DEMONSTRATION PROGRAMS IN READING AND MATHEMATICS: A REVIEW

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INTRODUCTION

This report was prepared pursuant to a requirement contained in Chapter 1270, Statutes of 1983 (SB 1155).

Chapter 1270 provides for the termination of demonstration programs in reading and mathematics, effective June 30, 1985. (Chapter 1318, Statutes of 1984, postpones the termination date until June 30, 1986.) In enacting this measure, it was the Legislature's intent not to suspend state support for the demonstration programs but to ensure that the effectiveness and efficiency of these programs are thoroughly reviewed. To this end, Chapter 1270 requires that the State Department of Education review the programs and report to the Legislature on various aspects of their operation. Chapter 1270 further requires the Legislative Analyst to review the department's report and submit to the Legislature his findings, comments, and recommendations regarding the programs.

In their reports, both the Department of Education and the Legislative Analyst are required to address as many of the following issues as possible:

(1) The appropriateness of identification formulas used to determine which children have special needs.

(2) The appropriateness of allocation formulas used to distribute funds and the adequacy of funding levels provided for the programs.

(3) The effectiveness of the programs.

(4) The appropriateness of local control.

(5) The appropriateness of state-level involvement in monitoring, reviewing, and auditing the supported programs to assure that funds are being used efficiently, economically, and legally.

(6) The appropriateness of administration costs incurred by all entities involved in operating these programs.

(7) The appropriateness of having the State Department of Education administer categorical programs.

(8) The interrelationships between and among state and federal categorical programs.

(9) The characteristics of the target population being served by these programs.

(10) The need for the programs.

(11) The purpose and intent of the programs.

Organization of the Report

The first chapter of this report contains a brief description of the demonstration programs and the way in which state funds are allocated among individual projects. In Chapter II, we analyze the effectiveness of the demonstration programs, concentrating on the identification, dissemination, and replication of effective instructional techniques. In Chapter III, we discuss several additional issues involving the demonstration programs, including issues related to the populations served, program costs, the process used to select programs for funding, and the allocation of funds among individual projects. Chapter IV briefly summarizes our conclusions regarding continuation and expansion of the program.

This report was prepared by Chuck Lieberman, under the supervision of Ray Reinhard and Hal Geiogue.

SUMMARY OF FINDINGS AND RECOMMENDATIONS

I. FINDINGS

- Background. The demonstration programs, authorized by Chapter 106, Statutes of 1966, are designed to serve as exemplary or model programs for improving the proficiency in reading and mathematics of low-achieving junior high school pupils attending schools in disadvantaged areas. In 1984-85, the Legislature appropriated $3,997,000 from the General Fund for support of these demonstration programs.
- Test Scores. Reading and mathematics test scores of demonstration program pupils have increased significantly more than one would expect, based on the norm of all pupils taking the test.
- Cost Effectiveness. The cost-effectiveness of the demonstration programs has shown continual improvement, as measured by achievement gains.
- Instructional Techniques. The demonstration programs share common instructional techniques, such as individualized instruction, the use of learning laboratories for small group instruction, and diagnostic tests of pupils' abilities and needs.
- Program Dissemination and Replication. Curriculum materials developed by demonstration programs are distributed on request and during regional conferences, but a comprehensive summary of these materials has not been published.

- Compliance With Eligibility Criteria. Demonstration programs, in general, have been serving the target population identified in statute--that is, low-achieving pupils in disadvantaged areas. This is not true, however, of all demonstration programs.
- Eligibility Determination. Eligibility for demonstration program funding is determined using data compiled in 1969.
- Administrative Costs. State administrative costs for support of the demonstration programs appear to be reasonable; the data needed to assess the reasonableness of local administrative costs are not available.
- Use of Program Funds. At least one demonstration program is allocating part of its state funding for an activity that should be supported from general school aid apportionments.

II. RECOMMENDATIONS

1. We recommend that legislation be enacted to (1) continue the demonstration programs in reading and mathematics beyond the statutory termination date and (2) revise the programs along the lines recommended below.

2. We recommend that the Department of Education develop and distribute to all school districts offering instruction in grades 7-9 a descriptive summary of the curriculum materials prepared by the demonstration programs. (Page 14).

3. We recommend that legislation be enacted to make continuation of state support for any demonstration program that has been funded for three

or more years contingent upon an agreement by the school district to fund the instructional component of the program from district funds, with state support limited to the costs of curriculum development and dissemination/ replication activities. (Page 15).

4. We recommend that the Department of Education modify its formula for determining the cost-effectiveness of demonstration programs that have been operating for at least three years so as to include a measure of program replication by other schools. (Page 16).

5. We recommend that the State Department of Education review the demonstration programs to ensure that each project is serving its target population. (Page 18).

