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ABSTRACT

Nine conference reports focus on the prediction and remediation of learning and language disorders in children. Two papers report studies which found the Predictive Screening Test of Articulation to be a better predictor than a therapist in selecting first grade children for speech therapy. Described is an assessment procedure centering on the interaction between the child and his teacher and replacing disability labels with educational diagnosis and prescription. Also examined is the use of a developmental learning center to provide therapeutic service for children with learning problems. A differentiated staffing program utilizing contingency management techniques is recommended for the more efficient delivery of speech and hearing services. Considered is the use of computer simulation as a technique for training educational diagnosticians and clinical teachers working with learning disabled children. A prescriptive teaching program for learning disabled children is described which requires pupil information, appropriate learning processes and a prescribing teacher. Evaluated is a 2-week training program for teachers of children with severe language handicaps which stressed behavior modification techniques. Presented are reading instructional procedures for mentally retarded and learning disabled children based on research program activities. (DB)

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Exceptional Children Conference Papers: Learning and Language Disabilities.

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TITLE: Research on VanRiper's Predictive Screening Test of Articulation

AUTHORS: Velma H. Carr, Board of Cooperative Educational Services #1, Monroe County, 41 O'Connor Road, Fairport, N.Y. 14450
Home address: 50 French Road, Rochester, N. Y. 14618
Joan Stover, Board of Cooperative Educational Services #1, Monroe County, 41 O'Connor Road, Fairport, N.Y. 14450
Home address: 1737 Creek Street, Rochester, N. Y. 14625

DEGREE: Velma H. Carr, M.A.
Joan Stover, M.S.

RESEARCH ON VAN RIPER'S PREDICTIVE SCREENING TEST OF ARTICULATION

by Velma Carr, M.A. and Joan Stover, M.S.

PROBLEM

This study grew out of an interest in using the Predictive Screening Test of Articulation (PSTA) developed by Dr. Charles VanRiper at Western Michigan University to identify at the first grade those children who will still need speech therapy at grade three if none is provided earlier.

In their work with the PSTA, VanRiper and Erickson found that a score of 34 and below was optimal for determining which children should receive therapy at grade one. The primary purpose of this study was to replicate this research which established this predictive indictor of 34.

An extension of this study dealt with the persistence of error types from first to third grade. The hypothesis was that this persistence would more accurately identify the child needing early therapy.

PROCEDURE

Working in teams of two, six therapists screened 1267 first grade children in the fall of 1968; 550 children were found to make articulation errors and were given the Predictive Screening Test of Articulation. Errors were described, coded and stored for comparison with the results of testing done in September, 1970, when these children were in third grade.

RESULTS

Results of the data analysis involving the PSTA predictive indicator closely paralleled those of the VanRiper-Erickson study. Eighty-six per cent of the children in the current study who scored 34 or above in grade one did not need therapy at grade three. However, the data from the present study strongly indicates that a cut-off score of 32 is more efficient since it reduces the frequency of incorrect decisions at grade three to a minimum.

These data also indicated that the PSTA was approximately fifty per

cent more efficient than the therapist alone when used to identify and recommend first grade children for therapy.

Data were also available to compare (1) therapists' decisions at grade one and subsequent disposition at grade three and (2) agreement between the therapist team as "therapy" or "no therapy" at grade one using the interview technique and the PSTA. As a group, therapists were able to predict grade three outcome at grade one in 68.7 per cent of the cases. Comparison of the therapist team decisions at grade three showed agreement in 90.3 per cent of the cases compared to 84.0 per cent at grade one.

Analysis of the data on error persistence revealed the "s" and "z" error persisted at a rate of 42.0 per cent; "ch" at 25.0 per cent; "r" at 15.8 per cent; "sh" at 14.1 per cent.

In summary, the data presented and described in the preceding paragraphs suggests decisions about first grade children's therapy needs are difficult to make and strongly indicates the need for using an objective measurement such as the PSTA to support recommendations for or against therapy.

ACKNOWLEDGMENTS

The authors are deeply indebted to Dr. Russell Green, Coordinator of Research, Board of Cooperative Educational Services, District #1, Monroe County for designing this study; to Joanne E. Lang, Research Assistant, BOCES #1 research staff for her help in the data analysis; and to Marion M. Ward, Coordinator of Speech and Hearing Services, BOCES #1, for her support and guidance during the course of this study.

Abstract

This study was undertaken to determine if the results obtained by VanRiper and Erickson with respect to the establishment of cut-off scores on the Predictive Screening Test of Articulation (PSTA) could be replicated. This present study also includes analysis of errors and study of therapists' predictions of therapy need. Obtained results on the establishment of cut-off scores closely paralleled those of VanRiper and Erickson.

REPLICATION STUDY USING THE PREDICTIVE SCREENING TEST OF ARTICULATION

A Three Year Study

by Velma Carr, M.A., and Joan Stover, M.S.

Opinion and practice seem to vary widely regarding the most appropriate and effective time for intervention in the development of acceptable articulation. These philosophies range from, "Begin as early as possible", to "Not until age 8 or third grade". There was not an objective tool available to assist clinicians in making this decision until Dr. VanRiper, Dr. Erickson and their colleagues at Western Michigan University developed the PSTA and presented it at the ASHA convention in November, 1966.

We began using the test the following spring which led to questions that could best be answered by a controlled study.

With the permission and cooperation of our Superintendent, Supervisor, and Research Consultant, this study was designed to seek some of the answers.

The PSTA is a test containing 47 items which are scored a value of 1 point for a correct response and no value for an incorrect.

There are 38 one word items presented for the subject to repeat. Each is marked for a specific sound or blend to be tested. The remaining items include a sentence, sounds in isolation and nonsense, discrimination, and a clapped rhythm pattern.

Further information or clarification of the test can be obtained from the authors at Western Michigan University.

The test validation by VanRiper and Erickson was done on 1st grade children and we followed their procedure. Because of this, I will refer to the grade level rather than the customary chronological age.

The intent of our project was to assess the effectiveness of the PSTA with our population and our clinicians and to answer the following questions:

Question #1. Does it matter what form the screening procedure follows? If so, does one format provide a more reliable result than another?

Question #2. Will our investigation support the score of 34 which VanRiper and Erickson have found to be the score above which 85% of 1st grade children will not require therapy?

Question #3. Do therapists agree as to which 1st grade children who make articulation errors, need early intervention?

Question #4. Can the PSTA provide a more accurate gage for predicting which 1st grade children should be included in some form of speech therapy activity than the subjective judgement of the speech therapist?

Question #5. Does the score of 34 really find all of the children for whom we should assume responsibility, or is there any particular type of error which should be noted along with any score which would alert the therapist to a special need?

The participation of 8 of our colleagues was required in gathering data. Working in teams of two, six therapists screened 1,267 first grade children in 13 different schools. Each therapist

on the two member team tested the same children, but worked independently of one another and compared results only after the tests were finished. Each team screened each first grade child in their assigned school, alternating by classroom the therapist who interviewed first.

Instructions to the participants were:

1. Use whatever screening technique you habitually use.

2. After you have recorded those children making articulation errors, you are to indicate which of the following, in your judgement, should be the dispostion of the case.

   a. Placement in a suitable therapy situation.

   b. Provide a limited speech development program.

   c. Observe (make a follow-up contact at a future time.)

   d. Articulation within normal limits. The 3rd instruction was: Administer the PSTA to all children identified by either you or your partner as having a speech error.

Children scoring 22 or below on the PSTA could receive therapy. This was based on the results of the testing in Michigan and our research consultant advised us that we could expect statistically that none of those children would be error free by 3rd grade. Also there would probably be strong pressure from parents and teachers to provide help for these children.

Errors were described, coded and stored for comparison with testing to be done in September, 1970, when these children would be entering 3rd grade.

Testing of 3rd graders consisted of a two therapist team again. Each child was to be seen by each therapist - one using the PSTA - the other using an interview technique. Team members were to switch methods for about one-half of the children seen. Errors were to be noted just as in the previous testing.

In 1968, we identified 316 boys out of 660 as having speech differences and 234 of 607 girls. In September, 1970, we were

able to locate and retest 376 children: 216 boys and 160 girls. Of the 216 boys, 133 were judged error free (61.5% of the total) and 116 of the girls, (72.5%). Comparison of these percentages indicates that there is no significant difference in acquisition of error free speech between boys and girls.

Question #1. Regarding screening technique:

It was requested that no comparison of screening technique be made and that each therapist screen in her usual manner.

It was assumed that there might be considerable variety of method resulting in some differences in identification. However, we discovered that basically all six therapists used an informal interview with support of either picture cards or repeated sentences. As a result, any difference in reliability of identification could not be attributed to screening procedure.

Question #2. Will our investigation support the cut-off score of 34 which VanRiper and Erickson found would select 85% of the children who will not require therapy?

The analysis of our data very closely parallels that of the Michigan study, in that, 86% of our subjects scoring 34 or above in grade 1 do not need therapy at grade 3. However, we did not

find Score 34 to be the most efficient; we find Score 32 reduces the joint distribution of false positives and negatives to a minimum. That is, of the 30 subjects clustered between Score 32 and 34, only 7 of these [illegible]lse negatives - those that did, in fact need therapy at 3rd grade. In practice this would have required our therapist using Score 34 to include 23 children in therapy who actually did not require intervention to develop acceptable articulation. The result of using Score 32 to select those in need of therapy would delay only 7 children two years before help was made available to them. If numerous replications of this study were conducted it can be assumed that cut-off scores would all cluster around this range of 32 to 34 scores.

Question #3. Do therapists agree on which children who make articulation errors need early intervention?

When the initial figures were analyzed, we found that in an average of 84% of the cases the pair of therapists was in

essential agreement. Now that these subjects have been seen at 3rd grade and a set of decisions is available as to the actual disposition of the children, we can compare the original prediction with the disposition. We find that the therapists as a group were able to predict the 3rd grade outcome only 68.7% of the time. When we compare the pairs of therapists making the 3rd grade "therapy, no therapy" judgements, we find that they agree in 90.3% of the cases. This rather startling difference can only lead to the conclusion that decisions about 1st grade children's needs are inaccurate and there is strong evidence that some tool for objective measurement, such as the PSTA, is essential to support any recommendation for or against therapy.

Question #4. Can the PSTA provide a more accurate gauge for prediction?

Our study has shown the PSTA to be 50% more efficient than the therapist alone when the 32 cut-off score is used. When the therapist's recommendation is for no need for therapy, we

find that about 20% of these subjects do indeed need help at 3rd. If we use the PSTA score 32 at 1st grade to omit children, we only find 10% who still need therapy at 3rd. If we compare predictions of individual therapists and the PSTA, we find essentially the same 50% greater efficiency for the PSTA.

For those children who scored 22 and below, therapy has proved most rewarding. We had 22 such cases. They obtained a mean score of 15.6 at 1st grade and 36.8 at 3rd. This is a dramatic change of 21.2 points on the PSTA. Children scoring 23-27 were selected as a comparison group - to reduce the ceiling effect in the statistical analysis. Their change was far less. The 1st grade mean was 25.0 and 3rd was 36.0, a gain of only 11 points. This is rather strong support for the use of therapy for the lower scoring sample.

We inadvertently acquired a very small "control group". Fourteen children who scored between 22 and 34 received therapy. These fourteen were compared with 120 other subjects with the

same range of scores who did not receive therapy. There was significantly less need for continuing therapy at 3rd grade in the "control group". This is further support for the usefulness of therapy for the 1st grade child who is appropriately selected.

Question #5. Regarding error pattern.

If we look for a pattern of persistent errors from 1st to 3rd grade, we find that the s and z errors persist at a far greater rate than any other error. Of 356 (s), (z) and (s blend) errors at grade 1, 149 of these errors remain at grade 3. That is 42% still needing remediation. The next most persistent error is (ch) - 25% of these errors are still with us at 3rd grade. (r) persists to 3rd; only 15.8% with (sh) essentially the same at 14.1%. (l), (ə&ʒ), and (F & V) drop all the way to 7.8%, 4.3% and 4.1% respectively.

We in school therapy have long been chided as (s) and (z) therapists. If we rely on the PSTA to assist us in case selection, we will continue to be sibilant therapists because other errors seem to change with age and general educational stimulation.

If there is any group of sounds that seems to be maintained it is the full (s) error - distorted (s) in isolation, words,

sentence and blend.

Other than this strong persistance there is no pattern of errors. The PSTA score of 32 is the only realistic support for judgement of 1st grade children who will require something other than living in an educational environment for two years.

In summary, we can say that

1. The PSTA is a far better predictor than any therapist or pair of therapists in selecting children for therapy from a 1st grade population.
2. We did not find a pattern of errors that can replace the PSTA as a predictor.
3. Our study clearly supports all postulates of the VanRiper, Erickson study with the possible exception of establishing 32 as a significantly more efficient cut-off for our population.

The studies of Poole and Templin and Darley on age norms for sound acquisition gave us our first step toward objective case selection. I predict that the Predictive Screening Test

of Articulation will be as widely used and the second step up that ladder of objective case selection.

AN EDUCATIONAL DEMONSTRATION - ASSESSMENT PROCEDURE

by Nancy E. Dworkin
Director of Educational Services
Program for Learning Studies

and David A. Yochim
Coordinator of Psycho-Educational Services
Comprehensive Health Care Program

Children's Hospital National Medical Center

Washington, D.C.

