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ABSTRACT

The impetus for this study developed from a search for intervention procedures applicable to children with learning difficulties in the regular grades. It was noted that, when certain aspects of the curriculum which involved extensive repetition were being taught to pupils, approximately 90 percent of the interactions between teachers and pupils were either negative or neutral. It was decided to explore the use of the audio tape recorder in the three areas of spelling, math combinations, and preschool language (areas which exemplify this extensive repetition), thus replacing neutral and negative comments by audio-tutorial (A-T) programming. Three groups of exceptional children provided the data for this study: slow learning, educable mentally retarded, and trainable mentally retarded. The purpose of the A-T programming in math combinations was to provide intervention after the concepts had been taught, but prior to the time the pupil was required to use them as part of more advanced math skills. The purpose of the spelling program was to provide overlearning of words on the required spelling list. The preschool language program was used with severely retarded pupils, utilizing the Basic Concept Inventory as both a diagnostic device and as a subject matter source. These three programs are criterion referenced in their basic approach and the data collected to date on pupil progress and teacher reaction is encouraging. The characteristics of A-T programming offer promise as a way of meeting some of the problems encountered in the instruction of exceptional children. (BD)

Audio-Tutorial Programming With Exceptional Children

Alan Hofmeister

The impetus for this study developed from a search for intervention procedures applicable to children with learning difficulties in the regular grades. It was noted that, when certain aspects of the curriculum were being taught to these pupils, approximately 90 percent of the interactions between teachers and pupils were either negative or neutral. The areas of the curriculum that appeared to be associated with this phenomenon were those in which extensive repetition often occurs. Two areas which exemplified this extensive repetition were spelling and math combinations.

While it is natural to expect both teacher and student to react aversively to the repetition of a failure situation, it is obvious that continued placement in a setting where the chance of a positive comment is one in ten is not conducive to the development of either academic competency or an improved attitude to that aspect of the curriculum. Since all teachers involved had extensive inservice training in the application of positive comments, it became necessary to look for other intervention

procedures. It was decided to explore use of the audio tape recorder because this device does not mind repeating itself and rarely raises its eyebrows or suggests that "if you keep failing like this you'll never make it to college".

In using the cassette audio tape recorder as the basic coordinating medium, the following frame of reference was established.

(1) The main thrust was not so much the acceleration of the teachers' positive comments, although this was a concern, but replacement of neutral and negative comments by audio-tutorial (A-T) programming. It should be noted that while our A-T programming had little in common with Postlethwait's suggestions for college classes the programming was consistent with many of his suggestions for the elementary school. The introductory comment that "... a good educational vehicle should permit the learner to adjust the amount of repetition to his individual needs" (Postlethwait, Hovak, & Murray, 1970) was related to a major concern of this study.

(2) The severity of the academic problems of the pupils required more effective and individualized programming than they had been receiving.

(3) In recognition of the reality of classroom economics, the A-T programming had to provide the intervention at a maintenance cost (in terms of time and equipment) no greater than existing remedial procedures.

Programming Examples

Three groups of exceptional children provided the data for this report: (1) slow learning children located in regular grades, (2) educable mentally retarded children (IQ range approximately 50-75), and (3) trainable mentally retarded children (IQ range approximately 35-50). With regard to the retarded child, Bateman (1968) has reported a need for repetition and noted a tendency to use the visual motor channel at the expense of the auditory-vocal channel. A-T programming is both suited to providing repetitive exercises and practice in auditory reception. Three curriculum areas were explored

utilizing the populations listed above. These areas were math combinations, spelling, and preschool language.

Math Combinations

Many intellectually handicapped children are pushed through math skill sequences without achieving mastery of the math combination sub-skills. As a result these children are not equipped to handle instruction in the more advanced skills. The purpose of the A-T programming in math combinations was to provide intervention after the concepts associated with math combinations had been taught but prior to the time the pupil was required to use the combinations as a part of instruction in more advanced math skills.

Diagnosis and placement into the program was achieved by use of four test sheets, one for each of the four areas (addition, subtraction, multiplication, and division). Within each area the combinations were grouped in categories. Both accuracy and speed data were collected and the pupil's prescription listed the category or categories in which the child failed to meet criterion.

