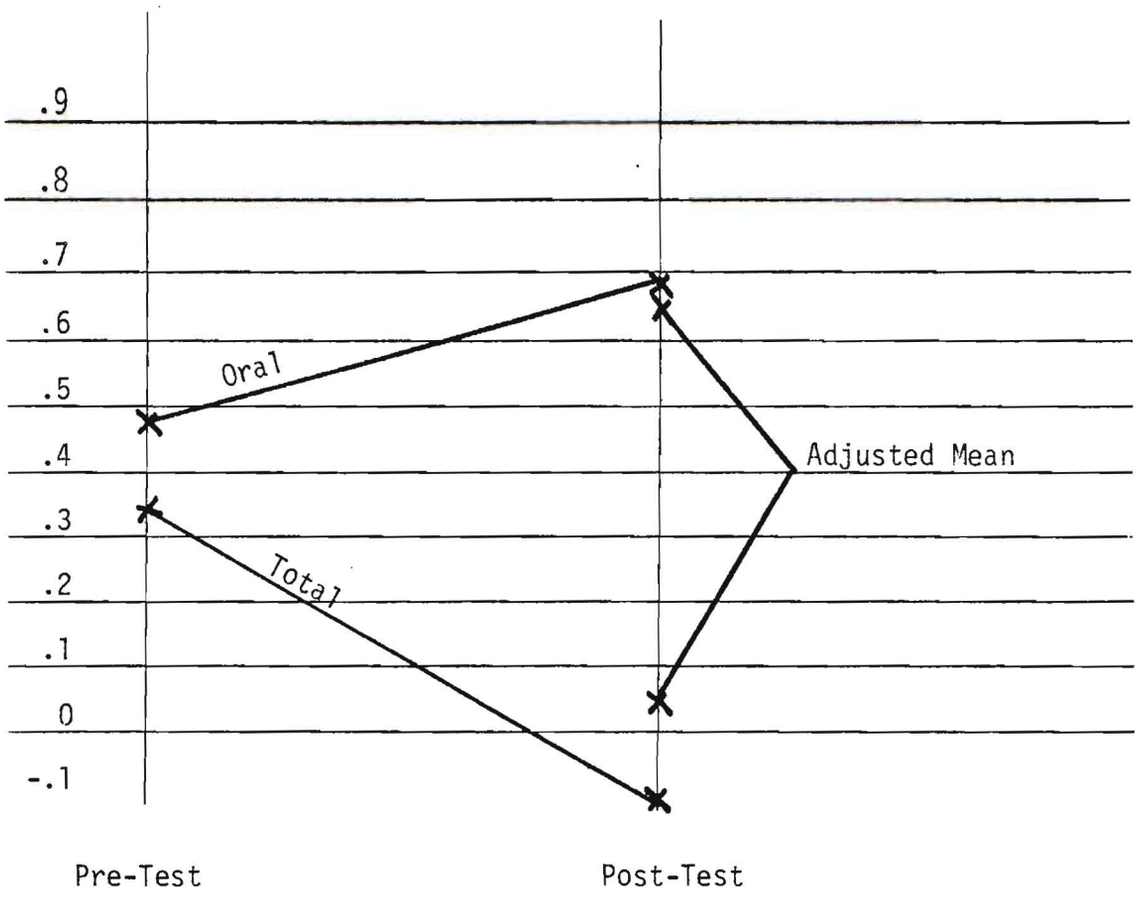

Figure 2

MATH

APPLICATIONS

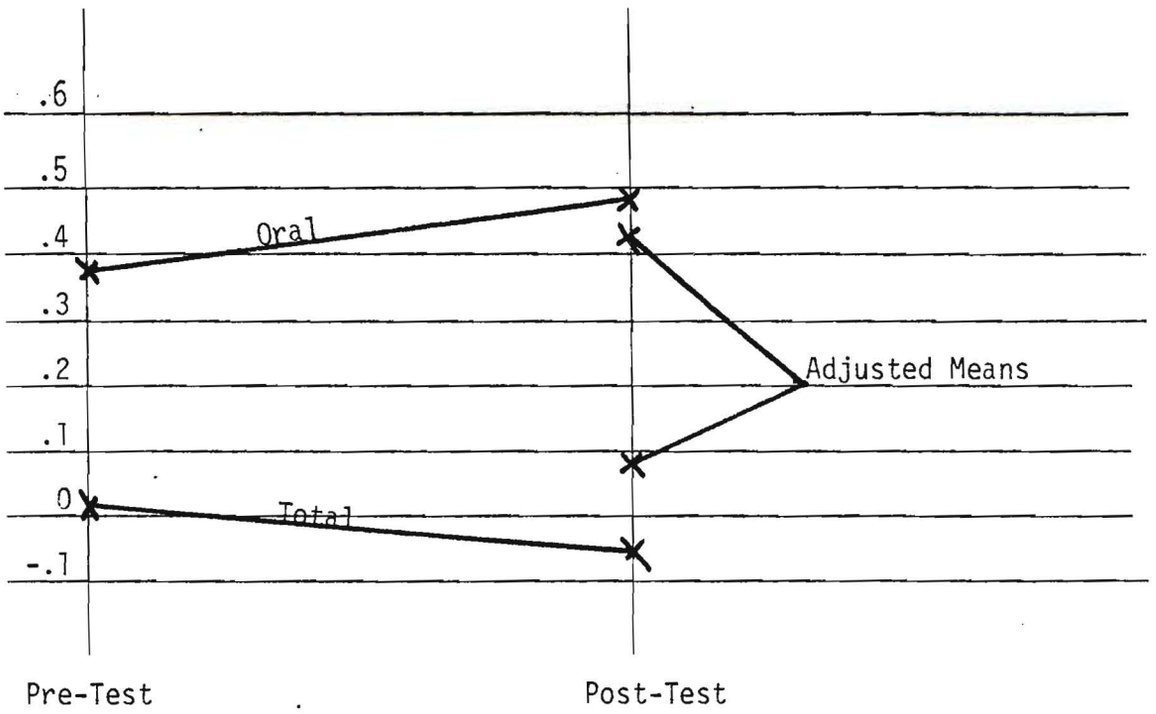

Figure 3

Table 10 reports a multivariate analysis of variance on five skill areas of the APL, a test of adult coping skills that was developed for eleventh and twelfth grade students. The sample consisted of all non-multiply handicapped students over 15 years old. Although no differences between groups were found, the performance levels were very low. Figure 4 reports the skill and content areas included in the APL and the objectives of twenty-five of the items. Random responses on the forty item test would be expected to give ten correct answers, yet the mean performance on the total test was only 14. This suggests that students are not learning the skills needed by adults.

Table 10

APL SKILL AREAS

Multivariate Analysis of Variance

Multivariate Tests of significance using Wilks Lambda Criterion

	F	DFHYP	DFERR	P Less Than
Test of Roots	0.623	5.000	26.000	0.683

Univariate Analyses of Variance

Variable	F	Mean SQ	P Less than
Facts & Terms	1.215	2.227	0.279
Reading	1.124	4.108	0.297
Writing	0.114	0.310	0.738
Computation	0.321	0.508	0.575
Problem Solving	0.050	0.127	0.824

Degrees of freedom = 1,30

Means

Contrast	Facts & Terms	Reading	Writing	Computation	Prob. Solve
Total	1.111	3.278	3.444	1.889	3.056
Oral	1.643	4.000	3.643	2.143	2.929

CONTENT AREAS → / SKILLS	COMMUNITY RESOURCES	OCCUPATIONAL KNOWLEDGE	CONSUMER ECONOMICS	HEALTH	GOVERNMENT AND LAW
IDENTIFICATION OF FACTS AND TERMS	Knowing what a time zone is	Knowing what skills are needed for clerical jobs	Knowing what "bait and switch" is	Knowing what the normal human temperature is	Knowing what the Bill of Rights says
READING	Reading a bus schedule	Reading a want ad	Reading a contract	Reading a prescription label	Reading a ballot
WRITING	Writing a letter to make hotel reservations	Filling out a W-4 Form	Filing a consumer complaint	Answering a medical questionnaire	Writing a letter to a legislator