6. We recommend that legislation be enacted to specify that only those new demonstration program applicants proposing to utilize an instructional methodology or curriculum which differs significantly from existing demonstration programs may be considered for funding. (Page 20).

7. We recommend that the Department of Education review the expenditures of each demonstration program in order to ensure that all program funds are allocated for costs associated directly with the project. (Page 23).

I. BACKGROUND

Chapter 106, Statutes of 1966, authorizes state funding for demonstration programs which are designed to serve as exemplary or model programs for improving the reading and mathematics proficiency of low-achieving junior high school pupils attending schools in disadvantaged areas.

Individual demonstration programs operate on a two-year or three-year cycle, and serve the same group of students throughout the cycle. The length of the cycle depends on the number of grade levels in the participating junior high school. Thus, for example, a project in a junior high school offering instruction at the seventh, eighth, and ninth grade levels would operate on a three-year cycle, and would serve the same group of students as they progressed through the three grade levels.

Current law directs the State Department of Education to review the cost-effectiveness of the demonstration programs on an ongoing basis, and to terminate those that are least cost-effective.

Although the instructional procedures employed by individual demonstration programs vary, some characteristics of these programs are similar. Common characteristics include: individualized instruction, the use of learning centers or laboratories, and the development of specially-designed curricula.

In addition to the instructional component, demonstration programs include a replication component that reflects the "demonstration" nature of the program. Specifically, participating schools are expected to conduct

replication activities, such as inservice training of teachers and dissemination of classroom materials to other schools.

Table 1 summarizes the funding and pupil participation for the demonstration programs from 1981-82 through 1984-85.

Table 1

Demonstration Programs
in Reading and Mathematics
Funding and Participation
(dollars in thousands)

	1981-82	1982-83	1983-84	1984-85
General Fund appropriation	$3,558	$3,667	$3,771	$3,997
Number of programs	30	29	29	29
Pupil participation	9,178	8,841	9,364	8,908

In 1983-84, the Legislature appropriated $3,771,000 from the General Fund to support demonstration programs administered by local school districts. These funds were allocated to 28 schools in 19 districts, where they were used to operate 16 reading projects and 13 mathematics projects (one school operated both a reading and mathematics project). Table 2 shows the amount allocated to each individual project.

Table 2

Demonstration Programs
in Reading and Mathematics
Funding During 1983-84

School	District	Amount
Reading Projects:		
Compton	Bakersfield	$126,407
Sierra	Bakersfield	121,550
Willard	Berkeley	102,725
North Park	El Rancho	97,196
Garvey	Garvey	95,819
Greenfield	Greenfield	162,215
Jurupa	Jurupa	103,504
Santa Fe	Monrovia	167,781
Clifton	Monrovia	75,400
Roosevelt	Oakland	103,880
De Anza	Ontario	179,988
Imperial	Ontario	140,779
Central	Pittsburg	127,480
Ben Franklin	San Francisco	159,692
Santa Barbara	Santa Barbara	218,325
Mathematics Projects:		
Mission	Jurupa	117,561
Franklin	Long Beach	140,977
Washington	Long Beach	106,699
Pacoima	Los Angeles	163,165
Carter	Oakland	116,739
Hillview	Pittsburg	116,475
Simons	Pomona	107,505
Sierra	Riverside	134,560
University Heights	Riverside	135,348
Shandin Hills	San Bernardino	115,010
Peter Burnett	San Jose	159,412
Hoover	San Jose	157,404
Reading and Mathematics:		
Terrace Hills	Colton	131,559
Total		$3,685,155[a]

a. Excludes $85,845 allocated to Santa Fe Middle School to conduct regional conferences.

II. EFFECTIVENESS OF THE DEMONSTRATION PROGRAMS

Current law does not include criteria for evaluating the effectiveness of demonstration programs. Consequently, we must infer such criteria from the program's objective of improving the reading and mathematics proficiency of low-achieving pupils.

We have identified two criteria that must be satisfied if the demonstration programs are to be considered effective. Demonstration programs must (1) identify successful instructional techniques and (2) bring about the implementation of these techniques in other schools through dissemination activities. In other words, if the Legislature's intent in establishing demonstration programs is to be realized, these programs must identify and accomplish the replication of new instructional techniques.

Identification of Cost-Effective Instructional Techniques

Most of the Department of Education's report on the demonstration programs focuses on the issue of cost-effectiveness. The department's formula for measuring cost-effectiveness uses two variables:

- the degree of improvement in reading and mathematics achievement scores, as measured by the Comprehensive Test of Basic Skills (CTBS); and
- increases in program expenditures per pupil, relative to district expenditures per pupil (ADA).

The degree of improvement is measured by comparing the increase in test scores of participating students with the increases predicted for

these students based on the scores attained by a sample of all pupils taking the test nationwide, as reported by the test publisher. Using these variables, a cost-effectiveness index is developed for each project. The index is derived by dividing (1) the actual increase in test scores as a percentage of the predicted increase by (2) the cost per pupil participating in the demonstration programs as a percentage of the district's average operating cost per ADA.