AN EDUCATIONAL DEMONSTRATION - ASSESSMENT PROCEDURE

The authors would like to acknowledge the development work done by the Program for Learning Studies, under the direction of Dr. Mark N. Ozer. Much of the work described below was nurtured by and grew out of the Program's concepts of clinical and diagnostic services to children with learning disabilities.[1]

The focus of the assessment procedure is on the level of interaction between the child and his teacher, rather than at a classification or placement level. Since we expect that for most children the teacher is, and will continue to be, the person most responsible for his learning, the concern of this procedure is with those aspects of the teacher/child transaction which can be improved to enhance the child's learning. For those few who need more intensive and even more specialized instructional programming, the procedure described here can be used as a screening device and as a first component of a more detailed psychoeducational assessment.

Rather than attempting to define the child's disability, through the use of a label (i.e., minimal brain dysfunction), our aim is to consider the aspects of an educational interchange between the teacher and child in terms of:

1. the child's acquisition of academic skills
2. demonstration of those success-oriented strategies by which this can be brought about
3. the use of classroom materials as the vehicle through which this can be accomplished
4. teacher variables which may enhance the child's learning.

The assessment, lasting approximately one hour, culminates in the generation of an operationally defined remediation plan. Since the planning is done in collaboration with the teacher and is based on her current concerns in relation

to materials presently being used in her classroom, suggested approaches and techniques can be directly implemented. It thus is viewed as immediately useful and has a reinforcing effect on all participants.

CONTRASTS

The assessment procedure, as indicated above, is educational in nature, rather than psychologically or psychoeducationally oriented. It is not explicitly concerned with functional skill areas, the "measurement" of intelligence, or the study of personality factors. Results are not expressed in terms of intervening variables and do not imply that the problem resides wholly in the child. Rather, its focus is on the acquisition of academic skills, and on the strategies and materials whereby this is accomplished.

The procedure is precriptive in nature, rather than descriptive or etiological It attempts to specify a plan of action for immediate use, that is, it suggests what might be done, rather than offer a description of what is. It pays particular attention to sought-for educational or behavioral outcomes, since it is through these that effectiveness is measured. Even though one of the aims of the procedure is the development of a short-term prescription which can be implemented immediately, its primary aim is to communicate that the process of arriving at the prescription can be used in a variety of contexts and with a variety of children.

The procedure is remedial-diagnostic because it is a constant search for what works.[2] Labeling is rigoriously avoided, since labels may unnecessarily restrict choices of remedial options, may establish and feed expectancy sets, and may become a self-fulfilling prophecy. The procedure's remedial emphasis is in terms of the conditions necessary for the child to learn, and extends to the teachers by requiring her to indicate what the child can do and what she found to work with him in the classroom. Constraints are imposed on the system by the necessity of tying the suggestions offered to the teacher's observations of what transpired during the assessment and by the need to limit the number of new ideas presented at any one time.

CHARACTERISTICS

The demonstration-assessment procedure described here has five distinctive characteristics:

1. It provides a model for the teacher of problem-solving strategies
2. It incorporates classroom instructional materials into the assessment procedure itself
3. It can be used as a component of the teacher inservice training program
4. It emphasizes the continuity between assessment and remediation
5. It is academic-task oriented.

The first characteristic, that of providing a model for the teacher of problem-solving strategies, communicates much more clearly than any written report some possible courses of action. It shows not only that the child can successfully learn tasks of academic importance, but identifies some strategies by which that success can be achieved. The likelihood of a teacher utilizing particular strategies is enhanced when he sees their effect on a child's performance. At the same time, an attempt is made to demonstrate and suggest only those approaches which are feasible within the constraints of a large class situation.

An optional feature of the assessment calls for the specialist to encourage the teacher to actively participate by carrying out a task with the child, under his guidance. This not only gives the teacher an opportunity to observe a model and then put it into practice, but enables her to see that she, as well as the specialist, can bring about the child's success.

The second characteristic involves the use of classroom materials in the assessment itself. This precludes a set-battery of tests since the specialist must be responsive to the teacher's specific concerns. No testing is done to determine if the child measures up to some norm; no pre-established set of tasks is employed. The only criterion is the teacher's criterion for this child.

Thus, tasks to be utilized during the demonstration-assessment are chosen through the collaboration of the specialist and teacher. The latter brings with her some examples of the child's current work and the materials. Using classroom materials during the assessment maintains the focus on accountability - the responsibility of the teacher to lead the child to success in learning and the responsibility of the specialist to provide classroom-realistic assistance. It maintains the focus on "what works" with regard to relevant problem areas. Further, the use of these materials avoids the problem of transfer from assessment tasks to classroom tasks.

The third characteristic, use of the assessment as a component in an in-service program, conceives of the procedure as a micro-teaching experience in which classroom teachers, special education resource teachers, or school psychologists can increase their skills by observing problem-solving strategies with the option of practicing them and receiving feedback as to what was done well and how it could be generalized to small group instruction. For the classroom teacher, the impact of the program is increased by the applicability not just to the classroom, but to her classroom specifically. As a first level of service for those children referred for evaluation, it can also be used as a screening device for those few children needing more intensive study.

The fourth characteristic, continuity between assessment and remediation, stresses that these are parts of one process.[3] Since the learning situation changes, depending upon the interaction between a child and the person instructing him, transfer from assessment to remediation is facilitated by having the teacher present, by having her actively participate, and through the use of academic tasks.[4] Although these tasks are not exactly the same as those she may be teaching in the classroom, the purpose of the assessment and of her instruction are the same - i.e., how to go about teaching the child. Transfer is further facilitated by a

follow-up visit to the classroom, several weeks after a written summary has been sent to the teacher. The procedure stresses the fact that a teacher can be successful in remedial planning for the vast majority of children referred.

The fifth characteristic, that the procedure is academically rather than developmentally oriented, indicates that it probes academic areas within which the child is presently expected to function. The developmental level is seen as the entry point to be used as initial stages in programming further learning. It should not be accepted as a conclusion, that is, a statement of how far the child could proceed.

PROCEDURES

The diagnostic process is initiated through an orientation meeting with the teacher, in which a referral form is presented and explained. The form asks the teacher to provide a description, in specific terms, of what the child has achieved in problem and non-problem areas; to identify major areas of concern; to define the approaches and materials she has used and their effectiveness; to set short range goals. In addition to eliciting this information, the referral form is also designed to begin to shift the teacher's viewpoint towards a more positive and problem-solving approach.

A classroom observation takes place prior to the assessment, in order to note how the child functions in a group learning situation, and to observe the effect of a group context. Instructional interactions are carefully recorded in order to reinforce those strategies the teacher used which led to successful learning on the part of the designated child. Successful strategies are reinforced in terms of their response to a particular learner's style or needs, rather than in terms of use with a particular category of children; thus, they can be generalized to other children and to a wide range of academic areas and tasks.

The first step of the actual procedure is the pre-assessment conference. During this time, the teacher is asked to elaborate on any information in the Teacher Report Form where necessary. Specifically, the teacher is asked to discuss in detail the child's present level of achievement in the areas about which she is most concerned. Her responses on the referral form are discussed in terms of what she did that worked, so that these strategies can be reinforced.

Another component of the pre-assessment conference is the specialist's study of the child's classroom material and examples of his written work, which the teacher is requested to bring with her. This enables the specialist:

1) to see the kinds of academic tasks the child is asked to perform

2) to see how the child responds to these demands

3) to make use of this information in the specialist's planning of his strategies with the child.

Finally, the specialist, with the collaboration of the teacher, decides on the two specific tasks to be explored during his work with the child.

Although the procedure cannot be discussed in detail within the limits of the time available to us here, a number of rules of thumb are worth mentioning:

1. Explain to the child, during your work with him, what you are doing and how this appears to affect his success. This will both benefit the child and aid the teacher in following the steps of your programming.

2. On working on the task collaboratively selected by the specialist and the teacher, begin at a level slightly below that at which the teacher reports the child is presently functioning. This is done to insure that successful responding occurs from the very beginning.

3. There are a limited number of strategies demonstrated during the educational assessment. These strategies exemplify the manipulation of a small number of learning variables. The particular variables emphasized include: breaking the task

into its components (task analysis); selecting and combining the modality of input (modality variation), and reducing background confusion and/or highlighting relevant features (focusing). Special emphasis is given to the provision of feedback and positive reinforcement for correct responses.

4. The specific tasks worked on with a given child are formulated in such a way that his responses provide interpretable and meaningful information about how he learns, rather than what he learns.

5. To enhance the likelihood of use and generalization, whenever possible, techniques are demonstrated which can be employed with groups of children, rather than just with one child.

6. If the teacher works with the child on a task, structure and program it with her in such a way that it is a successful experience for her. Provide feedback to the teacher following the assessment about what she did that went well.

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EAST BATON ROUGE PARISH SCHOOL BOARD
DEVELOPMENTAL LEARNING CENTER
2550 BOGAN WALK
BATON ROUGE, LOUISIANA 70802

April 24, 1973

MEMO TO: Council of Exceptional Children - ERIC SYSTEM

From: Gabriel J. Jumonville, Administrator

Subject: Program Paper

Raleigh Huyenga, Ph.D. Moderator

EAST BATON ROUGE PARISH SCHOOL BOARD
DEVELOPMENTAL LEARNING CENTER
2550 BOGAN WALK
BATON ROUGE, LOUISIANA 70802

DEVELOPMENTAL LEARNING CENTER - TITLE I PROGRAM

The Developmental Learning Center provides therapeutic service for children with learning problems. These children have been evaluated by state certified agencies at the request of parents and school personnel in East Baton Rouge Parish.

Despite the range of problems with which the Developmental Learning Center deals, the nature of these deficiencies is determined by school consultation and by a careful study of referral data. A study of each child's performance within the Center is made and when necessary, additional evaluations by the staff are geared to answering specific questions and to finding present levels of functioning.

Once the child's problems have been delineated, a planned program of developmental therapeutic assistance is initiated. The child, who may be enrolled in kindergarten through the 12th grade will be seen individually or in groups, depending upon his needs.

The Developmental Learning Center makes several assumptions.

First, it assumes that the child should be kept in the regular school setting and therefore views its' role as a therapeutic and supportive service to the child.

Second, the Center assumes that an interdisciplinary approach is the most effective method of therapy. The interdisciplinary team concept gives direction to the overall program for the child. It is believed that the child's classroom instruction whenever possible, should be blended carefully with developmental activities. This will insure consistency of direction to his total program.

Third, the Center does not assume that a given child is "dyslexic", "brain damaged", or "ataxia", because of the inadequacy of labels.

The child comes to the Developmental Learning Center for one-half to one and one-half hours of intensive therapy during the school day, two or three days per week.

The Administrator, Psychologist and Therapists consult with the school in an attempt to coordinate these special services with the regular classroom activities and to provide supportive help to the child's teacher and parents. Reports of the child's progress are filed with the school periodically. In addition, staff visitations are made to the schools at least once during the school session and our staff members are available for telephone consultations and/or personnal conferences with teachers upon their request.

The speech therapist, as a member of the interdisciplinary team works with severe articulation, language, cerebral palsy, cleft palate, voice and stuttering problems. As a language specialist, emphasis on receptive and expressive language skills is geared to each child's level of ability. Auditory, visual and tactile stimuli are used to introduce concepts and the child expresses his understanding in actions and words.

The perceptual motor therapist has a very diversified role at the Developmental Learning Center, ranging from the development of general coordination to the correlation of basic concepts (even letters and words) with complex movement activities. This area serves as a basis for the development of many concepts which are both directly and indirectly related to necessary academic skills. Perhaps one of the greatest aspects of this area is the development of a good self image achieved by successful experiences in movement activities.

Language concepts are also an important aspect of the hearing program which provides therapy for children with sensory or perceptual hearing difficulties. Depending upon the needs of the child, therapy for children with hearing difficulties may include speechreading, auditory training and speech conversation. The children with sensory losses use a hearing aid, the Train Ear Unit, or desk amplifier designed to amplify sounds so that residual hearing may be used to the fullest extent.

Speechreading training is designed to improve the child's ability to understand language by observing the speaker. This includes not only observation of the lips but also of the tongue, facial expressions and gestures.

The students referred to the Center for visual motor training have been thoroughly evaluated and have been found to have a definite lag in their visual perceptual development.

Visual perception is a process of integration that occurs in the brain and not within the eye. For instance a child sees a shape with his eyes but the ability of the child to interpret these lines as a specific shape is a process of integration that occurs within the brain. The development of this ability is directly related to the skills needed for academic development.

One of the ultimate goals of the Center is to develop the reading skills of each child so that he can perform the conceptual tasks necessary to achieve the academics. Upon entry into the reading area each pupil is administered diagnostic and informal tests to determine the level of performance and the skills with which instruction is to begin. Realizing the perceptual handicaps of some pupils, special methods, techniques and devices are used to help alleviate these handicaps. When a child demonstrates a perferred modality for learning, use is made of this strength to develop his weaknesses.

TITLE: Evaluation of Differentiated Staffing in Speech and Hearing Service Delivered in Public Schools

AUTHORS: Joanne E. Lang, Board of Cooperative Educational Services #1, Monroe County, 41 O'Connor Road, Fairport, N.Y. 14450
Home address: 103 Highland Parkway, Rochester, N.Y. 14620
Marion M. Ward, Board of Cooperative Educational Services #1, Monroe County, 41 O'Connor Road, Fairport, N.Y. 14450
Home address: 100 Glen Haven, Rochester, N.Y. 14609

DEGREE: Joanne E. Lang, Ed.M.
Marion M. Ward, B.A.

