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ABSTRACT

Computers in Bilingual Education (Project CIBE) was fully implemented at South Bronx High School in its fourth year of federal funding. During the 1987-88 school year, students received computer-assisted and classroom instruction in English as a Second Language (ESL), native language arts (NLA), social studies, mathematics, science, computer literacy, and word processing. Project CIBE served 343 limited-English-proficient Spanish-speaking students at South Bronx High School. Students met 3 of the program's 4 objectives (for ESL, NLA, and the content area objective for ESL, but not for the other subject areas). The program met its objectives for computer-assisted instruction, staff development, curriculum development, and parental involvement. The most effective program element appeared to be computer literacy. Recommendations for program improvement include development of alternative techniques for greater success in teaching advanced ESL students and in teaching bilingual content area subjects. (MSE)

OREA Report

EVALUATION SECTION REPORT

COMPUTERS IN BILINGUAL EDUCATION
PROJECT CIBE
1987-88

EVALUATION SECTION
John Schoener, Chief Administrator
June 1989

EVALUATION SECTION REPORT

COMPUTERS IN BILINGUAL EDUCATION
PROJECT CIBE
1987-88

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NEW YORK CITY BOARD OF EDUCATION

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COMPUTERS IN BILINGUAL EDUCATION
PROJECT CIBE*

1987-1988

SUMMARY

- Computers in Bilingual Education was fully implemented. During the 1987-1988 school year, students received supplementary instruction in English as a Second Language, Native Language Arts, bilingual content area subjects, and computer-assisted instruction.

- Students met the objective for E.S.L. that was measured by the Language Assessment Battery (LAB) and two of the three that were assessed with the Criterion Referenced English Syntax Test (CREST). It met one N.L.A. objective but did not provide data for the other one in order that it could be evaluated. It met the content area objective for E.S.L. but failed to meet it for other subject areas. Project CIBE met its objectives for computer-assisted instruction, staff development, curriculum development, and parental involvement.

Computers in Bilingual Education (Project CIBE) completed its fourth year of Title VII funding. Project CIBE offered computer-assisted and classroom instruction in E.S.L., N.L.A., social studies, mathematics, science computer literacy, and word processing to limited English-proficient (LEP) students whose native language was Spanish. The project served 343 students at South Bronx High School.

Program staff used the Language Assessment Battery (LAB) and the Criterion Referenced English Syntax Test (CREST) for pre- and posttesting the students. The project provided activities for staff development and parental involvement and undertook curriculum development.

The Office of Research, Evaluation, and Assessment (OREA) evaluated Project CIBE by inspecting student test results and program records, interviewing school and project personnel, and observing classes. Project CIBE achieved three of its objectives for E.S.L., one of its N.L.A. objectives, and its content area subject objective for E.S.L. Students showed a significant gain in English language proficiency as measured by the LAB, and those students tested on the beginning and intermediate levels of the CREST mastered an average of one objective per 20 days of instruction. Over 70 percent of the students passed their courses in N.L.A. and E.S.L., and students showed significant

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*This summary is based on the final evaluation of the "Computers in Bilingual Education (Project CIBE) 1987-88" prepared by the OREA Bilingual Education Evaluation Unit.

gains in computer literacy. The project also achieved its noninstructional objectives for attendance, staff and curriculum development, and parental involvement. Participating students' attendance was significantly higher than mainstream students. All staff members were involved in staff development activities. Staff members developed or identified the required computer instructional units, and the Parent Advisory Committee held at least two meetings.

The project did not provide the data necessary to evaluate one N.L.A. objective. It did not meet its objective for English language proficiency for those students in advanced E.S.L. It also did not meet its content area objective for E.S.L. reading, bilingual mathematics, science, or social studies.

The most effective aspect of the program appeared to be computer literacy. The outcome of the E.S.L. program at the advanced level and in the bilingual content area subjects was not as strong.

The conclusions, based on the findings of this evaluation, lead to the following recommendations:

- Develop alternative techniques which would yield greater success in teaching advanced level E.S.L. students.
- Develop alternative techniques which would yield greater success in teaching bilingual content area subjects.

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I. INTRODUCTION

This report documents the Office of Research, Evaluation, and Assessment's (OREA'S) evaluation of the E.S.E.A. Title VII program, Computers in Bilingual Education (Project CIBE). During the spring semester of the 1987-88 school year the project completed its fourth year of funding. The program's two chief goals were to offer limited English proficient (LEP) students computer-assisted instruction in English as a second language (E.S.L.), native language arts (N.L.A.), social studies, mathematics, and science; and to provide instruction in computer literacy to Spanish-speaking students.