COMPUTATION	Computing plane fare	Computing overtime earnings	Finding the best buy	Computing a daily dosage	Computing a statute of limitations
PROBLEM SOLVING	Determining where to go for help with a problem	Deciding what to say to a bothersome co-worker	Deciding which of two decisions is better in economic terms	Deciding which meal is best, given a set of preconditions	Determining whether a given situation or action is legal

Figure 4: Content and Skills Areas of the APL with objectives of 25 sample item

RECOMMENDATIONS

The recommendations discussed below can be classified under three main headings: 1) evaluation and research, 2) administration, 3) miscellaneous.

The need for adequate evaluation of students, faculty, classroom practices, curriculum, and programs cannot be over-emphasized. Evaluation is needed in order to prescribe educational programs for students, provide inservice training for teachers, and determine the effectiveness of programs. More and better information is needed about each student's abilities, desires, needs, and performance.

The existing testing program includes both over-testing of some variables and neglect of other variables of critical importance. An example of a neglected variable is that of comprehendibility of speech. Even though speech training is a major component of the curriculum, no objective tests of speech comprehendibility are administered. An example of over-testing is the yearly administration of the Stanford Achievement Test Battery. The test requires several hours of student time but provides little information that is not already known by the teachers and/or students. Measures of important classroom practices also seem to be lacking. Classroom communication modes and patterns are believed to be critical to the success of the Oral program, yet objective measurements of this kind are lacking.

In conclusion, with the exception of audiological tests and records, testing procedures are in need of evaluation and revision. Assistance is also needed in the administration of tests and measurement of classroom and teacher variables.