EVALUATION OF DIFFERENTIATED STAFFING IN SPEECH AND HEARING SERVICE DELIVERED IN PUBLIC SCHOOLS

PROBLEM: In recent years, many children diagnosed as learning disabled with deviant or delayed language development have been added to a caseload which traditionally has consisted mainly of articulation defects. Many children in this latter group remain in therapy several years without acceptable correction. The factor of increased caseload combined with decreasing budgets has made it necessary to search for alternative approaches to delivering speech and hearing services which would provide an optimal program for all children. The differentiated staffing program was implemented to make this possible.

PROCEDURE: Variations in scheduling and therapy techniques were introduced into the schools in the BOCES #1 area during the 1970-71 school year. The Intensive Cycle Program is designed to serve children with severe speech defects and hearing problems who are in grade three and above. Each child is seen individually by the therapist in three sessions per week for a ten week block. Contingency management techniques are used. Contingency management was chosen as the basic technique to be used because of its demonstrated efficiency in laboratory settings.

In addition to the intensive cycle therapist, another therapist (language-speech therapist) maintains continuous service in the same school throughout the year. Her role is mainly as a language development consultant for primary teachers; she screens first grade children and conducts a structured series of ten diagnostic language lessons for primary children who exhibit

deviant language and/or articulation problems.

Prior to the 1970-71 school year, a single therapist had complete responsibility for all speech, language and hearing problems in a building.

At the conclusion of the therapy or language development period, a report form containing information on the child, school and family background and speech and/or language problem is completed by the therapist. Utilizing data from these report forms, the status of children receiving traditional speech therapy in 1969-70 and the 1970-71 intensive cycle and language speech program was compared on the following variables: disposition at end of therapy, prior therapy, number of lessons, parent conferencing and type of problem. Children participating solely in the speech development program were excluded from these analyses.

RESULTS:

Complete data was available on 1256 pupils in 1969-70 and 1328 pupils in 1970-71. In 1970-71, 440 pupils were seen in the intensive cycle program and 888 in the language-speech program. Dismissal rate was 34 percent in 1969-70 compared to 39 percent in the 1970-71 total program. This increase is due in large part to the intensive cycle program where 51 percent of the caseload was dismissed compared to 33 percent in the language-speech program. Sixty-six percent were rated as improved-continue in 1969-70 compared to 61 percent in 1970-71, 49 percent of which was in the intensive cycle program and 67 percent in the language-speech program.

Approximately three-fourths of those enrolled in the intensive cycle program had been in previous therapy compared to 39 percent in the 1970-71 language speech program and 54 percent in the 1969-1970 caseload. Forty-seven percent of the intensive cycle pupils were in grades three-five with only seven percent below grade three; enrollment in the language-speech program was heavily in the primary grades (74 percent). Practically all of the 1969-70 caseload was distributed between grades K-5 (90 percent) with the bulk falling in grades 1-3.

In the intensive cycle program, each child has a maximum of thirty lessons. Thirty-eight percent of those dismissed in 1969-70 and 21 percent dismissed from the 1970-71 language-speech program received more than thirty lessons. The intensive cycle program not only has a better dismissal rate than the other programs but also accomplishes this in fewer lessons.

In 1970-71, there was therapist-parent contact for 84 percent of the intensive cycle pupils, 49 percent of the language speech pupils and 45 percent of the pupils in the 1969-70 program.

The caseload in 1969-70 and in the 1970-71 intensive cycle program consisted mainly of articulation problems (91 percent both years). The 1970-71 language speech program saw 70 percent articulation cases and 14 percent language. The increase in language cases from 1969-70 to 1970-71 shows the effects of differentiated staffing moving into the language areas, especially in the primary grades.

Abstract

The traditional method of delivering speech and hearing services in the public schools is compared with a program utilizing a differentiated staffing approach. The differentiated staffing program included an intensive cycle therapy program based on contingency management techniques. Both programs are described and compared with respect to outcomes in the area of case disposition, prior therapy, number of lessons, parent conferences, and type of speech problem.

COMPUTER SIMULATION: A TECHNIQUE FOR TRAINING EDUCATIONAL DIAGNOSTICIANS AND CLINICAL-TEACHERS

by Janet W. Lerner
Northwestern University

The technological revolution created by the computer in the last decade has succeeded in revamping many areas of human endeavor. New ways to analyze data, new ways to develop models, new ways to study relationships, new ways to teach and to learn, new ways to store and retrieve data, and new ways to simulate experiences are now possible.

The exploration of ways to bring this new technology to the field of learning disabilities was the purpose of an interdisciplinary research project at Northwestern University. The work was a joint effort of specialists in the fields in learning disabilities and computer science. The focus of the project was the development of teacher-training applications. Three areas of computer applications were developed: (1) simulation of the diagnostic and clinical-teaching processes; (2) a computer course for specialists in learning disabilities and related areas of study; and (3) related applications of the computer to the field of learning disabilities. This paper presents the work in the first area--simulation of the diagnosis and clinical-teaching process as a method or training learning disabilities specialists.

Simulation of the diagnostic and clinical-teaching processes

Simulation has been described as a procedure in which a model or an analog to a real life situation is created for the purpose of testing or teaching. A systems analyst seeks to construct a model or definition of a system that is realistic and corresponds to reality in certain relevant particulars. A simulation attempts to duplicate certain activities of a system without attaining reality itself.

* This work was supported by the Bureau of Education for the Handicapped, Department of Health, Education, and Welfare, Office of Education. Grant #OEG-0-71-3736(603).

Computer simulation games have been widely used in fields such as business, medicine, management, and the military science to promote more efficient decision-making, to better understand the system under study, to analyze the relationship of the elements within the system, and to test certain decision-making rules. Thus, computer simulations permit practice in business management decisions without the risk of bankruptcy; they allow military decision-making to be practiced without the loss of life or actual battles; and they permit prospective medical specialists to make diagnostic and treatment decisions without endangering the health of patients. The success found with this technique in many disciplines suggests that the technology could be adapted to the field of learning disabilities by using computer simulation programs as a method of training learning disabilities specialists in the process of diagnosis and clinical teaching.

A primary aim of the learning disabilities programs in colleges and universities is to train prospective specialists to make a diagnosis of a child with a suspected learning disability; further, they are expected to learn how to plan and implement remediation within a clinical teaching program. The process of diagnosing and teaching is an ongoing, dynamic process, requiring decisions that take into account many elements and variables, including test scores, observation data, medical reports, and case history information. Among the decisions that must be made by the clinician are the selection of the data; the determination of the functions to be tested, decisions on follow-up procedures, formulation of the diagnosis, the making of recommendations and referrals, and the development of a teaching plan (Lerner, 1971).

In a typical teacher-training program, the diagnostic and teaching process is discussed in a theory course; and the student gains actual experience while working with children in a clinic or practicum course. Students generally find such clinic experiences extremely valuable; however, this clinical practice is

often limited within the training programs because of the costs involved. Unfortunately, clinical experiences are frequently insufficient to adequately train the learning disabilities specialist because clinic space is often limited, college supervisory personnel are in short supply, and student time that can be devoted to clinic work is insufficient. Computer simulation can provide one way to supplement and enrich training experiences for the learning disabilities specialist. Moreover, in a practicum, students are carefully guided to prevent making errors in diagnosing and teaching because such errors may be detrimental for the child involved. A further problem is that the students gain experience only with the type of case they happen to encounter in the program.

In contrast, in a computer simulation, a student can learn through the process of making mistakes while working with a simulated child. Simulation is, therefore, one way to bridge the gap between the theory course and the clinic experiences. It is not intended to be a substitute for either, but it does provide additional experiences without the expense and difficulties involved in the clinic setting.

The Simulated Diagnostic Sessions

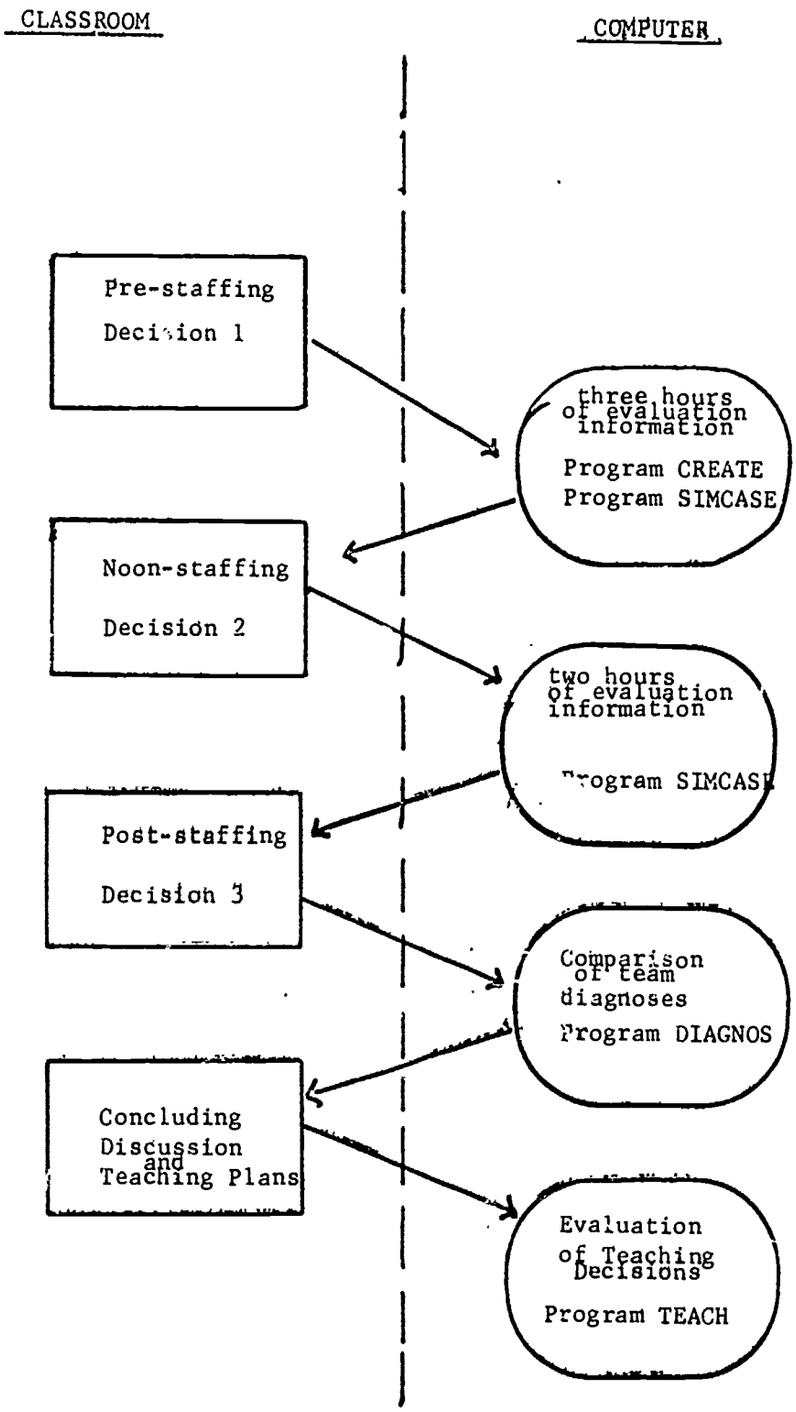
The simulation procedure is planned as an integral part of a graduate course in the diagnosis of children with learning disabilities. The computer simulation game approach was used to enable the participants (students in the course) to practice diagnostic decision-making. While the computer programs were written to simulate the actual clinical setting at Northwestern University, the parameters were set as variables so that they could easily be changed to simulate other clinical conditions. A computer program was written to store extensive information on specific children with learning problems in computer memory. Again, the program was written so that the information stored in memory could be readily changed and modified.

Students were organized into several diagnostic teams, each consisting of about five staff members. Each team made a series of decisions concerning the simulated case. Diagnostic decision-making requires specialists to arrive at decisions concerning the case history, observations, and tests. Realistically, certain constraints limit data collection within any organizational setting, and these constraints affect decisions. Constraints include variables such as time, money, and facilities. Some of these constraints were built into the simulation program. This type of simulation has been referred to as an operational simulation for it simulates an operational environment with which human participants use their judgment and other human abilities to interact with the simulated system (Hare, 1967).

For example, a scarce resource is time; each request or decision, therefore, came at a cost of time. If Silent Reading-Tests A was requested by the student staff to be administered to the child, the computer would check to find how long this particular test would take to administer and if sufficient time remained in the diagnostic session to give it. If not, the computer message in the printout would tell the team that not enough time remained to give that test and that the child should go to lunch. The computer would also check to find if another test that had been requested by the team could be given in the remaining time.

Batch Processing. Two different kinds of computer programs were used--batch processing and time-sharing programs. In the batch processing computer programs, the teams participating in the computer simulation met for several staffing sessions to make decisions and request diagnostic information from the computer. A computer printout based on these decisions was given to each member of the team at the following simulated staffing session. The routine of staffing sessions and computer printouts is diagrammed in the flow-chart shown in figure 1.

Figure 1. FLOWCHART OF SIMULATION OF THE DIAGNOSIS PROCESS



There were four staffing sessions: (1) a pre-staffing; (2) a noon staffing; (3) a post-staffing; and (4) a concluding session. At a final class session students indicated teaching strategies on an individual rather than on a team basis.

