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ABSTRACT

The Bilingual Learning Centers in Elementary Schools program was begun in four Philadelphia public schools in 1982-83. The project's goal was to improve the achievement of limited-English proficiency children through work in bilingual learning centers containing materials and instructional devices for individual and small group work. Learning centers established at the four project schools were equipped to varying degrees by the end of the year. Use of the centers by pupils was associated with improved aural comprehension of English, improved reading vocabulary, and better attendance than the school norm. Learning center use was not associated with statistically significant improvement of English reading comprehension, mathematics, or word study skills test scores. Of the six original objectives, five were attained in full or in part. These outcomes are considered good because the centers had operated for only part of the academic year and without the full complement of instructional devices. Further progress toward the objectives is anticipated by the time of a reexamination of the centers' impact during the 1983-84 school year. (MSE)

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# BILINGUAL LEARNING CENTERS IN ELEMENTARY SCHOOLS
1982-1983

Prepared by
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Federal Evaluation Resource Services
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# EXECUTIVE SUMMARY

Bilingual Learning Centers in Elementary Schools was begun in 1982-83, with operation commencing during the winter. The goal of the project was to improve the achievement of limited English proficiency children through work in bilingual learning centers containing materials and instructional devices for individual and small group work.

Learning centers were established at the four project schools and were equipped to varying degrees by year end. Use of the learning centers by the pupils was associated with improved aural comprehension of English, improved reading vocabulary, and better attendance than the school norm. Learning center use was not associated with statistically significant improvement of English Reading Comprehension, Mathematics, or Word Study Skills test scores.

These outcomes were considered good, as the centers operated for only part of the year and without their full complement of instructional devices.

# BILINGUAL LEARNING CENTERS IN ELEMENTARY SCHOOLS

This program was designed to improve the achievement of limited English-proficiency (LEP) elementary school pupils, pupils whose first language is not English, who are in need of English for Speakers of Other Languages (ESOL) instruction or had scored below the national 26th percentile on the standardized tests used in their schools. It serves pupils in two public elementary schools with bilingual education programs and large numbers of Spanish-dominant students and two neighboring diocesan schools. Bilingual individualized learning centers and bilingual classroom aides are used to individualize the instruction.

## RATIONALE

There was a critical need to individualize the instruction of students of Hispanic origin who attended Cramp, Hartranft, St. Edward, and St. Hugh elementary schools.

A review of preprogram test results and records indicated that there were many Hispanic students at the public school sites who required ESOL classes and many others who, despite mastery of oral English skills, scored poorly on Form A of the California Achievement Tests (CAT)-the test used to evaluate the performance of mainstream public school students. These findings suggested that the ongoing bilingual program could be improved in two ways. First, it could be expanded to serve Hispanic pupils who had low CAT scores. Second, a bilingual learning center could be added to each school to provide individualized and small group instruction.

St. Edward and St. Hugh were selected for participation in this project with the advice of the Philadelphia Archdiocese. These schools were located near the public school project sites, were reported to have a substantial number of Hispanic pupils who scored below the national 26th percentile on the Scholastic Testing Services (STS) examinations used for annual evaluation in the diocesean schools, and were to be part of a bilingual project supported by Chapter 1, ECIA. A bilingual learning center could also be installed in each to serve these pupils.

## IMPLEMENTATION

The instructional program was begun at all four sites by December 1982, and pupils had the use of the project learning centers for about two-thirds of the school year. Equipment and materials for the centers continued to be delivered throughout the spring, and even at year end, none of the centers was fully equipped. Under these circumstances, the evaluations of pupil performance in the following sections are preliminary and probably underestimate the long-term impact of the fully implemented project.

Instructional Personnel. When the instructional program was begun, all the project personnel were appointed and were able to begin serving the project pupils.

Two ESOL teachers who had been in the project's public schools became bilingual resource specialists. Each specialist served a pair of schools, one public and one diocesan, located across the street from each other. The resource specialists were bilingual speakers of Spanish and English. A total of six bilingual, Hispanic aides was subsequently appointed. One was appointed to each diocesan school, and two were appointed to each public school. As the program at one of the diocesan schools served a small number of students, its aide spent part of her time at the paired public school. All of the aides had prior experience in bilingual programs.

