

# **MISSION CONSOLIDATED INDEPENDENT SCHOOL DISTRICT COMPUTER SCIENCE INSTRUCTIONAL PROGRAM**

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## **ABSTRACT**

A computer-based, four part instructional support program was developed for elementary and secondary students at Mission Consolidated Independent School District in Mission, Texas.

Of particular importance because of its far-reaching implications in the field of elementary education is the CMI component which represents a quantum leap toward recognition of the technical sophistication of today's elementary school students.

The student-controlled, electronic learning laboratory at Mission, used to augment the Learning Lab Listening, Speaking, and Reading Skills Program is believed to be the first such laboratory used at the elementary level in the United States.

## **OVERVIEW**

In the continuing quest for a better student learning environment, the Mission Consolidated Independent School District of Mission, Texas, under the leadership of District Superintendent Dr. Kenneth White, has recently installed an instructional support program that has rapidly gained a well-deserved popularity with students and teachers alike. The learning system consists of four different types of computers which are used for: 1) Computer managed instruction (CMI); 2) Computer assisted instruction (CAI); 3) Computer augmented learning (CAL); and 4) Student data computer input (SDCI).

What we present is an explication of the computer based instructional support program as it was implemented at Mission. Special emphasis is given to the CMI component used extensively with elementary students to promote English language acquisition.

## **ELEMENTARY SCHOOL CMI: A MODEL**

In the area of CMI, under the supervision of Ms. Irene Rivas, limited English speaking students at Mission are using a microprocessor based, computer controlled LL system daily to increase their skills in English language speaking, listening, and reading. Each LL is furnished with the "Star System" hardware developed by ELS Educational Media of Oklahoma City, Oklahoma. Currently in use in five elementary schools and one secondary school with the school district, the elementary school labs at Mission are believed to be the first LL installations to be used at the elementary level in the U.S. Funding for the systems was provided under the federal government's Title I grants for migrant students.

The new electronic laboratory has proven to be a very effective answer in bridging the individual communication gap between student and instructor. Enhanced communication through the utilization of the common language of electronics promotes a more rapid and effective acquisition of English language skills.

Major goals of the elementary CMI program at Mission CISD are:

- 1) To improve listening skills through auditory training activities leading to auditory attention to the details of speech;
- 2) To intensify concentration leading to the extension of understanding that in the act of reading or writing, one is utilizing graphic, symbolic representations of speech;
- 3) To increase the individual, active speaking vocabulary and language patterns;
- 4) To relate these oral sounds, words, and language patterns to their written forms;
- 5) To instruct the individual in such a manner that the sounds and letters that represent them become useful tools in understanding language usage; and
- 6) To support other instructional activities that foster the thinking process--the innate ability of the mind to form patterns or concepts of objects, events, processes, and relationships.

Mission's LL Listening, Speaking, and Reading Skills Program utilizes a solid state electronic, computer controlled master console and individually controlled student stations to provide an individualized, sequenced curriculum in English language listening and speaking skills. Each student receives twenty to forty minutes of English language drill and practice in the LL per class period, with most students scheduled for two periods daily. This instructional support process serves as a supplement to the instructors in the classroom as well as to the tutors who render after-school individual and small-group instructional services to the students.

Each student station is equipped with an individual headset and microphone and has the capacity for listen-respond-record performance. The instructor's console is designed to distribute master program material from a remotely-located cassette rack to the student station, which records it on the first track of a two track tape. Student responses are recorded on the second track. The student has no control over the first track where the lesson is stored, but can record, erase, and re-record over the second track. Such capability gives each student the opportunity to continually improve and correct his listening and speaking skills which may then be reviewed by the teacher or instructional aide.

This CMI model gives the instructor a choice of entire class contact or one-on-one teacher-student contact, which ensures

student response privacy and thus eliminates inherent fear of embarrassment on the part of a student having English oral language difficulties.

Teachers who have used computer-based CMI system with their students report that it becomes immediately apparent that the LL experience initiates and develops logical thinking skills through a pattern of cognitive stages, or categories, which no other type of formal instruction seems able to do quite as well, if at all, for the board range of students found in the typical public schools.

### **MISSION'S CMI CURRICULUM**

The LL Reading Curriculum activities consist of supplemental practice items in word analysis, vocabulary extension, comprehension of sentence structure, interpretation of spoken material, and development of study skills. Essentially, the LL Reading curriculum extends from grade level 2.5 through grade level 12. Mission has six LL installations containing a total of 58 student stations.

LL Language Arts curriculum activities consist of practice items in the principal parts of verbs, verb usage, subject-verb agreement, pronoun usage, contractions, possessives, and negatives, modifiers, sentence structure, and mechanics. The Language Arts curriculum at Mission is notional-functional in that the stress is on listening and speaking skills rather than grammar rules per se. Such skill building is approached through individualized mix drills for students in grades 3 to 6 and those at the secondary level. The notional-functional approach goes beyond traditional grammar rules and pattern practices by accenting the treatment of register, setting, intention, emotion, etc. Supplementary exercises for students include such areas as the development of insights into the basic patterns of asking and answering questions; the development of listening and speaking skills to aid in the discrimination among different ways of asking and responding to questions depending on the degree of formality or informality; practice in dialog completion; and extra drills and practices in pronunciation, roleplays, interviews, paraphrasing, and restatement.