At the pre-staffing, the team received preliminary information about the child: name, age, grade, and general problem. In addition, the teams were given a list of the diagnostic information that could be obtained about the child from the computer. This information included scores from a large variety of tests; both total scores and subtest scores are available. In addition, medical reports, neurological reports, EEG reports, ophthamological or psychiatric reports could be requested. Other possible information that was available for diagnosis included teacher behavior reports, case history data, speech and language reports, etc. Each piece of information, however, was tied to a realistic time constraint. Since the morning diagnostic session was scheduled for the simulated time period of 9:00 a.m. to 12:00 noon, the computer would release only three hours of diagnostic information to a team. The pre-staffing, thus, consisted of planning the morning diagnostic session wisely. Although each team was diagnosing the same simulated child, each team received different information because each team had made different diagnostic decisions.

At the simulated noon staffing, the teams received computer printouts of the morning decisions and planned for two hours of additional diagnostic examination in the afternoon (1:00 p.m. to 3:00 p.m.). At this session, the teams began to develop hypotheses concerning the child's problem, and the afternoon session was planned to test or substantiate these hypotheses.

At the post-staffing the teams received output from the afternoon session. In addition, teams evaluated the information that they had obtained during the simulated sessions and developed a series of diagnostic decisions. These included decisions such as determining whether the child has a learning disability, further

referrals, and recommended teaching procedures.

At the concluding staffing, each member received the printout showing decisions made by all the participating teams. At this session students had the opportunity to compare and contrast decisions made by their fellow classmates. During the class discussion, students probed decisions made by other teams and had to explain and justify diagnostic decisions made by their teams. By this point in the computer simulated diagnosis, the students had spent over one week of class time and over four hours of real time discussing and analyzing one child with a learning problem. At the final staffing of the simulation each participant was required to make decisions concerning the teaching strategies that should be used with the simulated child who had just been diagnosed. From some 60 possible teaching techniques, students had to decide whether each method was appropriate and why. Finally, the student received a printout which gave him an evaluation of his skill in reaching decisions. The output shows an individual student how his decisions compare to those of others in the class and to decisions made by a group of experts.

All of the above programs describe a batch processing computer method. Following the making of these decisions in the classroom setting, each decision was keypunched and a job card deck was submitted to the computer. The output was printed on the large computer sheets. All the programs described within the batch processing mode were written in FORTRAN IV.

Time sharing method. The method described above uses computer cards to process the diagnostic decisions. The decisions must be keypunched and submitted as a batch job at the central computer center. Since there is a wait of 15 to 30 minutes for jobs to be processed, students do not receive the printout of the decisions until the following class session. In a time-sharing computer method, students can receive immediate feedback from the computer after decisions have been made. Instead of keypunching cards, a computer terminal with a

typewriter-like keyboard is used. The computer responds immediately. Two types of responses are possible. In one type, (CRT), the responses appear on a small screen; on the other, responses are printed on paper somewhat like a teletype. In the project the printer-type of terminal was used because this permitted users to take home the output and study it. Students were able to diagnose a case via the computer terminal by asking for diagnostic information, and receiving it immediately. The language used for the time-sharing program was an interactive computer-assisted instruction type of language called LINGO, which was developed by James A. Schuyler for the CDC 6400 at Northwestern University.

Using the shared-time (ON-LINE) mode, the student is able to practice diagnosing cases and receive instruction and correction from the computer as he makes his decisions. Several children representing different types of cases are available in the time-sharing computer simulation program so that students are able to assess these children, practice making diagnoses on different types of problems, and develop case studies for class assignments.

Clinical-teaching Simulation

The clinical-teaching simulation is designed to give prospective learning disabilities specialists the opportunity to practice making clinical teaching decisions while teaching a simulated child. The computer, a shared-time printer-type terminal, feeds back information to indicate the effectiveness of their teaching decisions.

In this context, clinical teaching means the tailoring of learning experiences to the unique needs of a particular child. The initial diagnosis is a means of obtaining preliminary information, but the diagnosis should not stop when treatment begins. A continuous and integrated diagnosis and treatment process becomes the essence of clinical teaching. The clinical teacher modifies the teaching procedures and plans as new needs become apparent.

Clinical teaching is also viewed as a test-teach-test process with the teacher skillfully alternating his role between teacher and tester. First the child is tested; a unit of work based on the resulting information is then taught to the child and he again is tested to determine what he has in fact learned. If the child passes the test, the clinical teacher is informed that the teaching has been successful; and he plans the next stage of learning. If the child fails the test, analysis of why he has failed is valuable for subsequent teaching. Clinical teaching differs from regular teaching because it is planned for an individual child rather than for the entire class; for an atypical child, rather than for the mythical average child. It is continuous in that each response to a teaching or testing situation gives additional clues about the child, which provide further guidelines for subsequent teaching decisions.

An important aspect of clinical teaching is the skill of interpreting feedback information and the need for continuous decision-making. The clinical teacher requires the following competencies:

1. Understanding the child. Be able to specify how a particular child functions--the things he can do and those he cannot do, his areas of strengths and weaknesses, his developmental levels as they affect school subjects.

2. Understanding the task. Know the process of task development and the components needed to perform specific skills.

3. Relate the task to the child. Use data gathered from both tests and observation on information behavior in teaching to bring about improvement in the child's performance.

4. Make appropriate decisions. Be able to make appropriate decisions using this information to bring about improvement in the child.

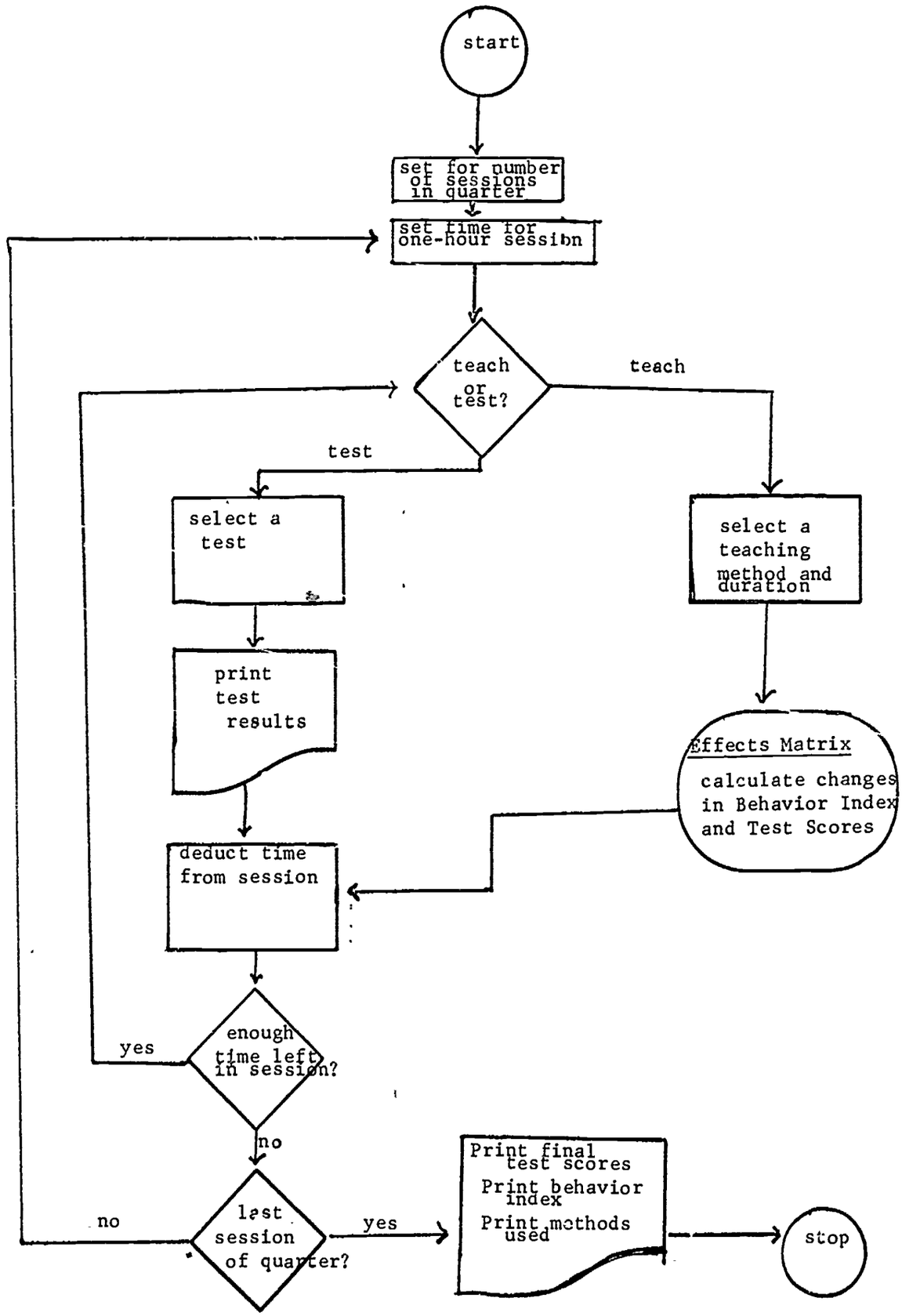
The Clinical-teaching Model

Figure 2 presents the underlying model of clinical teaching used to program the computer simulation. The scores on typical tests are placed in the computer to create a simulated learning disabilities child. For each portion of a simulated clinical-teaching lesson, the student makes a lesson plan and can decide to either (a) administer a test in order to find out something about the child, or (b) teach something, using one of many possible methods. The time spent on a test is pre-determined by the computer program, while the time spent on a teaching technique is determined by the user. If a test is given, the computer program checks to see how much time is left in a simulated one-hour period (the actual time available in a single session with a child in the clinic). If a teaching method is selected, the appropriate time is deducted and the decision enters the "effects matrix." As a result, dependent upon the present status of the child and the method selected, the child's test scores and behavior index may change, either positively or negatively. The behavior change (behavior index) is printed at each step. However, the test score changes are not known by the user unless he decides to give the appropriate test (which takes more time, of course).

The "effects matrix" is the heart of the simulation program. It consists of a number of postulated connections between teaching methods and scores. The effect of a given teaching method is determined by a child's progress, the amount of time spent on a method and on prerequisite methods, the nature of the child's problem, and his behavior index.

A student proceeds through the simulation as outlined. He sees final results only after twenty simulated hours of clinical teaching. This simulation is planned to be equivalent to one academic quarter, or twenty hours of clinical teaching, two one-hour sessions per week for a 10-week quarter. This is roughly similar to the periods of the clinical teaching clinic at Northwestern

Fig. 2. LEARNING DISABILITIES CLINICAL-TEACHING MODEL



University. At the end of that period of time students can judge their clinical teaching decision skills by noting the amount of improvement the child has made in academic areas. The 20 hours of simulated time can be completed in approximately one hour of real time. A number of assumptions about relationships and functions gathered from the research literature are used in building this simulation and these underlying assumptions are presented to the user. Users' responses are stored on tape so that the simulation can be changed, revised, and modified.

It has been said that the fastest clinical method is a shrewd guess. The question arises as to how the investigator comes to make this shrewd guess. Does he pull it out of thin air? Is there a guide? Are there procedures that will prove his ability to make a good guess? The experienced clinician may call it intuitive clinical feeling that has developed from years of clinical experience. The initiate, however, needs logical and methodological aids to help him develop such skills. The goal of the simulated diagnosis and clinical teaching procedures is to enhance the skills of the prospective clinical worker, to sensitize him to critical symptoms, to give practice in the skill of closure while coping with many variables, and to give experience in team staffing and group decision-making. The computer simulation method appears to promote such skill development.

Student reaction to this procedure has been enthusiastic. The students commented that the simulation: (1) required them to make decisions concerning tests, information needed from other professionals, and time allotments; (2) created a realistic face-to-face staffing situation; (3) forced them to organize the data to develop hypotheses; and (4) permitted them to compare their decisions to decisions made by other diagnostic teams.

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DEVELOPING PRESCRIPTIVE COMPETENCY: ANY TEACHER CAN

Eleanor L. Levine
Specialist, Learning Disabilities
Exceptional Child Department
Dade County Schools

Paper presented at the 51st Annual Convention of the Council for Exceptional Children, Dallas, Texas, April 23-27, 1973.

DEVELOPING PRESCRIPTIVE COMPETENCY

ANY TEACHER CAN

A national convention is the time when new and innovative projects which have been developed in various school systems throughout the country may be presented before fellow educators. Since the Dade County, Florida Title VI Project, "Prescriptive Profile Procedure for Children with Learning Disabilities" is new and it is innovative, I would like to take this opportunity to share it with you.

As you know, Learning Disabled Children are those with average or above average intellect who exhibit a disorder in one or more of the basic psychological processes involved in understanding or in using spoken or written language. They are unable to learn under ordinary school instruction though they are not deaf, blind or mentally retarded. This group, who require an individualized educational program, make up approximately one percent of all children in public schools.

Consequently, a program is needed which incorporates adequate screening, diagnoses, prescription and remediation components. Of course, this type of program is required by any exceptional child. So we feel that our product has relevance to all areas of Special Education.

In 1971, the state of Florida utilized funds under ESEA Title VI-B to develop model learning disabilities demonstration programs for each of these components. Dade County was awarded the model prescriptive component.

