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NEW YORK CITY'S USE OF PROGRAMED INSTRUCTION, WITH EMPHASIS ON READING.

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THE NEW YORK CITY SCHOOL SYSTEM'S EFFORTS IN PROGRAMED INSTRUCTION ARE DISCUSSED. IN THE SENIOR HIGH SCHOOLS, EXPERIMENTS ARE BEING CONDUCTED WITH DOUBLEDAY'S "TUTOR TEXTS" ON COMPUTER MATHEMATICS, THE TEMAC MATERIALS, AND THE UNITED STATES INDUSTRIES' "AUTO TUTORS." IN THE JUNIOR HIGH SCHOOLS, SPECIALISTS ARE DEVELOPING PROGRAMS IN READING AND MATHEMATICS FOR SLOW LEARNERS. IN 1963, THREE COMMERCIALLY PREPARED PROGRAMS IN SCIENCE, READING, MATHEMATICS, AND SOCIAL STUDIES WERE USED IN SEVEN PUBLIC ELEMENTARY SCHOOLS. DATA OBTAINED ON PUPIL ACHIEVEMENT AND ATTITUDES REVEALED THAT THE PUPILS LEARNED THROUGH THE PROGRAMS AND THAT THEY LIKED THE TECHNIQUE. HOWEVER, THE USE OF THE PROGRAMS ALONE WAS NOT AS EFFECTIVE AS PUPIL-TEACHER INTERACTION. THEREFORE, AN AUDIO APPROACH TO PROGRAMING IS BEING EXPLORED. IN 1964, A PROJECT TO DEVELOP PROGRAMED READING MATERIALS FOR SLOW LEARNERS WAS INITIATED. CORRECTIVE READING TEACHERS IDENTIFIED OBJECTIVES AND SKILLS IN BEHAVIORAL TERMS, SET STANDARDS OF ACHIEVEMENT, AND PREPARED PROGRAMED READING MATERIALS. INTERVIEWS WITH PUPILS REVEALED ATTITUDES, THE MENTAL PROCESSES USED, AND THE BEHAVIOR MANIFESTED. WHILE PROGRAMED READING PROVIDES FOR INDEPENDENT READING, ITS ADVANTAGES CANNOT BE EXTENDED TO PRELITERATES UNTIL PROVISIONS ARE MADE FOR THEM. THIS PAPER WAS PRESENTED AT THE CONVENTION OF THE NATIONAL SOCIETY FOR PROGRAMED INSTRUCTION (PHILADELPHIA, MAY 7, 1965). (NS)

New York City's Use of Programmed Instruction, With Emphasis on Reading *

by Robert J. Fanning
Board of Education of the City of New York

In exploring the possible benefits of programed instruction to children, the New York City Board of Education has moved ahead on several fronts. Commercially-prepared programs are being used on a pilot basis in the elementary and secondary schools. Other programs to suit the needs of our pupils are being prepared or have already been developed. Complete libraries of programed material are being maintained for the use of teachers and supervisors. In-service courses in programed instruction are offered to teachers. New programed offerings from the publishers are scrutinized by evaluation committees. Many have been accepted and may be purchased by principals from regular testbook allotments.

Three of New York City's public high schools are experimenting with the Doubleday Company's Tutor Texts, especially the program on Computer Mathematics. Others are continuing work with the TEMAC material which was begun several years ago. Five high schools are doing pilot work with the United States Industries' Auto Tutor teaching machine. The USI programs on the slide rule, computer mathematics, career arithmentic, and grammar are being used. Some feedback on the use of the machines is expected this month.

Junior high school specialists have developed reading and mathematics programs for slow-learning pupils in grades seven, eight, and nine. A program on spelling for fifth-grade children was developed and tested by the City system's Bureau of Curriculum Research.

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* Text of an address at the Annual Convention of the National Society for Programed Instruction, Philadelphia, Pennsylvania, May 7, 1965

Beginning in February 1963, selected commercially-prepared programs programs have been used on a pilot basis in the New York City public elementary schools. At that time, three programs were used with 750 children in seven elementary schools. These programs were: Words, Latitude and Longitude, and Programmed Reading. On the basis of encouraging trials in these schools, the program was gradually expanded. Additional programs were introduced; more schools, teachers, and children became involved. A deliberate effort was made to involve schools in the heart of the City, in disadvantaged areas. During the current school year, a total of four thousand pupils in grades two through six in thirty-three elementary schools are working with eleven programs.

The elementary school project on programed instruction is designed to obtain data on pupil achievement via the programs. The programs deal with a variety of topics in science, reading, mathematics and social studies. Progress is measured by means of pre- and posttests. Data are obtained on each pupil's time requirement for completion of the program. Information is obtained on teacher and pupil attitudes toward the particular program and toward programed instruction in general. This is done by means of questionnaires filled out upon completion of the programs. Additional data on pupil age, I.Q. scores (when available), and reading level are also obtained.

While all data are not in as yet, some judgments about our elementary pupils' use of programed instruction may be made. First, elementary school pupils do learn through this technique, some of them to an astonishing degree. Second, most of the children, on anonymous questionnaires, say that they would like to use more of this kind of instructional material. They give many reasons for this; chief among them is that the pupils enjoy using programed material. They say, "It's fun,"

"I learned a lot," or, "You know right away when you get the right answer." An occasional child responds, "I like to learn without the teacher."