HISTORY OF THE PROGRAM

South Bronx High School has had federally funded bilingual instructional programs since 1977. Since the program has completed its fourth year, the reader can refer to previous evaluation reports for a complete description of the implementation and outcomes of the program during its earlier years of funding. See the 1986-87 final evaluation for a full description.

SETTING

South Bronx High School is located in one of New York City's most economically depressed neighborhoods. In the year under review, the school had an enrollment of 1,020 students most of whom came mainly from the surrounding community. Eighty-seven percent of the students were of Hispanic origin.

PARTICIPATING STUDENTS

All Project CIBE students were members of low-income families and were eligible for the free-lunch program. The majority (50 percent) were from Puerto Rico and the Dominican Republic (20 percent). Others were born in the United States (11 percent), and a number of Spanish-speaking countries of North, Central, and South America, and the Caribbean.

The majority of the students were recent immigrants; 79 percent had four or fewer years of education in the United States. The students' educational background varied; some had been well educated in their native countries while others had only minimal schooling. According to the project director, students from Puerto Rico tended to have better academic skills and were more literate in Spanish than were students from the Dominican Republic, who had weak educational backgrounds. The percentage of illiteracy was very small (one percent).

Many students were from single-parent families and had to work after school to supplement the family income. They often had child care responsibilities as well.

The majority of program students were in the ninth grade. (See Table 1.) Thirty percent of participating students were overage for their grade placement.

STAFF

Title VII paid 100 percent of the project director's and two paraprofessionals' salaries and 50 percent of the bilingual resource teacher's and office aide's stipends. The program's 17

TABLE 1

Number of Program Students by Age* and Grade

Age	Grade 9	Grade 10	Grade 11	Grade 12	Total
13	9				9
14	19	7			27
15	26	18	4		48
16	17	18	12	1	48
17	7	11	17	3	38
18		2	13	2	17
19		1	7		8
20		1			1
TOTAL	78	58	53	7	196
Overage Students					
Number	24	15	20	0	59
Percent	30.8	25.9	37.7	0	30.1

Note: Shaded boxes indicate expected age range for grade.

- The largest number of participating students were in the ninth grade.
- Thirty percent of program students were overage for their grade.

E.S.L., N.L.A., and bilingual content area teachers were supported by a combination of minicipal, state, and federal funds. Their years of experience in bilingual, E.S.L., and/or foreign language teaching ranged from one to 33.

DELIVERY OF SERVICES

Students received instruction in E.S.L., N.L.A., and Spanish content area classes (social studies, mathematics, and science), computer literacy, and word processing. Two tax levy-funded paraprofessionals, new to the program, assisted teachers in the computer labs.

Project personnel were involved in curriculum and staff development, and parental involvement activities. In addition, the bilingual resource teacher continued to edit the bilingual students' newsletter, El Vocero Bilingue, publisned three times a year.

MATERIALS AND RESOURCES

Title VII funds allowed the project to purchase IBM personal computers and printers that were used for computer literacy and computer-assisted instruction in E.S.L., N.L.A., and content area subjec . The New York City Board of Education provided monies for four computer laboratories.

REPORT FORMAT

This report is organized as follows: Chapter II describes the evaluation methodology; Chapter III presents an analysis of the qualitative findings of the evaluation; Chapter IV offers an analysis of the quantitative findings; Chapter V gives conclusions and recommendations based on the results of the evaluation.

II. EVALUATION METHODOLOGY

EVALUATION QUESTIONS

The evaluation assessed two major areas: program implementation and outcomes. Evaluation questions included the following:

Process/Implementation

- Did the program select students for program participation according to specific criteria?
- Did the project implement the instructional activities for developing English language proficiency as proposed?

Outcomes

- What specific English language proficiency skills have students in the program mastered as a result of participation in the program?
- What percentage of students passed their N.L.A. courses?
- How did the attendance rate of program students compare with that of mainstream students?

EVALUATION PROCEDURES

Sample

An OREA field consultant observed classes in E.S.L., Spanish, science, and computer literacy. She interviewed program and school staff including the principal, the program director, bilingual guidance counselor, and teachers of program participants. The project provided student data forms for the program population of 341 students.