The "Prescriptive Profile Procedure for Children with Learning Disabilities" or "PPP" was designed to enable teachers to review and evaluate diagnostic findings and translate them into prescriptions for teaching based

on a child's strengths and weaknesses in prerequisite skills, basic school subjects and behavioral factors. Our goal was to provide a concise, efficient and systematic procedure which could be utilized by all learning disabilities teachers regardless of their training and background in the field. It was intended to eliminate much of the haphazard guesswork that teachers must engage in when they enter a new class with little or no information about each student and yet must formulate valid individualized programs.

As an administrator of special education, it is your overall objective to provide an educational program which will be individualized to meet the specific needs of each child. To meet this objective, your teacher must have adequate information about the Pupil; his strengths and weaknesses in Prerequisite skills, his level of functioning in Basic School subjects, and Behavioral factors which may be preventing him from learning. Your teacher must have sufficient psycho-education diagnostic tools, and education programs and tools to evaluate a child's motivating forces to provide the appropriate learning Process for each child. The third requirement is the teacher or Prescriber, and her ability to match the Pupil with the Process and to provide the behavioral setting in which learning can take place. The "Prescriptive Profile Procedure (PPP) will facilitate the accomplishment of your objective by integrating Pupil, Process and Prescriber.

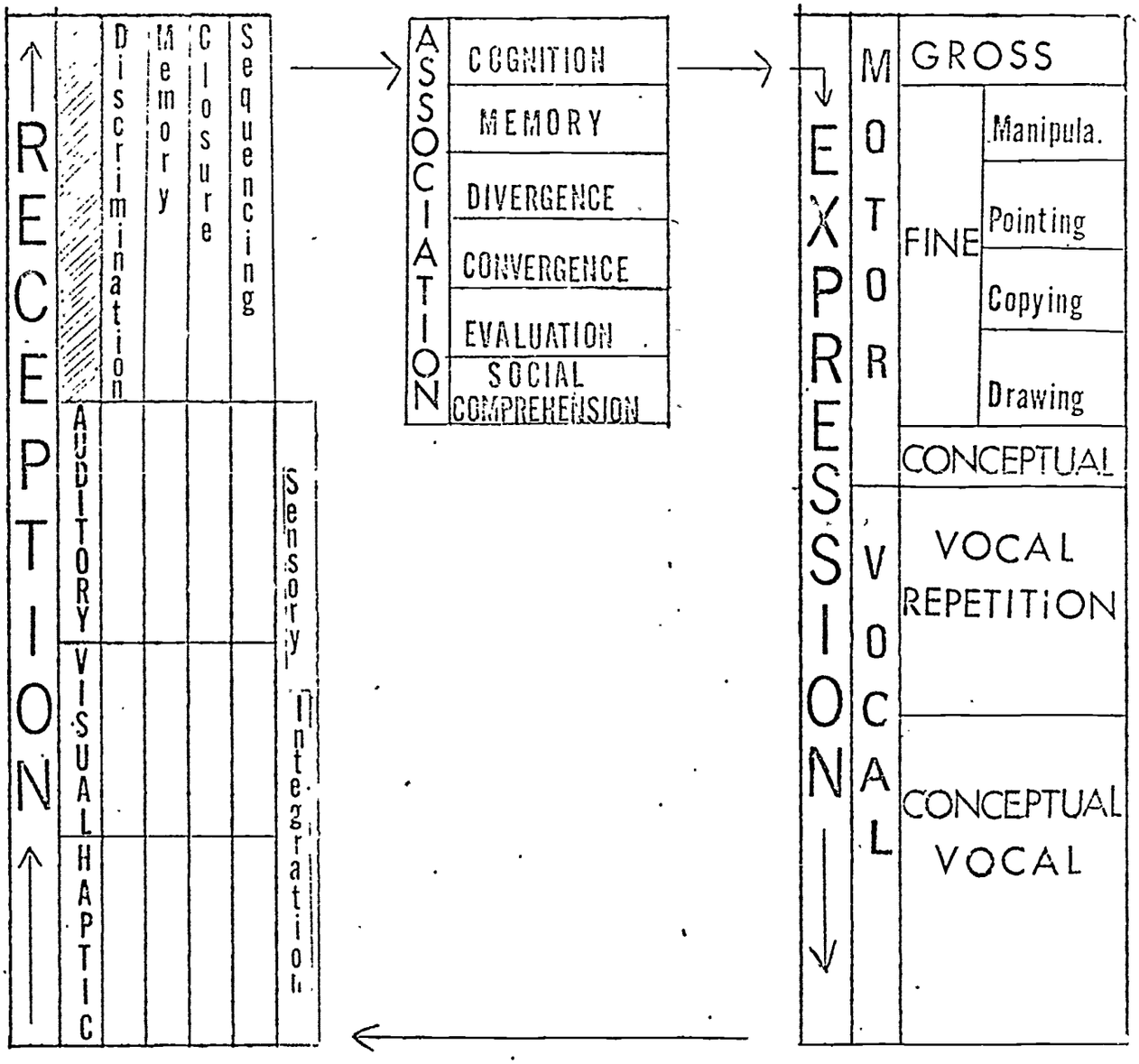
For the "Prescriptive Profile Procedure", an adaptation of Kirk's Clinical Communication Model was chosen as the basic theoretical framework within which you interpret data available from the core diagnostic battery including the Wechsler Intelligence Scale for Children, Illinois Test of Psycholinguistic Abilities, Detroit, Torrance Picture Completion, Test, Sequin Form Board (Tactual Performance Test) and the original PPP Copying Test.

Prescriptive Profile Procedure

Involves

Pupil	Prerequisite Skills	Basic School Subject Proficiency	Behavioral Factors
Process	Psycho-educational Diagnosis	Structured Program	Motivating Forces
Prescriber	Individualized Prescriptions	Curriculum Prescriptions	Individual and Classroom Management Prescriptions

'PPP' COMMUNICATION MODEL



Essentially, this model is an elaboration of the original ITPA model, with receptive, associative and expressive aspects, including more in-depth breakdowns. We refer to our model as the KLEG model or Kirk Late, Early Guilford. Sub-Test scores from the basic test battery relevant to each process and level are compiled by the teacher. The WISC and possibly the ITPA are provided by the psychologist, while she administers the "teacher-given" tests herself. One of which is the "PPP" Copying Test.

The PPP Copying Test is an original school-related task, based on partial upper case manuscript letters, partial lower case manuscript letters and partial numerals. This affords an example of a child's fine-motor, eye-hand ability not relying on any memory function.

The test scores are plotted according to a point system on prerequisite skill work sheets including one for Reception, Association and Expression. There are 3 test scores for each skill area scored from 0 to 3 points. The range would therefore be from 0-9. Five points or more is considered adequate functioning, since a child's weakness in another skill area may lower his score on an individual sub-test.

The child's basic receptive, associative and expressive integrities are then profiled on the Prerequisite Skill Summary Sheet.

The teacher is provided with information about sub-test task demands within the document for each test in the basic battery. This helps her to form an in-depth prescription for each child based on his innate strengths and weaknesses, which will correlate with task demands in the basic school subjects so that she may decide on an individualized program or method of instruction.

"PPP" Copying Test

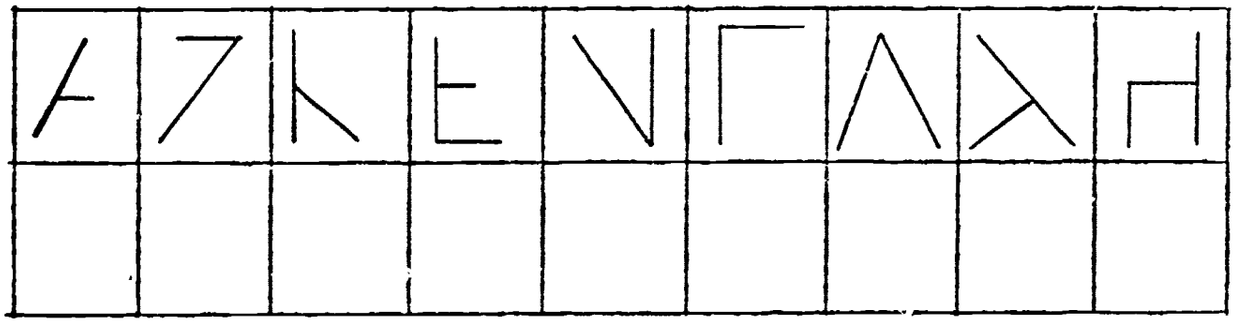
Name _____ Age*_____ Grade _____ Sex _____

Date _____ Teacher _____ School _____

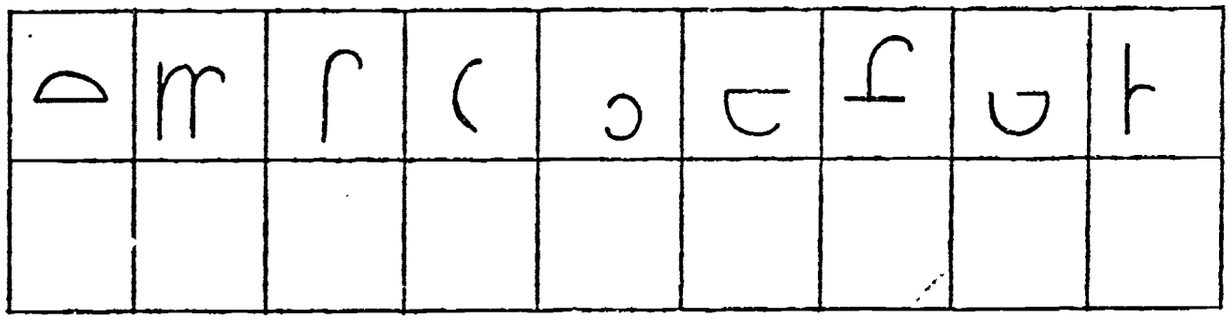
Score I _____ II _____ III _____* _____ Total _____