Reading and Communication Skills instructors and tutorial service teachers work closely with LL exercises by matching material to the learning level of each student. LL ideas also work and plan with the regular classroom instructors in integrating the daily classroom curriculum with that of the lab. Thus, each student works at the Reading and Language Arts level and pace most suitable to his level of competence, and at the same time is provided immediate reinforcement of his progress. In addition, the Language Arts curriculum presents exercises for students for whom English is a second or foreign language.

It is anticipated that the electronic LL will not only accelerate English language learning in the school, but will facilitate the everyday use of English by the students. The usefulness of the system in providing a "sense of sound" to written material being read by elementary level children achieves a special significance. Recent research findings by Charles Read and Peter Schreiber of the Wisconsin R & D Center for Individualized Schooling at the University of Wisconsin suggest that one reason children have difficulty comprehending written sentences is that written language lacks certain cues; found in spoken language. By utilizing the full resources of the LL in the teaching of reading, the "sense of sound" is readily demonstrated to each child and the class members learn to comprehend more quickly by virtue of reading silently while indicating to themselves the usually audible cues to sentence structure such as pitch, intonation, pause, and duration.

## **2] COMPUTER ASSISTED INSTRUCTION [CAI]**

In the area of CAI, under the supervision of Ms. Sara McLaughlin, the student first receives classroom instruction in concepts and skills. He may, however, be working with a wide gap between his grade level and his grade classification. To help close this gap, each student reports daily to the computer lab for a computer-timed, 25-minute drill and practice session. The student enters his identification number and requests a math or reading curriculum or any of 19 other courses. The computer calls up the student's sequence for the day and the student works the problems, formulating the concepts or answering the questions which he then enters into the computer. Should the student enter an incorrect answer, the computer supplies a tutorial message that the student can re-work or re-read as appropriate.

Course material is organized into strands or strings of similar items gradated in difficulty from simple to more complex. The CAI system keeps individual records of every student's progress through each strand. Students who perform well in one strand progress to more difficult levels in the same strand. Students who encounter learning problems are automatically assigned simpler items in the same strand. The instructor receives a computer printed report on any individual student or on an entire class whenever desired. The report pinpoints each student's position in each strand by tenths of grade years. Reports for the Language Arts strands also indicate the student's average grade placement, what he worked on during the current day, his progress, and total time spent in the lab.

Since the computer also identifies incorrect responses, their types and frequencies, it provides subsequent lessons designed to reinforce successes while reviewing and giving extra practice on areas of student weakness. Homework may be assigned by the computer

with a hard copy worksheet supplied to each student and classroom instructors can utilize the information to help them design future prescriptive lesson plans.

From an educational standpoint, benefits to the student can be summed up in the advantages evidenced in one-to-one instruction, uniqueness, immediate feedback, and continuous progress instruction. Many students have gained more than one month's advance in grade level for each month of CAI. Some students have progressed more than one full year in the curriculum in the CAI program this academic year (1980-81).

Mission CISD has seven CAI labs in operation at each elementary campus and at the secondary level, with a total of 209 terminals. Each lab is equipped with its own telephone hook-up so instructors can, when necessary, immediately contact the computer firm, Computer Curriculum Corporation, and with Region One's ESC component without having to leave the lab.

After regular school hours the CAI labs are used for adult basic education, with a total GED course available through the Mission CISD Community Education Department, J. D. Villarreal, Director.

### **3] COMPUTER AUGMENTED LEARNING [CAL]**

America's shortage of trained computer scientists is critical. For every bachelor's degree awarded in computer science, there are 12 job openings; for each Ph.D. in the field, 34 openings. Salaries for bachelor's degree holders start at approximately \$16,000 while Ph.D.'s start at \$36,000. Jerry Cox, chairman of Washington University's computer science department has noted that in the past, private industry could train the employees it had (in the computer field), but the field has become too complex to make such training feasible..

In an interview published in the April, 1981, issue of 'The School Administrator' Alvin Toffler (Future Shock, The Third Wave) stated, "if the schools have any function, any justification, it is to prepare young people for the future...the school is an anticipatory mirror, or properly should be, of the emerging society...We are going to see growth in industries like information services, computers, genetics, microbiology, electronics, ocean technologies, and aerospace... fundamental changes must be made if our kids are going to survive the transition into this new society."

Based on the realization that computer literacy has become of paramount importance for secondary school students, Mission CISD, with Cynthia Perryman as programmer/analyst, installed an HP 3000 Series III, the largest of the HP mainframes, for advanced training of students in mathematics and computer science courses. These courses include computer programming in BASIC and COBOL II. RPG, FORTRAN, and PASCAL computer languages may be added as

the need arises. The HP 3000 encompasses the areas of CAI and CAL, with each terminal having a combined viewscreen and printer.