INSTRUMENTS

OREA developed an observation schedule to document the classroom environment, instructional activities, and materials. OREA also created and used interview schedules for the program director and principal. Project personnel used OREA-developed data retrieval forms to report student demographic, attendance, and achievement data. South Bronx High School used the Language Assessment Battery (LAB) to assess the acquisition of English language skills.*

Data Collection

An OREA field consultants interviewed school and program staff and observed classes during the spring of 1988. Field consultants distributed student data forms in the fall and in the spring and collected them at the end of each semester.

Data Analysis

OREA evaluated acquisition of English language skills by calculating LAB pretest/postest differences and performing a t-test to assess statistical significance. Analysts calculated

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*The Language Assessment Battery (LAB) was developed by the Board of Education of the City of New York to measure the English-language proficiency of nonnative speakers of English in order to determine whether their level of English proficiency is sufficient to enable them to participate effectively in classes taught in English. Students scoring below the twenty-first percentile on the LAB are entitled to bilingual and E.S.L. services.

effect size to ascertain educational meaningfulness.*

OREA also evaluated the mastery of E.S.L. objectives by using the Criterion Referenced English Syntax Test (CREST).** Analysts computed a mastery score to indicate gains for each student by calculating the difference between pre- and posttest. They also computed the number of months of instruction between testings.

To assess the passing rates of courses, OREA divided the number of students passing particular courses by the number of students enrolled in them.

OREA also analyzed interview responses and observation data in order to assess accomplishment of objectives in noninstructional activities.

LIMITATIONS

Since all program-eligible students were involved either in Project CIBE or another program, it was impossible to select a valid comparison group.

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*The effect size, developed by Jacob Cohen, is a ratio of the mean gain to the standard deviation of the gain. This ratio provides an index of improvement in standard deviation units irrespective of the size of the sample. Effect size (E.S.) is interpreted to indicate educational meaningfulness, and an E.S. of .80 is thought to be highly meaningful, while one of .20 is considered to be only slightly so.

**The Criterion Referenced English Syntax Test (CREST) was developed by the Board of Education of the City of New York to measure mastery of instructional objectives of the E.S.L. curricula, and thus was constructed to maximize content validity. The test contains four items per curriculum objective, and mastery of an objective is achieved when three of these items are answered correctly. The test measures mastery of 25 objectives at Levels 1 and 2, and 15 objectives at Level 3.

III. EVALUATION FINDINGS: IMPLEMENTATION

Project CIBE provided 343 LEP students with instruction in E.S.L., N.L.A., content area subjects taught in Spanish, word processing, and computer literacy. The project's noninstructional component included curriculum and staff development and parental involvement.

STUDENT PLACEMENT AND PROGRAMMING

Participants entered the program as a result of their scores on the LAB. Students who scored at or below the twentieth percentile on the English LAB were considered LEP and therefore eligible for biligual instruction. Other selection criteria included results of other standardized tests, parental requests, Chapter 1 guidance counselor interviews, and a review of students' academic records. Once the students were admitted into the program, the project director determined their placement in E.S.L. classes.

LEP students were fully integrated with mainstream students in art, physical education, music, and shop classes, as well as in schoolwide activities such as assemblies.

INSTRUCTIONAL ACTIVITIES

English as a Second Language

Project CIBE offered four levels (beginning, intermediate, advanced, and transitional) of intensive E.S.L. instruction for two or three periods per day. The classes focused on developing

the four language skills (listening, speaking, reading, and writing). In addition to English grammar, vocabulary, and idiomatic usage, students also learned the survival skills needed for daily living. The classes also developed reading and writing skills in order to prepare students for the Regents Competency Test (R.C.T.) and for citywide examinations.

According to the principal and the project director, bilingual students were often better prepared for these tests in English than were English-proficient students because they received more formal instruction on language structure than did mainstream students.

An OREA field consultant visited an intermediate E.S.L. class in which the teacher presented a lesson that combined both E.S.L. and business skills. The aim of the lesson was to learn the seven parts of a business letter. The teacher first asked the students to list the parts of a personal letter. She then explained the components of a business letter, digressing slightly to explain why companies now used nine-digit zip codes. Near the end of the period, the teacher showed the students International Male magazine to demonstrate how to order from a catalog.

Native Language Arts

Project CIBE students received native language instruction to increase their fluency in it as well as to fulfill the three-year sequence required for high school graduation. All program students who completed this three-year sequence passed the New

York State Regents Examination. Students were placed in one of four levels according to their oral proficiency. In the future the school intended to offer an advanced placement Spanish course for possible college credit.