* Add 5 points if 5 years old; 3 points if 6 years old

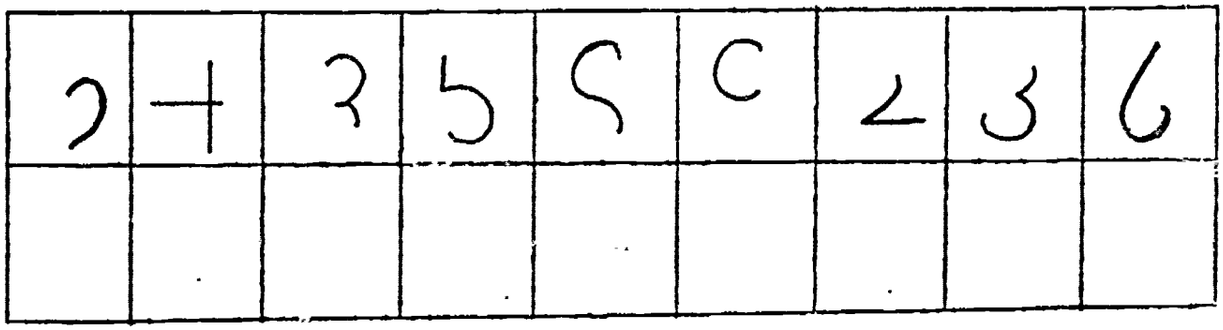
I. Partial Letters. Straight Lines

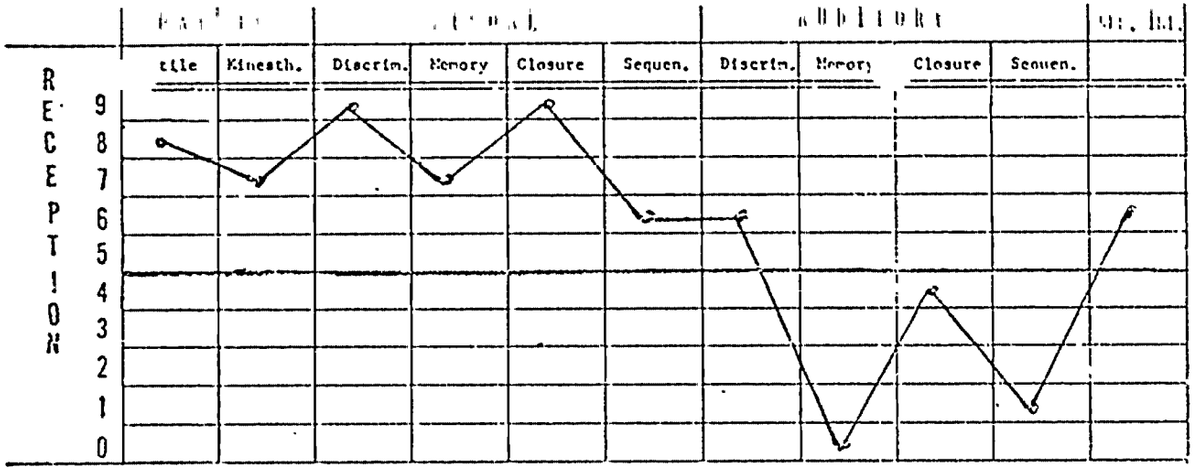


II. Partial Letters. Curved Lines



III. Partial Numerals





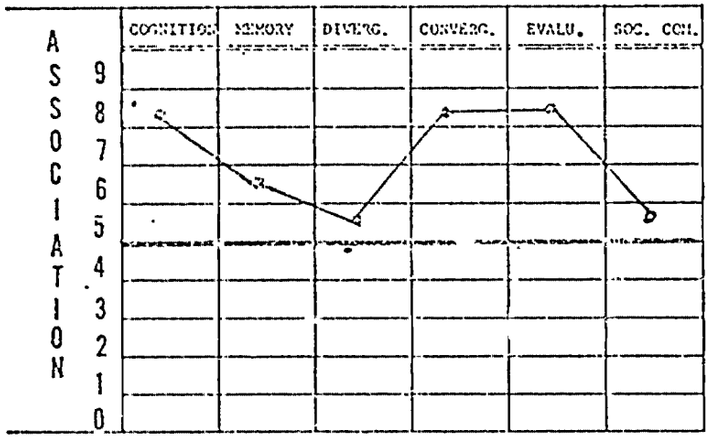
Name JOHNNY DOE

B.D. 9/16/64 Sex M

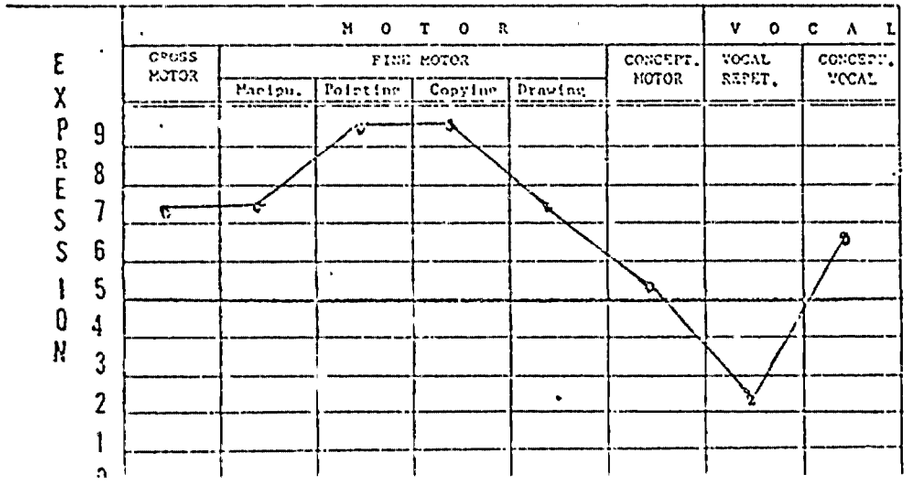
Date Sept. 1972

Teacher _____

School _____



PPP
Prerequisite Skills
Summary Sheet



WISC V. ____ P. ____ F.S. ____

Reading Ind. ____ Inst. ____ Def. ____

Arith. Compu. ____ Comprs ____

Writing ____ Spelling ____

Behavior _____

When the teacher is interpreting the child's profile, she notes if there is a significant discrepancy in a triad. This occurs whenever there is a gap of two or more rating points between one sub-test and the other two. This is seen when the low sub-test requires task demands which are not required by the other test. The teachers will find the discrepancies are usually due to a skill area which is a low point on the summary sheet. Then she is more secure in pinpointing these low areas and also pinpointing areas of strength. Now the teacher can develop the prescriptive process which is directed at specific remediation of the skill weaknesses and the formulation of a total program by teaching subject matter through strong channels in conjunction with behavioral factors.

For instance, if a child shows visual problems on the PPP Summary Sheet, the teacher should remediate the deficit by starting from a rung of the visual developmental sequence at which the child can succeed. But when she is teaching reading, she must use the child's strong, auditory channel and circumvent the visual problems when possible. She would use large, legible, distinct reading material, and muemonic devices, and auditory-associational clues whenever possible.

The teacher uses the knowledge she has acquired about the learner as the key to teaching him the necessary skills. She cannot wait for all deficit areas to be remediated before starting this teaching, as time that is lost is gone forever.

The next step in the procedure is to make an assessment of reading skill development for comprehensive prescriptive planning. Formal and informal tests are utilized to give an accurate profile of each child.

The Durrell Analysis of Reading Difficulty was selected as the formal reading measure since it has sub-tests which may be used in profiling spelling and writing. But, any other comprehensive reading battery may be substituted.

Included in the PPP is a breakdown of the Durrell sub-tests illustrating how reading task demands relate to the prerequisite skill areas,-so that the teacher can note where deficits in the prerequisite skill areas will be likely to affect performance on the reading test.

The PPP Decoding Skills Analysis sheet provides the teacher with a concise inventory of a child's phonetic abilities. As the teacher adminsters formal or informal reading tests, she checks off the decoding skills at which the child is proficient. This record of behavioral observations can then be used for prescriptive planning. It is important for the teacher to remember that a reassessment of these skills be made periodically, to assure that genuine automatic learning has taken place.

The PPP Reading Skills Hierarchy is essentially a summary of skill development based on Kaluger and Kolson, "Reading and Learning Disabilities". Four basic units of paramount importance in developing reading skills are identified as Phonetic Analysis, Structural Analysis, Word Meaning and Comprehension Skills. A task analysis of these units and a grade placement for the teaching of these skills sequentially is delineated. This hierarchy can be used for diagnostic purposes as well as profiling. The teacher can determine the reading level of the child, where remediation must begin, and what must be taught to fill in the gaps in learning.

"PPP" DECODING SKILLS ANALYSIS

Name _____ Sex _____ Age _____

Grade _____ Date _____ Teacher _____

1. Single Consonant Sounds

initial position

m	r	t	s	n	l	f	b	h	g	w	d	z	k	v	p	c	y	j	

final position

m	n	t	p	d	g	l	s	b	f	x	k	z

2. Short Vowel Sounds

initial positions

a	o	i	u	e

final positions

a	o	i	u	e

3. Consonant Diagraph Sounds

initial position

sh	th	wh	ch	rh	kn	wr	gn	sc

final position

sh	th	ch	ck	ng	nk	ph	gh	gh

4. Consonant Blend Sounds

initial position

sk	bl	cl	fl	gl	pl	sl	br	dr	fr	gr	tr	sc	sm	sn	sp	st	sw	tw	str	spl	scr	thr

final position

nd	ct	nt	mp	sk	sp	ld	lp	lk	lt	ft	pt	ct	rst

5. Long Vowel Sounds

a	i	o	e	u

6. Long Vowel Digraphs

ē

ee	ea	ie	ei	ey	yy

ā

ay	ey	ai	eigh	ea	ei

o

oe	oa	ow	oo

T

uy	ie	igh

yu

ew	ue

ü

wo	o	oo	oe	ew	ue	ui	ful	oo

7. Vowel Dipthongs

au

ou	ow

oi

oi	oy

8. Vowel Plus "r"

er

er	ur	ir	or	ear

ir

ear	eer	ere	ier

er

air	are	ear	ere

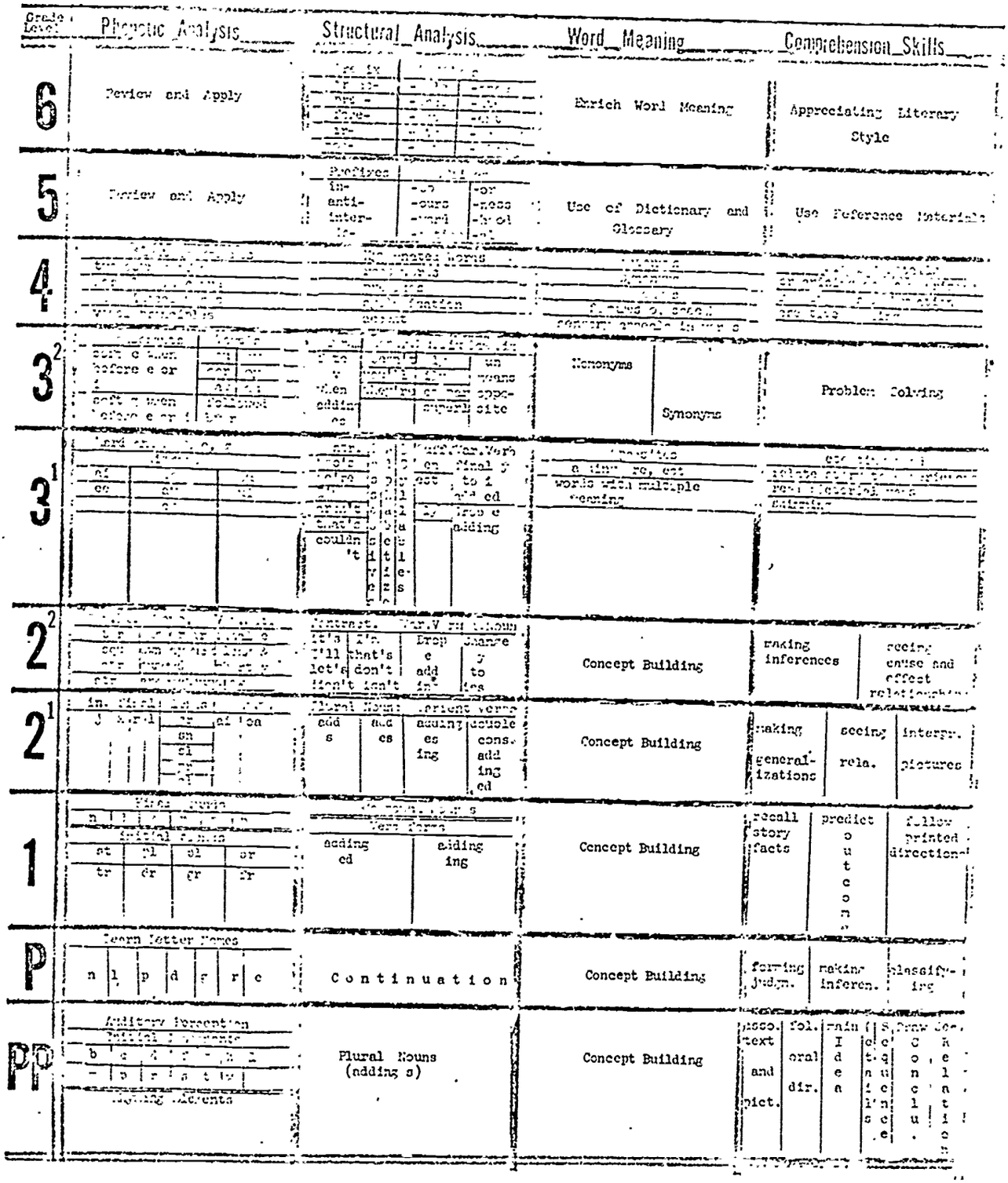
or

or	oar	ore	our

ar

ar

'PPP' READING SKILLS HIERARCHY



A means of facilitating prescriptive program planning is to interpret the process of reading in terms of the PPP Communication Model. The prerequisite deficits a child exhibits leads to specific prescriptions in reading. The teacher is made aware of the processing demands that are made on the learner depending on the reading method being used. Examples of the task analysis or functional analysis of reading methods are given. Learning styles of children are related to particular methods of teaching that may be used. Approaches to reading instruction through specific types of books or readers - such as the basal, linguistic or phonics reader are delineated. Clarification of all ideas propogated in the PPP is provided by the use of a Case Study Approach. One child is used to exemplify the processes involved in each section, as a teacher provides an individualized prescriptive program suited to his needs. The teacher's thought processes as she plans for this child are included.

The Prescriptive Planning for Arithmetic-page gives examples of specific problems in arithmetic that are caused by prerequisite skill deficits.

The teacher continues to evaluate the functioning of the child in arithmetic, spelling and writing. She uses her knowledge of the child's prerequisite strengths and weaknesses along with the subject area information to determine appropriate methods and materials to meet the child's needs.

The next step in the procedure has the teacher observing the child's behavior as it relate to specific classroom experiences. The Behavior Factors section provides techniques for profiling negative behaviors, using sociometric data for class grouping, and assessing self concept. Prescriptive procedures are provided for the teacher to utilize behavioral information in planning the total program for individual children.

As an example, the PPP Behavior Profile has the teacher chart negative behaviors that occur at a specific time, place, activity and teaching situation during a normal school day. Then the teacher can change inappropriate behavior by providing a different educational program tying in her knowledge of the prerequisite skills inherent in the learner and the method of instruction to be used for each child, - in other words an intergation of the prescriptions which were developed in each basic area of school learning - prerequisite skills, basic school subjects and behavioral factors.

Another example is the PPP School Sentence Form which exemplifies the self-concept of a child as it relates to how he see himself in school performance tasks.

Deficit prescription pages in Reception, Association and Expression are provided in the PPP to show samples of symptom behaviors, suggested methods and materials to train deficit areas, and recommended teaching techniques using strengths. These are just examples to which the teacher can add her own storehouse of knowledge.

This Prescriptive Planning Page was designed for the teacher to prepare a summary of all her prescriptions in the three pertinent areas on a single page.

The teacher of a learning disability class is urged to have as many books on remedial games and activities as possible. The more material she has to work with, the more flexibility she has in prescribing.

The PPP Methods and Materials Chart provides a format for listing available games, programs, books etc. and planning their most efficient use. It helps the teacher note the channels required and any skills needed to perform the task. She can then denote the remedial and instructional use of the game. This plan will enable the teacher to use a single activity in many ways and to meet different individualized needs.

Name _____
Date _____
Age____ Sex _____

PPP PRESCRIPTIVE PLANNING PAGE

PREREQUISITE SKILLS			Strengths	Deficits	PRESCRIPTION
RECEPTION	HAPTIC VISUAL	T			
		K			
		D			
		M			
		C			
		S			
	AUDITORY	D			
		M			
		C			
		S			
	SI				
ASSOCIATION	C				
	M				
	D				
	C				
	E				
	SC				
EXPRESSION	MOTOR	Gross			
		FINE M			
		FINE P			
		FINE C			
		FINE D			
		Conc			
	VOCAL	VRV			
		VCV			

BASIC SCHOOL SUBJECTS		PRESCRIPTION
READING		
ARITHMETIC		
WRITING		
SPELL.		