The department's data indicate that:

- the improvement in the reading and mathematics test scores of demonstration program pupils has been significantly greater than what was predicted for these pupils using national norms; and
- during the past eight years, cost-effectiveness, as measured by the ratio of achievement gains to costs, has increased.

Table 3 shows, for the period 1975-76 through 1982-83, the actual and predicted gains in the test scores for demonstration program students. On the average, the increases for reading students were 203 percent higher than the predicted increases, while the increases for mathematics students were 392 percent higher.

Table 3

Actual and Predicted Gains in Achievement
By Demonstration Program Pupils

Year	Reading			Mathematics		
	Actual Gains	Predicted Gains	Increase Above Predicted Level	Actual Gains	Predicted Gains	Increase Above Predicted Level
1975-76	45	15	200%	51	14	264%
1976-77	49	15	227	51	14	264
1977-78	41	17	141	64	14	357
1978-79	46	16	188	73	12	508
1979-80	44	17	159	59	13	354
1980-81	53	16	231	68	12	467
1981-82	56	18	211	72	14	414
1982-83	59	17	247	77	12	542
Averages	50	16.5	203%	64	13	392%

It is possible that factors other than the activities conducted as part of the demonstration programs contributed to the results shown in Table 3. For example, it is likely that districts selected for demonstration programs receive relatively high levels of funding for other compensatory education programs which enhance student achievement.

Unfortunately, we cannot adjust for these other factors in measuring the effectiveness of the demonstration programs. Ideally, such adjustments would be made by comparing the achievement test scores of participating students to the test scores of a control group composed of pupils that are

similar to participants except for the fact that they do not participate in demonstration program activities. Programs of this type, however, generally do not lend themselves to such analysis, due to the difficulty of establishing appropriate control groups.

For these reasons, the department's analysis of achievement test scores for demonstration program pupils cannot be considered conclusive. Nevertheless, the size of the difference between actual and predicted achievement gains is large enough to warrant the presumption of program effectiveness, assuming that the test is a valid measure of proficiency.

What accounts for the programs' success in producing higher-than-predicted gains in achievement? Further research is needed to identify the factors responsible. Through our field work, however, we can identify the common elements of the individual demonstration programs that may contribute to the programs' success:

- individualized instruction, involving learning "contracts" between pupil and teacher,
- learning laboratories, attended by small groups of students in lieu of their regular class (thereby reducing class size), and
- diagnostic tests of pupils' abilities and needs.

Program Dissemination and Replication

To what extent have the demonstration programs caused these instructional techniques to be used at other school sites?

The department reports that in 1982-83, the demonstration programs allocated approximately 17 percent of available funds directly to

dissemination and replication activities. The department also reports that 63 percent of a sample of 1,000 persons who visited, or requested materials from, demonstration programs in 1978 indicated that they were using the materials and/or the techniques of the programs. The existing data, however, do not provide a basis for estimating the extent to which demonstration programs are replicated within the state.

Conclusion on Program Effectiveness

Given the fact that most of the current demonstration programs have been funded for 10 to 15 years and, during that period, have developed common methods, it would seem that the programs have accomplished the first part of their mission: identifying effective instructional techniques. This suggests to us that the programs' emphasis should now shift from the identification of successful techniques toward curriculum development, dissemination, and replication.

Catalogue of Curriculum Materials

We recommend that the Department of Education develop and distribute to all school districts offering instruction in grades 7-9 a descriptive summary of the curriculum materials prepared as part of the demonstration programs.

The State Department of Education has conducted various activities to facilitate the dissemination of materials developed as part of the demonstration programs. In 1980, the department published a summary of the individual demonstration programs. Although the summary describes the methodologies employed by each, it provides little information on

curriculum materials. The department also organizes regional conferences at which information on the demonstration programs is distributed to school personnel. Many schools, however, are not represented at these conferences.

In order to facilitate widespread dissemination of demonstration program materials, we recommend that the department publish and distribute a descriptive summary of all curriculum materials developed under the programs.

Local Contribution to Support Established Programs

We recommend that legislation be enacted to make continuation of state support for any demonstration program that has been funded for three or more years contingent upon an agreement by the school district to fund the instructional component of the program from district funds, with state support limited to the costs of curriculum development and dissemination/replication activities.

A demonstration or model program cannot be judged successful if schools are unwilling to replicate it. In these cases, one must conclude that the demonstration program is less effective than existing instructional programs. Consequently, individual demonstration programs must be evaluated in terms of the extent to which they are replicated.