Program evaluation and professional placement recommendations are not only dependent on adequate testing and record keeping, but also on expert data analysis. If the evaluative information is to be efficiently used, the school must have the services of an applied statistician and research director. If adequate evaluation of students, faculty, and programs are to be accomplished, the services of a measurement specialist, applied statistician, and research director must be provided. Test equipment, materials, data analysis, and support personnel such as test administrators are also required.

Policy three states that a continuous examination and evaluation of the program shall be the responsibility of the Division of Research and Innovation (now the Research and Development Division). The policy has not been carried out, and in my opinion, cannot be carried out with the present division staff. Not only is it doubtful that the division has the expertise for such an undertaking, but they are already assigned to other tasks.

If qualified research staff were to undertake the study, it is likely that grants could be obtained to conduct useful research in addition to that required for evaluation of programs, faculty, and students. It is therefore recommended that an evaluation and research plan be implemented which will include the level of funding and expertise to provide at least the following services:

1) Prepare and publish an annotated review of research on questions pertinent to education of those who are hearing impaired.

2) Establish and operate a program to educate parents about hearing handicaps and educational programs and practices for hearing handicapped persons.

3) Evaluate prospective students, determining characteristics, capabilities, and needs, the knowledge of which will facilitate their education and provide baseline data for educational research.

4) Establish and maintain an efficient record system for the use of educators and researchers.

5) Prepare a report of the initial student evaluation and recommend the type of educational program best suited to the students needs.

6) Periodically re-evaluate each student and prepare a written report of the findings; such a report for each student would be prepared at least once a year and would recommend subsequent educational treatments.

7) Describe and evaluate the educational programs and classroom practices.

8) Report the results of the above procedures to professional journals, educators, parents, and students, providing safeguards for the confidentiality of personal information.

9) Plan and, if possible, coordinate related research in other states.

Several of the functions described above have been carried out by a project at the University of Minnesota Research and Development Center. This project, now drawing to a close, may serve as a useful model for research in Utah. Publications of the project are referred to in David Nelson's review of literature under Moores, Weise, & Goodwin,(1974) and Weise, Goodwin, and Moores, (1975).

The coordinators and staffs of both the Oral or Total Communication programs believe their own program to be better for most students then the alternative program. The placement of students in one or the other program is, according to Policy two, the responsibility of the professional staff. Such a policy creates interminable conflicts and unprofessional placement decisions. There is no uniform periodic assessment of placements nor are there adequate objective test data to evaluate placements.

It is recommended that decisions concerning placement of students in programs not be made the responsibility of the staff or administration of the school. In addition, it is recommended that the administration

of the two programs be completely separated, not combined under a common principal.

The poor performance of students on the APL suggests that students lack important basic reading, mathematics, and problem solving skills. Reports for each program coordinator are being prepared which indicate the performance of students in each program. The APL test results should be helpful in an evaluation of the curricula. It is recommended that the curricula be evaluated to see if they can be altered to better teach adult coping skills.

RESEARCH METHODS

The description of the PIP project was based on interviews with Tom Clark, project director, and Skip Reese, services coordinator. Also, a staff conference in which students were evaluated and placed was attended.

The description of the orientation procedures was based primarily on interviews with Dr. Melvin Nielson, Admissions Officer, but also on interviews with the program coordinators and principal.

The description of the placement procedures was based on interviews with Boyd Nielson and Steve Baldwin, Program Coordinators, and Tony Christopulos, Principal.

The data on frequency and severity of handicaps was provided by Dr. Melvin Nielson, Audiologist. The SAT test data was obtained first from Dr. Nielson and then verified by examining the raw test data supplied by Duane Harrison, Assistant Principal.

The version of the SAT used for this study is one prepared for and normed on hearing handicapped students. The records of those students who had taken the test in February of 1975 and May of 1976 were examined to see if they met the following conditions:

1) Age 15 or over by February of 1975.

2) Leiter I.Q. over 85.

3) Non-multiply handicapped.i.e., using the severity scale and handicapping conditions listed in Table 1, the sum of the handicaps was not over three.

For those students meeting the above conditions, the raw scores were converted to age normed scaled scores and then to nationally normed scores having a mean of zero and a standard deviation equal to one.

The analyses of covariance were then performed on these scores, using the pre-tests as covariates.

The APL (high school level) was administered to non-multiply handicapped students over fifteen years old in January 1977. For Total Communication students, the test administrator interpreted (by manual signs) the instructions and item stems. An administrator's guide was prepared indicating which items could be interpreted and which terms could be explained. The purpose of the administrator's guide was to standardize the administration procedure and render the test as little dependent on reading skill as possible, except for the items specifically included to measure reading.

For the Oral students, a similar procedure was used, but rather than a sign interpreter, the test administrator was a person experienced in education of the deaf using the Oral method.

The multivariate analysis of variance was performed on the raw scores.