An OREA field consultant observed an advanced N.L.A. class of 32 students. The lesson began with a discussion of a short story. The teacher then selected four phrases from the story and asked the students to use them to construct full sentences. After completing this task, the students continued reading on their own to find out the end of the story. While they were working on this assignment, the teacher introduced the students to some South American idioms and new vocabulary words.

Content Area Subjects

Municipally funded teachers taught content area courses in the native language; the more advanced the students were, the more English the teacher used. The curricula paralleled those of mainstream classes.

The project director said that some science and social studies courses were being evaluated to determine their academic and cultural relevance to the school's Puerto Rican and Dominican populations. For example, as a result of previous evaluations of this nature, they were planning a bilingual social studies elective, Latin American studies.

An OREA field consultant observed a level 2 physical science class, conducted entirely in Spanish. The aim of the lesson was for students to become familiar with several physical science

concepts. At the beginning of the class, students worked on answering questions about carbon, atoms, and ion chains. When they had completed the assignment, the teacher involved the students in a discussion of the topics.

Computer-Assisted Instruction

Title VII funds supported computer literacy and computer-assisted instruction for Project CIBE students. The bilingual computer literacy courses taught students to program in BASIC and reinforced their mathematics skills. The bilingual keyboarding/word-processing classes familiarized students with the use of the keyboard, word processing software, and appropriate terminology. The mathematics department offered computer literacy electives that paralleled the mainstream curriculum. The project provided teachers with lists of available computer software in their subject area. The project developed an after-school program for bilingual students to learn cosmetology, health sciences, and office skills using computers.

A field consultant observed a computer literacy class with nine students present. The teacher conducted the class in Spanish. The subject of the day's lesson was writing a computer program which would determine a total salary. After checking each student's work, the teacher asked one student to go to the board and explain his program. The teacher ended the lesson by explaining how to make a flow chart.

NONINSTRUCTIONAL ACTIVITIES

Staff Development

Project CIBE staff members attended workshops at which topics included techniques of language teaching, R.C.T. preparation, and the teaching of reading and writing. Project staff were involved in joint E.S.L./English department meetings on R.C.T. reading and writing preparation.

The Assistant Principal (A.P.), project director, and Chapter 1 staff development specialist regularly reviewed teachers' lesson plans and made suggestions. All teachers attended monthly departmental meetings at which professional topics were discussed.

Five teachers and one paraprofessional were enrolled in college courses in E.S.L., bilingual education, and content area subjects.

Curriculum Development

Resource teachers and other professional staff members reviewed, evaluated, and purchased software programs that were used in E.S.L., N.L.A., and bilingual content area classes. Program staff revised and translated mainstream curricula for American history, global history, computer literacy, and sequential mathematics. The resource teacher translated English software instructions into Spanish and printed them for program students. Project CIBE was awaiting the finalized American History I curriculum from the Bilingual/E.S.L. Unit of the Division of High Schools that will be used as a course text.

Parental Involvement

Project CIBE offered several activities for parents: the Bilingual Parent Advisory Committee held periodic meetings; there were two workshops on dropout prevention; Puerto Rican Discovery Day and Pan American Week were occasions for luncheons and shows. The program also sponsored an E.S.L. class for the parents of Project CIBE students. Parents spoke with teachers during Open School week. "El Vocero Bilingue," the bilingual newletter sent to parents three times a year, informed them about school activities, educational programs, cultural events, and parent association meetings. The Parent Advisory Committee held meetings in the fall and in the spring to discuss program goals.

IV. EVALUATION FINDINGS: OUTCOMES

INSTRUCTIONAL ACTIVITIES

The project proposed instructional objectives in E.S.L., N.L.A., content area subjects, and computer-assisted instruction.

English as a Second Language

- As a result of participating in the program, E.S.L. students will make statistically significant gains in English language proficiency.

OREA used the LAB to evaluate the proposed objective. The program provided complete data on 340 students who took E.S.L. classes. Students in each grade and the group as a whole made significant ($p < .05$) gains (see Table 2). The effect size was .70 for the group, indicating that the gains were of moderate educational meaningfulness. Students made statistically significant gains in English language proficiency.

Project CIBE met its proposed objective.