We are interested, of course, in just how much children learn by means of programs, and by means of only the program. Therefore, at the present time in our programed instruction project, we ask the teacher to let the program per se carry the burden of teaching for that particular topic. The teacher enters the picture only to help the children with the mechanics of program use, or to help out when a child has reading difficulties. As our work progresses with teachers and children, however, we are becoming convinced that this unilateral use of programs is not the optimum use. The pupils need opportunities to discuss what they learn with the teacher and with their classmates. One day while visiting one of our program schools, I found a fifth-grade boy, his nose buried in his program on latitude and longitude. I whispered to him, "What do you dislike most about this kind of book?" He looked at me wide-eyed and said, "I like to talk to the teacher!" Here, apparently, is a boy who learns best, not by reading and writing, but by listening and speaking. If we are to extend the benefits of programed instruction to these children, we shall have to explore the use of an audio approach to programing.

It is the teacher, too, who, during or following the use of a program, must exercise her highest professional talents in working with children in applying their newly-acquired skills in novel situations, in correlating knowledge with other learning, in stimulating creative thinking based on programed information.

We are finding, too, that our elementary school pupils, like most people, like being right so often in their linear programs. This is especially true in our deprived-area schools, where some children

have had very little taste of success in their academic careers. But this is not always so. Other children complain of boredom. The stimulating effect of "being right" seems to pall. These children need the teacher's encouragement, her nod of approval, her smile of approbation, to help them through the program. Boredom seems to set in mostly during the use of lengthy programs which are used frequently each week. This motivation function points to another vital role for the teacher in programed instruction in elementary grades.

With the assistance of the Fund for the Advancement of Education, the New York City Division of Elementary Schools began in February 1964 a project to develop programed reading material for slow-learning pupils in grades one through six. The project was undertaken for two reasons. First, New York City, like most large city school systems, has a persistent problem of underachievement in some of its elementary school pupils. There are many reasons for this: foreign-language background, high mobility of pupils, lack of adequate experiential background for reading, some deep-seated emotional problems. Every resource, therefore, including programed instruction, is being explored to reach these children. Second, there is a paucity of programed material in reading to meet the needs of our pupils.

A group of special reading teachers (Corrective Reading Teachers) was selected for training in programing. These are teachers who know their subject and the target population very well. They have had years of full-time experience teaching reading to the very pupils at whom we are aiming our programs -- children retarded a year or more in reading achievement. Experts from colleges, universities, and commercial programing companies were used in the training program to explain the rationale

of programed instruction and to work with the teachers in their first efforts in frame-writing. Several of these teachers are now working full time on the programed reading project.

There are days when I wish we had decided to program some nice, neat subject like condensation and evaporation, or the Bill of Rights, or even the calculus. I cannot begin to tell you the snags, paradoxes, and complications we have encountered in programing reading. Reading is not neat. It is disorganized. Reading skills are not segmented. They are incredibly interwoven and interdependent. There is little agreement in the literature on standards of achievement in specific reading skills, in observable, measureable terms. Standardized reading tests are not satisfactory. They assess a whole galaxy of reading skills, and fail to give diagnoses specific enough for the programer. Selecting a narrow reading skill for attack by the programers is like demolishing a house of cards, one card at a time. Each suports, and yet each depends on, the other. As part of our programing course for reading specialists, I asked one of the City's leading authorities in reading to speak to the group. This outstanding authority began by saying:

> "I have seldom felt so inadequate in my life: until one sits down and seriously undertakes the task of programing, one doesn't realizehow little we know about the reading process."

Yet, this complex structure is yielding -- a card at a time, if you will-- to the patient, steady hands of our programers. They are identifying specific reading skills. They are identifying specific reading objectives in behavioral terms. Where standards of achievement do not exist, we are setting them.

Dr. Sidney Pressey, the distinguished mentor of this Society has said that, like the mythological giant wrestler Aeneus who drew his

strength from Mother Earth, programers must be in regular contact with their clients. Our teacher-programers follow Doctor Pressey's injunction by talking with pupils in the schools, by finding out from them what entering behaviors we can count on, how pupils' mental processes work in answering questions in reading, by finding out how they feel about individual frames or sequences of frames. We have searched the literature in vain for directions in specifying objectives and in programing reading. These contacts with our pupil population have given us valid, and sometimes, unexpected, directions. The view from the armchair is not the decisive one. Most of our discussions are resolved not around the table at Board of Education headquarters, but in the schools, in chatting with the pupils on whom we are focusing our attention.

What about the future of programing in New York City especially in relation to reading? How much help can we in the schools expect to get from programed instruction in solving some of our reading problems? First, it should be pointed out that there is a paradox in teaching elementary reading by means of conventional paper-and-pencil programs. Here, we propose to have children learn reading by doing what? By reading-- independently, and in a sustained manner.

Second, if we agree that reading -- with meaning -- is the identification of printed symbols with sound symbols already associated with meaning in the learner's repertoire, then something is missing in the conventional programing technique. We will be unable to extend the advantages of programed instruction to pre-literates unless we make some provision for supplying the right sound symbol to the right pupil at the right time and at the individual's pace.