For instruction in each category, the child utilized one side of a C-30 audio cassette. A major problem encountered in teaching combinations is the fading of crutches such as finger counting. To eliminate this, examples were presented in two units. In the first unit the pupil had 6 seconds to respond, in the second unit the pupils had 3 seconds to respond. The time limits of the second unit made the use of crutches difficult and promoted mastery.

After a prescription had been developed, the pupil was given a cassette and answer card for the examples presented on the cassette and several blank work sheets. The pupil then moved to a cassette recorder and practiced by listening, responding, and checking responses. When the pupil felt he could answer the examples correctly, he asked to be tested. The teacher collected all answer cards and work sheets; gave the child a new work sheet and asked him to respond to the examples on the same cassette for the test. On completion of this the teacher corrected the work sheet. This testing situation presented less threat to the child because the same cassette was used for both the practice

and the test settings. It should be noted that the environment has been arranged so that while there was less contact with the teacher there was a higher probability that the contacts made would be positive.

Spelling

The purpose of the spelling program was to provide overlearning of words on the required spelling list. While some aspects of the program were concerned with development of comprehension, this was not the major aim. The program was designed to supplement and not replace existing instruction.

The random access placement procedures used in the math combinations program could not be adapted for the spelling program mainly because of the extensive time that would have been involved in testing every example. A linear placement procedure was incorporated into the cassettes. On each cassette there would be a placement unit and four other units presenting new words. The placement unit used a random sampling of all new words introduced on the previous cassette. To place a

pupil, the pupil worked through only the placement units until the criterion was not met. The pupil then began instruction on the preceding tape. Once the placement had been made, the pupil utilized answer cards and work sheets in the manner described for the math combinations program.

Preschool Language

Both the spelling and math program appeared to be effective with slow learners and educable mentally retarded children. These programs were not successful with severely retarded pupils of elementary school age. A major reason was that the severely retarded child could not discriminate to determine if the answer on the answer card was the same as his response on the work sheet. Another reason for discontinuing efforts on the spelling and math programs with this population was the inappropriateness of the subject matter. The young severely retarded child has more critical needs, a major area of need being that of language. The preschool language program utilized the Basic Concept Inventory (Engelmann, 1967) as both a diagnostic device and as a subject matter source.

Two approaches were explored, one utilizing a three dimensional response setting and the other a two dimensional setting. In the first one, the child was given a tray with a three dimensional mock up of a street and several houses. Language concepts covered included prepositions and colors. For example, the cassette might request the child to put the green car in the blue garage or put a man behind the house. The teacher was provided with "before" and "after" diagrams of the model for each cassette, to enable her to prepare the model and determine incorrect responses. The two dimensional approach used pictures instead of the three dimensional mock up and required the child to have a knowledge of basic shapes and colors. With reference to the picture, the child was requested to do such things as put the red ring on her dog, put the blue ring on his hat. Both the diagnostic and instructional procedures of the language program are still in an exploratory stage but indications to date suggest this as an area worthy of further development.

Validation Efforts

All three programs are very much criterion referenced in their basic approach and the data collected to date on pupil progress and teacher reaction is encouraging. A listing of this data would serve little purpose without a lengthy curriculum description. Both the spelling and math programs lend themselves, to some extent, to comparative evaluation. Such an evaluation was recently done on the spelling program. White (1972) conducted an evaluation in two schools. Low achieving spellers who were at least 1.2 years below grade level in spelling were randomly divided into experimental and control groups. There were twenty-four children in each group. The A-T spelling program was presented to the experimental group for a ten week period and used in place of normal spelling periods. The spelling word list was the same for both groups. The difference between the means on a criterion test which randomly sampled the word list was tested for significance. An analysis of covariance gave an F value significant at the .05 level. A result probably more interesting to the classroom teacher was

the fact that the majority of this group of spelling failures were able to complete the equivalent of one year's work in ten weeks.

In summary, it appears that the characteristics of A-T programming offer promise as a way of meeting some of the problems encountered in the instruction of exceptional children. This report dealt with relatively limited areas of the curriculum. The data collected suggests that applications of A-T programming to other curriculum areas and other populations of exceptional children appear to be worthwhile.

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