Students Served. The learning centers were designed to serve pupils who were attending the bilingual and ESOL programs that were operating at their school, or who met the criterion of scoring below the twenty-sixth percentile on the norm-referenced test used at their school. When the learning centers were developed, it was evident that not all these students could be accomodated at the learning center and still be provided with a reasonable amount of exposure to the individualized instruction. So, resource specialists and supervisory personnel were faced with the task of deciding who should use the learning centers.

When the selection process was completed in January, the resource specialists prepared lists of the pupils who were using the learning centers each period of the school day. A total of thirty distinct groups had been formed. The groups ranged in size from three to seventeen and averaged eleven pupils. As the organization of the preexisting programs varied from site to site, the population of pupils who used the learning center differed from site to site, and the organization of the groups in centers varied among the sites. But, despite the variations, observations in the learning centers indicated that all the pupils using them met the primary program participation criteria stated in the proposal.

At the Hartranft School, 198 pupils were in the various ESOL and bilingual classes, and 124 pupils were using the learning center. The learning center group came from all grade levels of the school (K-6) and included pupils who were in ESOL classes, bilingual classes, special education classes, or regular classes during the remainder of the school day. Pupils were scheduled for one or two learning center visits, which totaled 1.5 to 2.7 hours per week.

At St. Edward, the sister school to Hartranft, the program served all the pupils in the Chapter 1 ESOL classes, and some of the Hispanic pupils in the mainstream classes or in the Basic Skills Readiness bilingual Chapter 1 kindergarten program. None of these participants was receiving instruction in Spanish. A total of 72 pupils was using the learning center, and each pupil received 1.5 to 2.7 hours per week of instruction in it. At St. Edward, the number of hours per week was determined primarily by the grade level of the pupils.

The Cramp School approach was to serve a relatively small proportion of the total group of potentially eligible pupils and to provide each pupil with at least three hours of instruction in the center per week. Moreover, the learning center resources were concentrated on the upper elementary school grades. Of the 250 pupils in various bilingual program elements at the school, 53 were served by the center. Fifty-two of the center pupils were in grades 4 through 6, and one was in grade 3. When not attending the learning center, some pupils were in ESOL classes, in both bilingual and ESOL classes, or in regular English mainstream classes, depending on the pupil's individual needs. The "Beginners" with the least knowledge of English were in the learning center every day for a total of 6.2 hours per week. The more advanced students used the center two or three times per week for a total of 3 or 4.5 hours per week.

St. Hugh was the sister school to Cramp. Its learning center served six pupils. Contrary to the original program design, no other classes for limited English proficiency pupils were conducted at the site, and the learning center was the only specialized instruction that the pupils received. The pupils were divided into two groups, one serving three first-grade children; the second serving the other children, who were in grades four through six. Each group was scheduled for the center daily, for a total of 6.2 hours per week.

All but two of the pupils using the learning centers were Spanish-speaking. There was one Southeast Asian pupil at Cramp and a second at St. Hugh.

Learning Center Activities. The bilingual learning centers organized at each of the project schools ranged in size from a room that was larger than a typical classroom, at St. Edward, to a small temporary area at St. Hugh that was separated from the open hallway by six-foot high partitions. By year's end, the learning centers at the public schools were more fully equipped with instructional devices than those at the diocesan sites, but none was equipped completely (see the evaluation of Objective 1).

Project sites were visited on 25 occasions, and eleven groups of children were observed working in the learning centers. There appeared to be a good supply of texts, many of which were commonly used in ESOL classes (English Around the World, New Horizons, the "Lado" English series, and Yes, English for Beginners). In the three larger centers, desks and chairs were arranged in clusters to facilitate the instruction of individuals and groups of three or four children. In the smallest center, clustering was not needed.

During virtually all the center visits, a few children were observed working with arithmetic materials, while the majority of children worked on various aspects of English language arts. During the typical learning center observation, the resource specialist or one or two aides moved among the individuals and small groups to help explain or review concepts and to assign new material.