BEHAVIOR		PRESCRIPTION
A		
B		
C		
D		
E		
F		
G		

PPP METHODS AND MATERIALS CHART

SUBJECT_____

SPECIFIC SKILL_____

CATEGORY_____

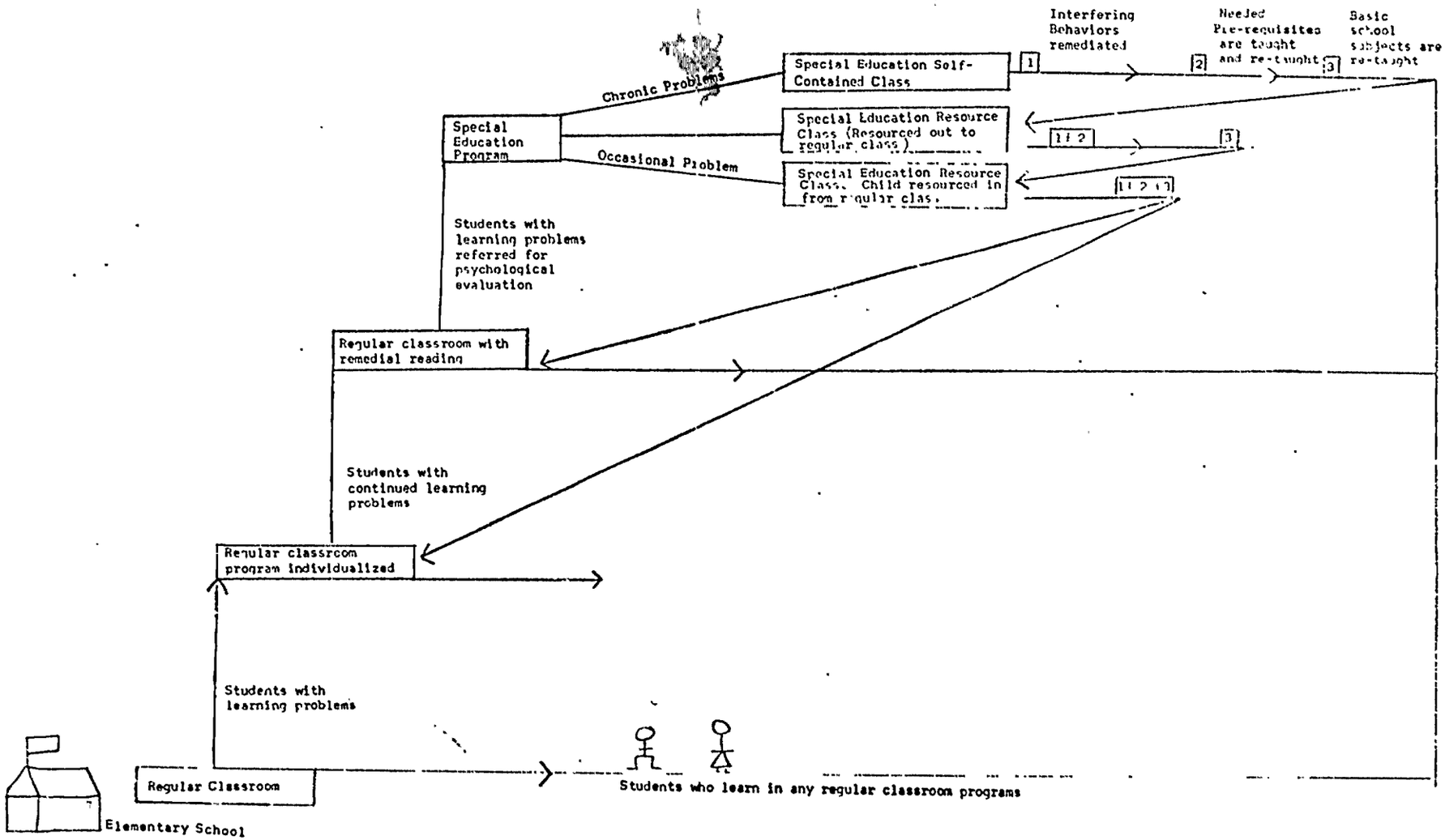
METHOD/ MATERIAL	PUPILS				
	RECEPTION	ASSOCIATION	EXPRESSION	REMEDIAL	INSTRUCTIVE

Competency Statements, Behavioral Objectives and Self Evaluations along with scoring criteria are provided for each section of the document which is color-coded for efficient teacher utilization. In this way, though the procedure is quite sophisticated, a teacher can work her way through by self-instruction with a minimum of in-service provided.

Since a learning disability teacher's ultimate goal for her children is the placement back into the regular class and the mainstream of education, the school climate must allow a free-flow of movement between special education classes and regular classes. The best means possible for this is true individualization of instruction by prescriptive teaching - which fill the needs for all students. The PPP Sequential and Hierarchical Teaching Design shows a suggested progression of programing for schools.

This is the start of a total prescriptive program - and you've seen that Developing Prescriptive Competency - Any Teacher Can.

PPP SEQUENTIAL AND HIERARCHICAL TEACHING DESIGN



TITLE: Training Program for Teachers of Severely Language Handicapped Children.

AUTHOR: Mary Ann O'Brien, Board of Cooperative Educational Services #1, Monroe County, 41 O'Connor Road, Fairport, N. Y. 14450

Home address: 497 Whiting Road, Webster, N. Y. 14580

DEGREE: B.S.

TITLE VI PROGRAM FOR

TRAINING OF TEACHERS OF SEVERELY LANGUAGE HANDICAPPED CHILDREN

PROBLEM: Many children in New York State are afflicted with severe language handicaps and are unable to learn language in a normal way. Since these are severely handicapped children, whether their handicap stems from demonstrated brain dysfunction or not, they would fall under existing mandates under New York State law. Yet, the individual school districts have not provided for these children because of their very low incidence and because they require a highly individualized teaching approach that is different from that now followed in every other kind of special class.

The costs to implement such a program have appeared prohibitive in the past and personnel specially trained to work with these children have not been available.

PROCEDURE: The speech and hearing department of the Lester B. Foreman Area Education Center in Fairport, New York, under BOCES #1, Monroe County, has developed the kind of specialized training procedures and facilities prerequisite to treating children with severe language disorders. These facilities are used exclusively for individual instruction in language development.

Project 71-574, a program funded by the Division of Handicapped Children under a Title VI-A, ESEA Federal grant, was initiated in January, 1971. This program is designed to provide speech and hearing teachers from throughout New York State, with the skills and techniques of behavior modification to more effectively develop language in children with severe language handicaps.

Participating teachers are involved in a two-week training session. Approximately half of this time is spent in observation and discussion of various techniques, methods and approaches while the remainder is spent in a guided practicum. Activities under study include identification of the criteria for reinforcement, the analysis of behavior that leads to identifying adequate or optimum reinforcements, criteria for initiating new language units into the program and kinds of approaches that can be passed on to the classroom teachers. During this period, the trainees work with the severely language handicapped children enrolled in special classes at the Foreman Center. All sessions are video taped and critiqued.

Upon completion of the two week program, it is expected that the trainees will be able to initiate language development programs for severely language handicapped children in their home areas.

RESULTS: The primary objective of this teacher training program is to lower the number of teacher verbal controls in any session and at the same time to increase the number of appropriate child responses. Tapes of initial and final sessions, each lasting five minutes in duration, were viewed to obtain a count of teacher verbal controls and child responses. The initial sessions of the forty-four trainees participating in the program through April, 19 2, showed an average of 94 teacher controls to 35 child responses - two-thirds of which were inappropriate. Final sessions showed an average of 51 teacher controls to 55 appropriate child responses. The beginnings of functional language were initiated in each of the children involved in the program.

Abstract

This Title VI (71-574) training program for teachers of children with severe language handicaps was initiated in January, 1971, because many children with such handicaps were not being adequately serviced by the New York State public school system. The teachers were trained in an intensive two-week program in the theory and techniques of behavior modification as used in language development. The trainees were expected to return to their home districts and be able to initiate their own remedial program for children exhibiting severe language disorders.

SPECIAL READING INSTRUCTIONAL PROCEDURES FOR MENTALLY RETARDED AND LEARNING DISABLED CHILDREN: OVERVIEW OF RESEARCH PROGRAM ACTIVITIES[1]

Charlotte L. Williams and Kathryn A. Blake

University of Georgia

Prepared for Presentation at The

Council for Exceptional Children

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Dallas, Texas

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SPECIAL READING INSTRUCTIONAL PROCEDURES FOR MENTALLY RETARDED AND LEARNING DISABLED CHILDREN: OVERVIEW OF RESEARCH PROGRAM ACTIVITIES

Charlotte Williams and Kathryn Blake

University of Georgia

The purpose of this paper is to describe briefly the problem and procedures for the research program, Special Reading Instructional Procedures for Mentally Retarded and Learning Disabled Children. This description is highly summarized. Many activities are required to carry out the research program. A complex technical description is needed to present sufficient specificity about the nature of the activities and the rationale for choosing them. In the prospectus for the program, we describe the procedures and rationale fully. The procedures include fine details about steps we use to conduct the research program. The rationale includes an extensive discussion of our problems, options, decisions, justification for these decisions, and knowledge base. These materials, of course, take too much space to include them here. For the interested reader, the complete program prospectus is available from the program directors.

Problem

Target groups

We have three target groups. They are intellectually retarded pupils, learning disabled pupils, and intellectually normal pupils. The intellectually normal pupils include two subgroups: younger normal pupils whose MA's are similar to those of the retarded pupils; older normal pupils whose CA's are similar to those of the retarded pupils.

Goal

Our goal is to produce reading instructional techniques adapted to the target groups' learning and language characteristics.

Target End-product

Our target end-product is a Sourcebook. This Sourcebook will contain descriptions of reading instructional techniques which we find to be effective. The Sourcebook will be a reference tool for teachers and others who must develop or select instructional systems for teaching reading.

Organizing Dimensions

We are engaged in instructional design in special education. That is, we are concerned with making educational adaptations for individual differences. Our goal -- to produce special reading instructional techniques which are adapted to the target groups' verbal learning and language characteristics -- may be expressed as a search for the most appropriate independent variables (bX) for maximizing pupils' reading attainment (Y). This kind of expression pertains to the formulation:

$$Y = b_o + bX_{S_i} + bX_{T_j} + bX_{T_k} + \ldots \text{ the interactions } \ldots + e_1 + e_2$$

Our approach to the goal involves applying knowledge and methodology in the behavioral sciences. Three notions serve as the supraordinate organizing dimensions in arranging the work and making choices. These notions pertain to the instructional design process, management, and starting points for adaptations. They are summarized here briefly.

The Nature of The Instructional Design Process. Certain tasks are involved in applying knowledge and research in the behavioral sciences to instructional design work. The training personnel and the research and development personnel who use this approach parallel one another in doing the required tasks.

Management Strategy for Instructional Design. A top-down management strategy is a useful tool in defining and organizing a mission-oriented set of activities. This strategy can be applied to instructional

design for adaptations to individual differences.

Starting Points for Making Adaptations. Making adaptations for individual differences starts with one concept and one value.

--The concept pertains to the interaction between people and situations: the presence/absence of an interaction indicates whether adaptations are needed; the nature of the interaction indicates what kind of adaptation is needed.

--The value is that situations are adapted in appropriate ways to individuals, not vice versa.

Nature of the Instructional Design Process

We use the six steps which both training personnel and R & D personnel must accomplish when they apply knowledge and research in the behavioral sciences to instructional design work.

1. Describe the Knowledge Base.

   They must put the relevant information in a form usable in carrying out the subsequent design steps.

2. Define the Scope of Instruction.

   They must specify the instructional objectives for the content to be taught the pupils.

3. Assess Entering Behavior.

   They must assess pupils' initial status in relation to the instructional objectives. Then, they must specify instructional needs on the basis of the discrepancy between pupils' initial status and the requirements of the instructional objectives.

4. Identify Instructional Procedures.

   On the basis of instructional needs, they must identify instructional procedures appropriate for facilitating pupils' attaining the instructional objectives.

5. Evaluate Instructional Procedures.

   They must evaluate the extent to which pupils using instructional procedures attain the instructional objectives.

6. Describe the Output.

   They must put the results of the design process in a form usable for working in particular situations.

As they go through these tasks, training personnel and R & D personnel have slightly different roles. The role of training personnel is to select adaptations appropriate for particular pupils in a target group. The role of R & D personnel is to design adaptations for the target group and to organize and describe these adaptations in a set; this set serves as a source from which the training personnel can make their selections for particular pupils; it includes not only specific elements but also principles and methods for selecting and using these elements.

Management Strategy for Instructional Design

We use the top-down strategy in defining and organizing actions involved in instructional design. We employ six categories to keep activities in a mission-oriented progression from the orgin goal through the instructional design process to the target end-product. These categories are listed below and illustrated in Figure 1.