Within the immediate future, curriculum development plans calling for expanded usage of the HP 3000 will be implemented. Components will include computer science courses in accounting and work processing for business education majors; science courses in physics and biology; mathematics (trigonometry) and computer science courses in Boolean algebra, flow charting, and Boolean search strategy for information retrieval.

#### **4] STUDENT DATE COMPUTER INPUT [SDCI]**

In the area of SDCI, Mission has installed five Scan-Tron 2012 microcomputer Optical Mark Readers made by the Scan-Tron Corporation. The 2012 has two major functions that serve to dramatically decrease the time involved in processing student date.

The first prime function of the 2012 is its use in scoring teacher prepared tests, criterion-referenced tests, and standardized, norm-referenced tests. During a recent administration of the Texas Assessment of Basic Skills, for example, the practice tests were scored on the 2012 at the rate of ten minutes per classroom instead of the usual two hours per class. At the same time, the 2012 provided a detailed item analysis and descriptive statistical data which, when plotted revealed specific areas of student strengths and academic weaknesses. Also readily available are an average score per class, a class-by-class item analysis, and question validation.

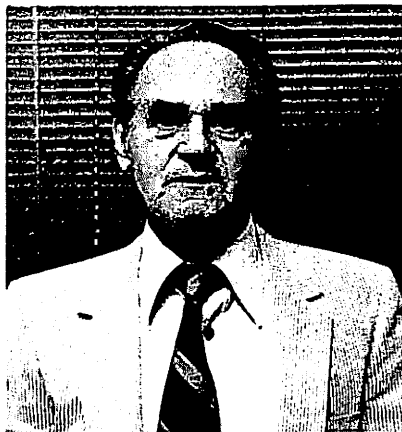
The second major function of the 2012 is a date input terminal to the HP 3000. The 2012 converts pencil marks on a standardized form to digital information which is then transmitted to the computer over a standard interface. Such date transmission can be done simultaneously with a test being scored or independently, without document scoring.

#### **SUMMATION**

For the first time in a formal educational setting, the student is doing something beneficial to himself, for himself, by himself. In such an operate psychological setting, it is no wonder that across the entire normal range of student capacities, individual student achievement in reading and mathematics--aided by the computerized instructional support program--exceeds any gains made by that student.

A computer helps to solve problems in much the same manner that pen and paper or books help to solve them. As an interactive process, the computer is quite similar to the pen and paper. As an information storage system, it serves very much the same purpose that books do. A computer, however, has the capability of precisely following a very complex set of instructions that involve entry, memory, manipulation, and output of data. When we state that all

students should be thoroughly grounded in "the 3 Rs" we are recognizing that they serve as the intellectual foundation for problem solving. Since the computer is essentially the "Rs" in electronic form, early, hands-on use of the computer by every student is as basic to future success as any other intellectual factor in or out of the school environment.



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The next issue of the NALLD JOURNAL will be dedicated to the topic of VISUAL LITERACY and will include an article by Kathleen Albertson on her use of a visual spectograph to teach English as a second language.



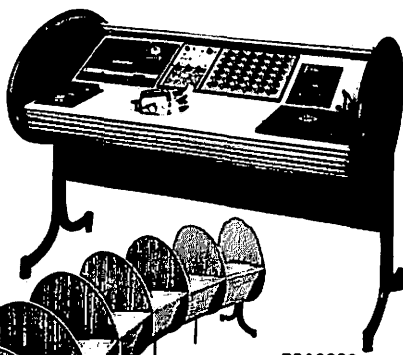
**Fleetwood**



# Language Laboratory Equipment

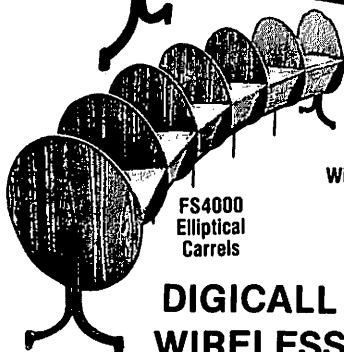
An  
Original  
Language Lab  
Manufacturer  
Still Operating  
Under Its Same  
Name

## WIRED-IN SYSTEMS



ECA9000  
Wired-in Console

Retractable  
Overhead  
Headset  
Storage  
Systems



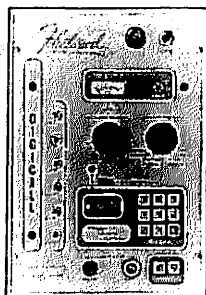
FS4000  
Elliptical  
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Choice  
of Carrels  
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Recorders

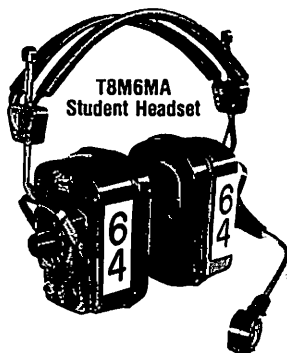
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