Since none of the centers had a full complement of equipment, activities based on textbooks and on commercially and locally prepared ditto masters were frequently observed. At the better equipped learning centers, children were usually observed working with the instructional devices for a part of the time. During the learning center sessions, most pupils carried out two or more activities and used various modes of learning: listening to staff, reading, doing written work, discussing material with the teacher, and responding as a group, to the teacher's prompts.

The resource specialists prepared and maintained individual activity plans for each child. These were referred to by the specialists and the aides from time to time as the pupils completed one activity and then moved to the next. The staffing pattern of the program resulted in the classroom aides being in charge of the learning centers from time to time without the specialists being present. During these periods, the aides used the plans that had been prepared by the teachers to guide the instructional activities of each pupil.

## EVALUATION OF THE OBJECTIVES

*Objective 1: The project will have learning centers containing the following equipment: System 80, tape recorders, Spellbinder, Craig Readers, calculators and Charlie the Robot machines.*

This objective was partially attained by June 1983. Three of the four schools had a variety of equipment specified by the objective. No learning center was fully equipped, and one center had not yet received any of the equipment specified by the objective.

Table 1 summarizes the equipment at each school's learning center. Of the six types of equipment specified by the objective, four were in place in the public school centers; fewer, at St. Hugh; and none were in place at St. Edward. As shown on the table, a variety of other instructional devices that had not been specified by the objective had been obtained for the learning centers.

Much of the "software" to be used with the specialized equipment had not been delivered, but one of the resource specialists reported being able to borrow some software from time to time. Project supervisory personnel indicated that the software and the undelivered equipment specified by the objective had been ordered, and should have been delivered by the beginning of the second project year, the fall of 1983.

*Objective 2: As part of the staff development program, teachers, teacher aides, and/or administrators will participate in at least six workshops.*

This objective was attained. Six workshops for project participants were conducted during the spring.

The workshops were conducted in one and two-hour sessions for a total of 10 hours. The topics included were: individualization of mathematics instruction, reading and language arts, using songs in language instruction, project evaluation plans, the preparation of bulletin boards, and the use of System 80 equipment.

According to the project coordinator, most of the programs made use of a hands-on approach in which the teachers discussed theory, then role played being the pupils or the instructors. The workshop on research and evaluation was conducted by the members of the evaluation team and was the only one in the traditional format of oral presentations followed by questions and answers.

All but one of the staff development program presenters, a sales representative who demonstrated System 80, were connected with the School District. One was a mathematics supervisor, two were in Foreign Language Division management roles, one was a reading specialist, and three were program evaluation specialists.

The workshop attendance was consistently high. According to payroll records, the two resource specialists and at least one of the two Foreign Language Division program coordinators, attended each session. Five of the six full-time bilingual program teachers working at the project schools attended five workshops. Each workshop was also attended by four to six program aides. An ESOL teacher whose time was shared between a project and a non-project site never attended the sessions.

The workshops were conducted between mid-April and the end of May. Since they began several months after the program began, it is anticipated that their impact will be on the 1983-84 school year.

Objective 3. *The rate of acquisition of English vocabulary and reading comprehension skills will be increased to a statistically significant degree ($p < .10$) above the rate at the time of the pretesting.*

This objective was partially attained. Statistically significant improvement was found on the measure of vocabulary ($t = 1.55$, $df = 1/112$, $p < .10$, one tail test). No statistically significant improvement was found on two other related measures.

The Stanford Achievement Test (SAT) Vocabulary, Reading Comprehension, and Word Study Skills subtests were administered to pupils in grades two and above when the use of the learning centers began, in December and January, and again in May and June. Different, but equivalent, forms of the test were used on the two occasions. Level 1 was used with pupils in grades 2-4, Level 2 was used with pupils in grades 5-6, and Level 3 was used with the handful of pupils in grades 7-8 who attended the diocesan school sites.