Instructional Design Task	Subprogram/Project
1. Describe knowledge base	1.0 Codification of the knowledge base
2. Define scope of instruction	2.0 Codification of the reading skills
	2.1 Specification of reading skills
	2.2 Specification of target reading skills

		2.3	Analysis of target reading skills
		2.4	Specification of assessment procedures: instrument development
3.	Assess entering behavior	3.0	Organization of specifications and recommendations
4.	Identify instructional procedures	4.C	Prototype design: procedures for teaching reading
5.	Evaluate instructional procedures	5.0	Evaluation of procedures for teaching reading
6.	Describe the output	6.0	Codification of source-books
		6.1	Codification of special techniques
		6.2	Codification of operator package: Principles and methods for selecting and using the special techniques.

Starting Points for Making Adaptations

The value orientation requires that we make appropriate adaptations where they are needed. This value applies in the same way in all facets of the design process. The pertinent interactions and their implications for our work are summarized below. (In the interaction term, Levels refers to the target groups.)

1. Levels X Time (age) interactions have implications for adaptations in scope of instruction. Implications for Instructional Design Task 2/ Subprogram 2.0.
2. Levels X Tasks interactions have implications for specifying where adaptations in instructional procedures are needed. Implications for Instructional Design Task 3/ Subprogram 3.0.
3. Levels X Tasks interactions also have implications for the nature of needed adaptations in instructional methodology; Levels X

Treatments interactions have even more direct implications for the nature of these adaptations. Implications for Instructional Design Tasks 4 and 5/ Subprograms 4.0 and 5.0.

Summary of Specific Program Activities

Instructional Design Task 1: Describe Knowledge Base

The task of Subprogram 1.0, Codification of the Knowledge Base, is to locate, index, and synthesize information about relevant research, theory, and practice for the selected independent and dependent variables and to route this information to all of the other subprograms. For example, the knowledge base relevant to the nature of the reading domain is collated and routed to Project 2.1; the knowledge base relevant to specifying reading skills, to Project 2.2; and so on.

Instructional Design Task 2: Define Scope of Instruction

The task is to specify the instructional objectives to be taught the pupils. Subprogram 2.0, Codification of the Reading Skills, is devoted to this task. It involves precisely delimiting the reading skills, which will be the dependent variables in all subsequent activities.

Specifying Reading Skills. Project 2.1, Specification of Reading Skills, is devoted to specifying the domain of reading skills on which we work, i.e., to locating and organizing reading skills taught in the schools. We considered a range of reading and delimited the following for our concentration. We will study those aspects of reading manifested in identifying, interpreting, and responding to messages presented in written form. Specific categories of skills are those taught in the school under the rubrics of comprehension and interpretation skills, word recognition skills, oral reading skills, and skills related to rate.

Specifying Target Reading Skills. In Project 2.2, Specification of Target Reading Skills, we take the codified list of skills from Project 2.1, select reading skills which should be given priority in teaching, and rank these skills on a priority dimension. Our selection criteria reflect joint consideration of three bases -- the society, the learner, and the content area. That is, we took into account reading skills which pupils need to fulfill their current and prospective social roles, pupils' potentiality for learning these needed skills, and the additional reading skills which are prerequisite to pupils' learning these needed reading skills. We use judgmental procedures to apply the criteria in selecting and ranking the skills.

Analyzing the Target Reading Skills. Project 2.3, Analysis of Target Reading Skills, is devoted to describing the target skills selected in Project 2.2. These descriptions become the specific bases for selecting assessment procedures, assessing entering behavior, and developing and evaluating instructional procedures. These descriptions include the following.

1. The instructional objective: content elements, desired terminal performance, and conditions under which the performance should occur.
2. The immediate prerequisite skills which are entering behavior for a target skill.
3. Response measures for the target reading skills and the prerequisite skills.
4. Criteria for mastery, or sufficient attainment, of the target reading skills and the prerequisite skills.

Specifying Assessment Procedures. In Project 2.4, Specification of Assessment Procedures: Instrument Development we are concerned with selecting or developing assessment procedures for the target reading skills analyzed in Project 2.3. The data from these tests are weighed

against the criteria for mastery at two places: in assessing entering behavior and thus in specifying the need for special instructional procedures; in evaluating the effectiveness of instructional procedures. We use appropriate test-judgment criteria as guides in locating or developing tests for the reading skills.

Instructional Design Task 3: Assess Entering Behavior

The instructional design task is to assess pupils' initial status in relation to the instructional objectives and to specify instructional needs on the basis of the discrepancy between pupils' initial status and the requirements of the instructional objectives. Subprogram 3.0, Organization of Specifications and Recommendations, is devoted to this task. We use information from Projects 2.3 and 2.4 to obtain data in Subprogram 3.0. In turn, we use these data as bases for recommendations for needed actions.

Instructional Design Task 4: Identify Instructional Procedures

The task is to use relevant information in identifying instructional procedures appropriate for facilitating pupils' attainment of the instructional objectives. Subprogram 4.0, Prototype Design: Procedures for Teaching Reading, is devoted to identifying techniques specified as needed in project 3.0. Relevant information pertains to the attributes of the reading skills and their underlying components, and to the characteristics of the pupils. We use this information in making appropriate adaptations in mehtods and materials. This development process involves four steps.

1. Doing a component analysis to identify the types of behavior involved in the instructional objectives.
2. Identifying variables which influence these types of behavior.
3. Selecting variables which should be optimum to influence the types of behavior and, thus, the attainment of the instructional objectives.

4. Describing these variables in terminology appropriate for the instructional objectives.

Instructional Design Task 5: Evaluate Instructional Procedures

The instructional design task is to evaluate the instructional procedures or treatments identified in Subprogram 4.0. Subprogram 5.0, Evaluation of Procedures for Teaching Reading, is devoted to this activity. As we have stated, we use this evaluation strategy. Given treatment procedures which should facilitate reading achievement, we design evaluation studies for one of two problems: the relative effectiveness of two or more effective treatments; or the relative effectiveness of amounts of one effective treatment. Ultimately, given a set of effective treatments, we intend to find out the most effective amounts of all treatments and the most effective treatments among those in a set. In addition to relative effectiveness, we are interested in treatments' usefulness in attaining the instructional objectives with absolute mastery criteria. Therefore, we use a successive approximation method. That is, during Year 1, we check what level of mastery the treatments lead to; during subsequent years, we will alter objectives and treatments as necessary until the absolute mastery criteria are met.

Instructional Design Task 6: Describe the Output

The task is to collect and organize appropriate outputs into Sourcebooks about special procedures for teaching reading to the respective target groups. Subprogram 6.0, Codification of Sourcebooks, is designed to accomplish this task. Each completed Sourcebook will be a reference work containing appropriate variants of special teaching techniques for specific reading skills. Also, it will have accompanying operator packages presenting precise information about principles and procedures for selecting and using the special teaching techniques.

Strategies: Years 1 and 2

The strategies we have used in conducting our research thus far are described below.

Research Strategy

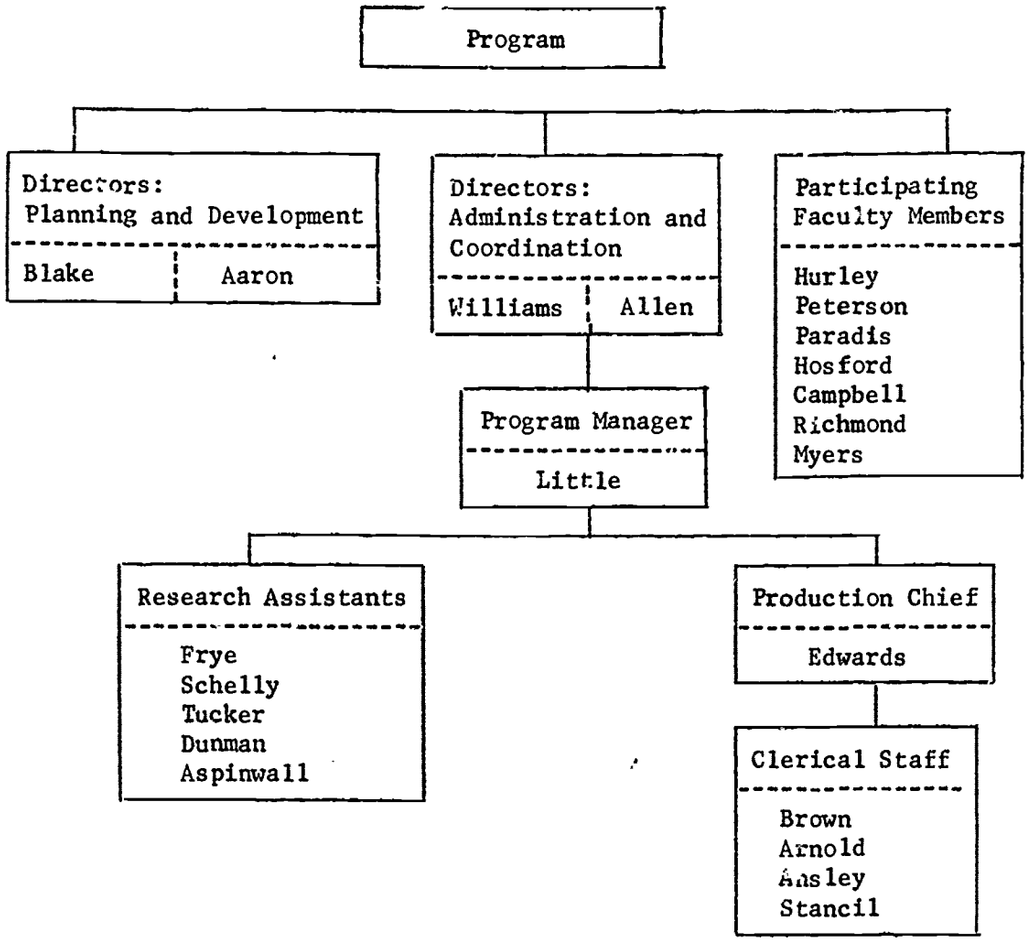
We examined the verbal learning and language knowledge base to find treatment procedures which should be effective in teaching. Going on from there, we designed evaluation studies for one of two problems: the relative effectiveness of two effective treatments; or, the relative effectiveness of two amounts of an effective treatment. Ultimately, given a set of effective treatments, we intend to find out the most effective amounts of all treatments and the most effective treatments among those in a set. In addition to relative effectiveness, we are interested in treatments' usefulness in reaching instructional objectives with absolute mastery criteria. Here, we are using a successive approximation strategy. That is, during Year 1 and Year 2, we have checked what level of mastery the treatments lead to; then, during subsequent years, we can alter objectives and treatments as necessary until the absolute mastery criteria are met.

Management Strategy

Different people have taken responsibility for the several tasks needed to take the skills through the subprograms from specification to the evaluation of treatments. Thus, each person has had a chance to pursue his or her own interests while contributing to the progress of program activities. Figure 1 portrays our organizational structure. Bracewell (1973) described the management system in more detail.

Figure 1

Organizational Structure



Planning Strategy

Target Groups -- During the first two years of our research program, we decided to focus on normal and mentally retarded pupils rather than on learning disabled pupils. The target groups were these: (a) intellectually retarded subjects; (b) intellectually normal subjects equated with the retardates on MA; and (c) intellectually normal subjects equated

with the retardates on CA. The subject selection criteria are specified in Table 1.

Table 1

Criteria for Subject Selection

Group	Criteria			
	IQ* Range	MA (in years) Range	CA (in years) Range	Reading Instructional Level (RIL)** Range
Retarded	50-80	8-0 to 11-0	10-0 to 16-9	2-5 (and 2 or more years below RIL of CA peers)
N = MA	90-110	8-0 to 11-0	8-0 to 11-0	2-5 (and appropriate for CA level)
N = CA	90-110	11-0 to 16-9	10-0 to 16-9	5-12 (and appropriate for CA level)

*Assessed with the 1960 Revision of the Stanford-Binet Intelligence Scale

**Assessed with an Informal Reading Inventory

Our subjects were these: Year 1 -- 192 from five public school systems in Northeast Georgia (Barrow County, DeKalb County, Madison County, Oconee County, and Oglethorpe County) enrolled in 14 different schools; Year 2 -- 384 pupils from five public school systems in Northeast Georgia (Barrow County, DeKalb County, Madison County, Oconee County, and Oglethorpe County) and one public school system in Florida (Duval County) enrolled in regular or special classes in 23 different schools. These subjects were assigned to two sets in Year 1 and four sets in Year 2. Subjects within each set were randomly assigned to two treatment groups. Statistical analyses of the sets,

groups, and treatments on MA, IQ, CA, and Reading Instructional Level (RIL) indicated that all design requirements were satisfied.

Information about the Year 1 subjects was presented by Allen (1973)

Target Reading Skills -- Blake and Aaron (1973) specified the reading skills and arranged these skills taxonomically. From this list, Hurley (1973) recommended certain of these skills as necessary skills for the retarded. We then selected reading skills as priority skills for Year 1 and Year 2 work and carried them through the five subprograms. The target reading skills were these:

A. Comprehension Skills

1. Finding Main Ideas in Connected Discourse
2. Finding Supporting Ideas in Connected Discourse
3. Sentence Comprehension
4. Content Analysis: Relations

B. Word Meaning Skills

1. Structural Analysis: Compounds
2. Homonyms
3. Synonyms
4. Concepts

C. Word Recognition Skills

1. Sight Vocabulary
2. Phonics

For these skills, we completed 17 evaluation studies in Year 1 and have conducted about 76 studies during Year 2. We can not present results for all these studies. Therefore, we have selected some of our Year 1 studies which we will describe in some detail.

Papers describing our specific Year 1 projects are published as a monograph in the Journal of Research and Development in Education. Copies of this monograph are available.

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