- As a result of participating in the program, students in E.S.L. 1 and E.S.L. 2 will master an average of one objective per 20 days of instruction on the beginning level of the Criterion Referenced English Syntax Test (CREST).

- As a result of participating in the program, students in E.S.L. 3 and E.S.L. 4 will master an average of one objective per 20 days of instruction on the intermediate level of the CREST.

- As a result of participating in the program, students in E.S.L. 5 and E.S.L. 6 will master an average of 0.80 objectives per 20 days of instruction on the advanced level of the CREST.

Complete data were available for 248 students in the fall and 175 students in the spring. Students tested at levels 1 and

TABLE 2

Pretest/Posttest N.C.E. Differences on the Language Assessment Battery, by Grade

Grade Level	Number of Students	Pretest Mean	Pretest S.D.	Posttest Mean	Posttest S.D.	Difference Mean	Difference S.D.	t Value	Effect Size
9	68	11.9	8.8	19.1	13.1	7.2	9.8	6.1*	.73
10	36	12.9	9.5	18.6	11.4	5.6	8.9	3.8*	.63
11	22	19.6	6.6	25.6	11.9	6.0	8.5	3.3*	.12
12	13	14.5	7.4	18.9	9.6	4.4	5.2	3.1*	.85
TOTAL	140[a]	13.6	8.9	19.9	12.3	6.3	9.0	8.2*	.70

*$p \leq .05$

[a]The project did not report grade level data for one student.

- Ninth graders made the largest gains.
- Overall, students made statistically significant gains on the LAB, thus achieving a program objective in E.S.L.

2 mastered an average of 1.1 CREST objectives per 20 days of instruction. (See Table 3.) Students tested at levels 3 and 4 mastered an average of 1.0 CREST objectives per days of instruction. Students tested at levels 5 and 6 mastered an average of 0.60 CREST objectives per 20 days of instruction. Therefore, Project CIBE met the E.S.L. objective for students taking the beginning and intermediate levels of the CREST but did not meet it for students taking the advanced level.

Native Language Arts

- At least 70 percent of the students will score at or above the 65 percent passing criterion in native language arts each semester.
- Students in the program will develop and maintain reading and writing skills in native language arts as measured by the completion of a three-year native language arts program and the passing of a citywide test or the New York State Regents Examination in Spanish.

Data provided by the program showed that 77 percent of the 272 fall registrants (209) and 73 percent of the 240 spring registrants (175) achieved passing grades of at least 65. The program met its first N.L.A. objective.

Since the project did not provide any data relevant to the second N.L.A. objective, OREA could not evaluate it.

TABLE 3

Pretest/Posttest Differences on the
Criterion Referenced English Syntax Test (CREST), by Test Level

Test Level	Number of Students	Pretest Mean	Pretest S.D.	Posttest Mean	Posttest S.D.	Mastery Mean	Mastery S.D.	Mean Mastery per Month
				FALL				
1	72	9.2	6.9	13.9	6.9	4.7	3.4	1.3
2	96	13.4	6.6	17.8	6.1	4.4	2.8	1.2
3	50	9.6	3.5	12.0	3.0	2.5	1.9	0.7
TOTAL	218	11.2	6.2	15.2	6.3	4.0	3.0	1.1
				SPRING				
1	41	9.0	5.5	13.3	6.5	4.3	2.8	1.0
2	98	13.3	6.4	17.2	5.9	3.9	2.5	0.9
3	36	10.6	3.0	12.6	2.4	2.0	1.4	0.4
TOTAL	175	11.7	5.9	15.3	5.9	3.6	2.6	0.8

- Students at the beginning and intermediate E.S.L. levels mastered an average of one CREST skill per 20 days of instruction.
- Students at the advanced E.S.L. level mastered an average of 0.7 CREST skills per 20 days of instruction.
- Overall, students made statistically significant gains on the LAB, thus achieving a program objective in E.S.L.

Content Area Subjects

- At least 70 percent of the students will score at or above the 65 percent passing criterion in each of the subject areas (E.S.L., E.S.L. reading, bilingual mathematics, science and social studies) each semester.

Only in E.S.L. did at least 70 percent of the students pass with a minimum grade of 65. (See Table 4.) Students in the E.S.L. reading class neared the proposed criterion (67 percent passed). Project CIBE met its content area objective only for E.S.L.

Computer-Assisted Instruction

- As a result of participating in the bilingual computer mathematics class, students will show significant gains in computer literacy.