Table 2 shows the analysis of the vocabulary test performance. The analysis for the other two tests, shown in Tables 3 and 4, used the same statistical model. The approach in the models is to control, and hence to minimize, the impact of two important determinants of posttest scores, initial ability and the mere passage of time. With these controls, it is possible to evaluate the independent effect of using a learning center.

The variable "Pretest Score" is in the analysis to control for the initial differences among the pupils when the program began. As shown in Table 2, its effect was statistically significant, meaning that posttest scores were strongly related to pretest scores, a phenomenon that is frequently found in pretest-posttest experimental designs.

The variable "Weeks Between Tests (Log)" is a variable that controls for the small variation in the number of weeks between the pretesting and the posttesting at the various sites. The "log" function of the number of weeks was used because it often appears that the growth rate in a new educational program is often greatest at its beginning. It was not significant, meaning that the effect due to the variation in number of weeks was so small that it could be found merely by chance.

The last variable "Use of Center (class periods)" is a measure of the rate of change of pupil score as a result of participation. It is an estimate of the total number of class periods each student used the center, and is derived from the report of the number of periods per week each student used the center for English language arts and the number of weeks between the student's pretest and posttest. For the Vocabulary subtest, this variable was statistically significant ($t=1.55$, $df=108$, $p<.10$, one tail test). The estimate of .096 means that the typical pupils' score improved by about one-tenth of a scale score point for each class period that the pupil used the individualized learning center. A comparison may put these findings in perspective: the norming sample typically grows 10 scale score points per year. Project effects of this magnitude were attained within a five month period for pupils receiving six hours of learning instruction per week.

The analyses in Table 3 and 4 show that the pretest scores were highly related to the posttests for the other two measures, Reading Comprehension and Word Study Skills. The amount of use of the learning centers did not effect pupil achievement to a statistically significant degree.

*Objective 4: The rate of pupils' acquisition of computational skills will be increased to a statistically significant degree ($p<.10$) above the rate at the time of the pretesting.*

This objective was not attained.

The SAT Mathematics Computation test was administered to pupils in grades 2-8 along with the reading tests used to evaluate Objective 3. The analysis of the scores relied on the same type of statistical model as well. The results are shown in Table 5.

The variable, "Use of Center (class periods)" is an estimate of the total number of periods of mathematics the students had in the learning center between the pretest and posttest. This variable was not statistically significant, meaning that no reliable improvement in pupils' mathematics scores, as a result of using a learning center, was detected.

*Objective 5. There will be a statistically significant ($p<.10$) improvement in ESOL (English for Speakers of Other Languages) pupils' rate of aural comprehension skills as compared to pupils at sites without multimedia programs.*

This objective was attained. ESOL pupils who used the bilingual learning centers were compared to other ESOL pupils at project schools and in a sample of other Chapter 1 Schools. Participation in the learning centers was found to improve pupils' scores on the Test of Aural Comprehension, at the rate of .1003 test items per 45-minute period in the learning center.

English to Speakers of Other Languages pupils in the three project schools with ESOL classes and in the seven elementary schools in the city-wide Chapter 1 ESOL evaluation sample of 1983 were given the Test of Aural Comprehension in the spring. The analysis shown in Table 6 controlled statistically for differences among schools, differences in pupils' initial ability, and the amount of time in ESOL that year. Initial ability was a composite of the pupils' ESOL level assignment at the beginning of the year and place of birth.

With these variables controlled, the effect on the scores of the number of class periods project participants studied in the learning centers was examined. A statistically significant increase of .1003 test items per 45-minute period was found. For example; if a pupil used the learning center to study English for five periods per week for twenty weeks the analysis suggests that the pupils' TAC score would be increased by about 10 points (5 periods per week x 20 weeks x .1003 points per period = 10.03 points). This amount of growth is considered to be substantial given the typical total score of the pupils on this instrument (the average of all pupils tested this year was 24.4).

*Objective 6. The average daily attendance of pupils served by the project (i.e., the learning center) on and after January 1, will be equal to, or better than, the average daily attendance of other pupils who were attending the schools during the same period of time.*

This objective was attained for pupils who were below the sixth grade in the public schools and completed the school year. It was not evaluated for sixth-grade pupils and for the diocesan schools during the first project year.