On a 20-item teacher-made instrument which tested general knowledge of computer literacy and numeric reasoning, the 16 fall and 11 spring students showed an increase of over 37 percent from pretest to posttest. OREA used a t-test to measure significance. The mean gain was significant ($p < .05$) for both groups of students. Project CIBE achieved its objective for computer-assisted instruction.

NONINSTRUCTIONAL ACTIVITIES

The project proposed noninstructional objectives in attendance, and staff development, curriculum development, and parental involvement.

TABLE 4

Passing Rates in Content Area Courses

Area	Number of Students Passing*	Percent Passing	Number of Students Passing*	Percent Passing	Overall Passing Rate
E.S.L.	287	70.7	222	69.8	70.3
E.S.L. Reading	284	68.0	209	65.6	67.0
Mathematics	264	47.7	222	52.3	49.8
Science	236	58.5	186	59.1	58.8
Social Studies	271	46.5	234	56.8	51.3

*Passing is a grade of 65.

- Project CIBE met the objective that 70 percent of the students would achieve a passing grade of 65 in E.S.L. in the fall and in the spring.

Attendance

- As a result of participating in the program, students' attendance will be significantly higher than the attendance of mainstream students.

The attendance rate for program students was 86 percent, 14 points above the schoolwide attendance rate of 72 percent. The statistical significance of the difference between program and mainstream attendance rates was determined through a z-test for the significance of a proportion.* This procedure tests whether the difference between one group's rate (the program's) and a standard rate (the school's) is greater than can be caused by chance variation. The z-test results ($z=4.91$) indicated that the difference in attendance rates was statistically significant ($p < .05$). The project met its objective for attendance.

Staff Development

- One hundred percent of staff members will be trained in educational aspects related to E.S.L., bilingual education, native language arts, and computer education through attendance at workshops, seminars, conferences, and courses at institutions of higher education.

Program staff participated in extensive staff development activities in techniques for teaching language, reading and writing, R.C.T. preparation, and E.S.L. They enrolled in courses in curriculum development, teaching E.S.L. and content area subjects, bilingual education theory and practice, and computer education. Project CIBE met its objective for staff development.

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*Bruning, J.L. and Kintz, B.C., Computational Handbook of Statistics, (Glenview, IL: Scott, Foresman and Company, 1968).

Curriculum Development

- By the end of each subsequent project year an additional two computer instructional units will have been developed or identified by the resource teachers in the following areas: E.S.L., N.L.A., bilingual mathematics, science, and social studies.

Staff members either developed new curriculum materials in computer literacy, E.S.L., N.L.A., and bilingual content area classes or adapted them from other sources. Project CIBE met its objective for curriculum development.

Parental Involvement

- The Bilingual Parent Advisory Committee will hold at least two meetings per year of the project.

The Parent Advisory Committee held periodic meetings throughout the school year. Therefore, Project CIBE met its objective for parental involvement.

V. CONCLUSIONS AND RECOMMENDATIONS

The Computers in Bilingual Education Program at South Bronx High School completed its fourth year of funding. The program provided students with both classroom and computer-assisted instruction in E.S.L., N.L.A., and bilingual content areas that paralleled mainstream curriculum.

The program continued to provide staff development through workshops and demonstration lessons and to encourage staff members to take courses in relevant areas for college credit. Program staff developed or adapted curricula to meet students' needs. Project CIBE also provided activities for parental involvement.

Project CIBE met its E.S.L. objective, measured by gains on the LAB, and the objectives for those students taking beginning and intermediate levels of the CREST. It met its N.L.A. objective that over 70 percent of the students would pass their N.L.A. courses with at least a grade of 65. The project reported no data for the second N.L.A. object, therefore OREA was unable to evaluate it. Project CIBE met its content area objective for E.S.L. but did not meet it for E.S.L. reading, bilingual mathematics, science, or social studies. Since students showed a statistically significant 37 percent gain on their posttests in computer literacy, the project met its objective for computer-assisted instruction.

The project met all of its noninstructional objectives: attendance, staff and curriculum development, and parental involvement.

The most effective aspect of the program was computer literacy. The outcome of the E.S.L. program at the advanced level and in the bilingual content area subjects was not as strong.

The conclusions, based on the findings of this evaluation, lead to the following recommendations:

- Develop alternative techniques which would yield greater success in teaching advanced-level E.S.L. students.
- Develop alternative techniques which would yield greater success in teaching bilingual content area subjects.