Pupil attendance records were obtained for children who completed the school year at the public schools, used the learning center, and were below grade 6. Their attendance was compared to the average daily attendance of the school and, where evaluators felt it appropriate, the average daily attendance of subgroups. The participants' data were from the second and third marking periods (December 10 to the end of the school year). The comparison data were from school reports for December through June.

The average daily attendance for the 53 learning center pupils at Cramp for whom data were available was 90.6%, as compared to 87.8% for pupils in the fourth and fifth grades, from which all but one of the Cramp learning center pupils came, and to 85.9 percent for pupils in the school as a whole.

At Hartranft, the average daily attendance of the 78 learning center pupils, who came from grades K-5 and for whom data were available, was 85.6% as compared to an overall school attendance of 83.5% for the analogous marking period.

Twenty pupils at Cramp and 14 pupils at Hartranft were not included in these analyses because they "graduated" from elementary school and their records had been forwarded to their new schools before the evaluators gained access to them. Another 30 pupils who had been served by the learning center had moved and their attendance records had been forwarded to another school before the data were gathered.

## Discussion and Conclusion

The Bilingual Learning Centers in Elementary School project was implemented at all sites by December 1982; however, much of the equipment for individualizing instruction was still not operational at year end. The first year partial implementation, is similiar to the pattern that has been observed in other programs since the Department of Education changed the funding approval date from the spring to the fall.

The centers were designed to be added to the ongoing bilingual and English as a Second Language programs, but at one site, the learning center was the only instruction especially designed for limited English proficiency pupils.

As the number of students using learning centers who were also studying the Spanish Language was small, project mangement decided to offer only English language and mathematics instruction in the centers. The evaluation conducted conformed to the offerings of the learning centers.

Pupils' use of the learning centers was associated with improved attendance and English aural comprehension and vocabulary skills, but no statistically significant improvement was detected on the English Reading Comprehension, Word Study Skills, and Mathematics Computation measures. These outcomes are considered to be good for a program that was newly, and only partly implemented.

The need for the project at one of the diocesan sites was apparently minimal. Only a handful of students were identified for the learning center instruction by the school faculty. The provided learning center space, in the hallway, was not considered adequate. Evaluators believe that, should the situation remain the same, using the site's resources at another, more impacted, school would be reasonable.

In conclusion, the finding that some statistically significant improvements in pupil performance could be detected within one-half year of operation of a partly implemented program suggests that the learning centers can be valuable resources for the limited English proficiency pupils attending the project schools. Reexamination of the impact of the project during the 1983-84 school year should offer more sensitive tests of the program's effects and an opportunity to replicate the first year efforts

TABLE 1

Equipment in Bilingual Learning Centers at Year End

| Instructional Device Listed in Objective | Number in Center | | | |
|---|---|---|---|---|
| | Cramp | Hartranft | St. Hugh | St. Edward |
| System 80 | 1 | 1* | 1 | |
| Tape Recorder (Cassette) | 3 | 2 | 1 | |
| Spellbinder | 1* | 1* | | |
| Craig Reader | | | | |
| Calculators | | | | |
| Charlie the Robot | 1* | 1* | 1* | |
| Other Devices | | | | |
| Voxcom | 1 | | | |
| Headphones | 16 | 16 | 16 | |
| Electric Board | 3 | | 1 | |
| Record Player | | | | 1 |
| Mathematics Marvel | 1 | | | |

*Incomplete or software not delivered.

TABLE 2

The Effect of the Number of Hours of Participation in the Bilingual Learning Center on Stanford Achievement Test (SAT) Vocabulary Posttest Scale Scores

| Variable | Estimate | t | p<* |
|---|---|---|---|
| Pretest score | .87445609 | 17.95 | .0001 |
| Weeks Between Tests (Log) | -1.90807596 | .25 | N.S. |
| Use of Center (class periods) | .09604605 | 1.55 | .10 |

*one tail test

R-square = .81
N = 112

Mean score = 124.67
Standard Deviation about the regression surface = 10.211

This analysis showed that use of the learning center was associated with improved SAT Vocabulary scores. When the effect of pretest and the number of weeks of participation in the program were controlled, the analysis suggested that pupil performance was improved at the rate of .096 scale score points per 45-minute class period.

TABLE 3

The Effect of the Number of Hours of Participation in the Bilingual Learning Center on Stanford Achievement Test (SAT) Reading Comprehension Posttest Scale Scores

| Variable | Estimate | t | p<* |
|---|---|---|---|
| Pretest score | .80396201 | 17.11 | .0001 |
| Weeks between Tests (Log) | -2.47441741 | .40 | N.S. |
| Use of Center (class periods) | .01549044 | .35 | N.S. |

*one tail test

R-square = .81
N = 114

Mean score = 132.03
Standard Deviation about the regression surface = 7.99

This analysis shows that there was no statistically significant relationship between the estimated number of class periods that pupils studied English skills in bilingual learning centers and their SAT Reading Comprehension posttest scores, once the effects of the pupils' initial abilities and the number of weeks between pretest and posttest scores were controlled.

TABLE 4

The Effect of the Number of Hours of Participation in the Bilingual Learning Center on Stanford Achievement Test (SAT) Word Study Skill Posttest Scale Scores

| Variable | Estimate | t | p* |
|---|---|---|---|
| Pretest score | .77990052 | 17.05 | .0001 |
| Weeks between Tests (Log) | -8.56859575 | .99 | N.S. |
| Use of Center (class periods) | .05007969 | .74 | N.S. |

*one tail test

R-square = .81
N = 111

Mean score = 124.92
Standard Deviation about the regression surface = 11.32

This analysis shows that there was no statistically significant relationship between the estimated number of class periods that pupils studied English and their SAT Word Study Skills posttest scale scores, once the effects of the pupils' initial scores and the number of weeks between pretest and posttest were controlled.

TABLE 5

Effect of the Number of Hours of Participation in the Bilingual Learning Center on Stanford Achievement Test (SAT) Mathematics Computation Scale Scores

| Variable | Estimate | t | p< |
|---|---|---|---|
| Pretest score | .97970329 | 16.50 | .0001 |
| Weeks between Tests (Log) | 16.11832447 | 1.99 | .05 |
| Use of Center (class periods) | .09675693 | .56 | N.S. |

R-square = .76
N = 107

Mean score = 139.85
Standard Deviation about the regression surface = 8.79

This analysis shows that there was no statistically significant relationship between the estimated number of class periods that pupils studied mathematics in a learning center and their subsequent SAT Mathematics Computation scores. There was a statistically significant result for the logarithmic transformation of the number of weeks between the pretests and posttests.

TABLE 6

The Effect of the Number of Hours of Participation in the Bilingual Learning Center on Test of Aural Comprehension (TAC) Scores

| Variable | F | df | p< |
|---|---|---|---|
| School | 12.49 | 9/189 | .0001 |
| Initial Ability | 18.11 | 4/189 | .0001 |
| Time in ESOL This Year (Log) | 10.66 | 1/189 | .0013 |
| Periods in Learning Center | 8.32 | 1/189 | .0004 |

R-square = .57 Mean Score = 24.43
N = 205 Standard Deviation About the Regression Surface = 8.73

This analysis showed that for each 45-minute period ESOL pupils attended the center, their score was increased by an average of .1003 test items.

This table shows that there was a statistically significant relationship between the total number of class periods pupils used the Bilingual Learning Centers and their TAC scores. Pupils who used the learning center were compared to a sample of children studying ESOL at other Chapter 1 schools and the children, studying ESOL at project schools, who were not using a learning center.

To make the comparison between learning center pupils and the others fair, only children in grades 2 and above were included in the analysis. The differences among schools, the effects of initial ability (a composite of ESOL level and country of origin), and of the number of months of ESOL class this year were controlled statistically. The logarithmic function for the variable Time in ESOL This Year was used because prior analyses have shown that TAC test scores increase at a faster rate when pupils first begin studying ESOL.