The starting point for applying this criterion should be at the school site where the demonstration program is in operation. If, after it has had an opportunity to guage the effectiveness of its own demonstration program, a district chooses not to fund the program's instructional costs,

there is no apparent reason why other districts would want to replicate the program. Put another way, if the state expects other schools to replicate an effective demonstration program, should it not hold the same expectation for the school operating the program?

With this in mind, we recommend that school districts be required to fund the instructional component of their demonstration programs after the third year of state support. In the fourth and subsequent years, state support should be limited to curriculum development and dissemination/ replication activities. Any savings resulting from the application of this policy could be reallocated to other programs, and thereby better achieve the program's overall objective. Funds freed up in this manner could be used either to finance new demonstration programs or increase support for curriculum development and dissemination/replication activities among existing programs.

Our recommendation assumes that school districts, in general, have the ability to support the instructional costs of a demonstration program through a reallocation of their baseline operating funds. The fact that many districts have established programs, such as reading and mathematics laboratories, without separate demonstration program funding tends to support this assumption.

Assessment of Program Effectiveness

We recommend that the Department of Education modify its formula for determining the cost-effectiveness of demonstration programs that have been operating for at least three years so as to include a measure of program replication by other schools.

As noted previously, the department rates the effectiveness of demonstration programs solely by comparing gains in achievement test scores to program costs. Given the objective of the demonstration programs--to demonstrate effective instructional techniques to other schools--it would seem that this definition of effectiveness is too narrow, ignoring as it does the degree of replication in other schools.

Accordingly, we recommend that the department incorporate the incidence of program replication (including the use of curriculum materials) in its measure of effectiveness. The extent of replication could be determined through the use of sample surveys conducted by the department.

This recommendation, along with the preceding recommendation, would give project directors more incentive to shift the emphasis of their programs to curriculum development, dissemination, and replication. Without a greater emphasis on these features, the program is unlikely to do more than provide greater state resources to a relatively small number of schools, without regard to relative need. The "demonstration" goal of the program would go unfulfilled.

III. OTHER ISSUES

Compliance With Eligibility Criteria

We recommend that the State Department of Education review the demonstration programs to ensure that each project is serving its target population.

The department's report indicates that the demonstration programs have been placed in schools located in low-income areas, typically those areas with large minority populations. In fact, minority students accounted for 61 percent of demonstration program enrollment in 1983-84. The report also states that, in recent years, the academic achievement level of students entering demonstration programs in reading and mathematics has been, on the average, more than one year below grade level.

In general, the data indicate that the demonstration programs have been serving what the statute designates as the target population: low-achieving pupils in disadvantaged areas. The department's review, however, does not report program data by school or individual project level.

Our review of the demonstration programs suggests that some currently funded projects may not be located in low-income or "disadvantaged" areas. In one demonstration project school, for example, only 8 percent of the school's pupils are eligible for grants under the Aid to Families with Dependent Children (AFDC) program--well below the statewide average of about 14 percent.

Our analysis also indicates that some of the demonstration program schools may not be serving low-achieving pupils. For example, three participating schools reported that the average test scores of students entering the demonstration program in 1982-83 exceeded the norms for these pupils' grade levels.

The data used to determine eligibility for demonstration program funding were compiled in 1969. This, coupled with the results of our analysis, summarized above, suggests a need to review the demonstration programs in order to ensure that each project is serving the target population as set forth in law. Accordingly, we recommend that the State Department of Education conduct such a review.

State and Local Administrative Costs

The Department of Education's budget for state administration of the demonstration programs amounted to $100,109 (General Fund) in 1983-84. This amount supported 1.0 professional position and 0.5 clerical position. In addition, the department, through its Division of Planning, Evaluation and Research, provides program evaluation services for the demonstration programs. The amount of funds allocated for this purpose is not known.

Our analysis indicates that the amount of state administrative support provided for the demonstration programs is reasonable. It is in line with the amounts provided for other state-funded programs of comparable size and scope. Moreover, the local program directors that we contacted indicated that technical support from the state department has been adequate.

The department's report does not include any information on administrative costs at the local level, nor do the project budget reports contain this information. The budget reports, however, specify the amount of program funding retained by each district for administrative services. Of the 19 districts with schools operating demonstration programs in 1983-84, eight assessed a charge for district services, ranging up to 6.6 percent of total program costs. These charges were made for activities such as program evaluation, clerical assistance, fiscal services, and districtwide indirect costs.

Our review of the budget reports indicates that district charges appear to be levied primarily for direct services, such as evaluation of the demonstration programs. We do not know the extent to which districts that do not assess such charges are, nevertheless, providing services to the demonstration program.

The amounts charged for district services do not appear to be excessive. The State Board of Education, however, might wish to consider adopting regulations limiting district charges to no more than the costs of providing direct services to the program.

Selection of Programs for Participation

We recommend that legislation be enacted to specify that only those new demonstration program applicants proposing to utilize an instructional methodology or curriculum which differs significantly from existing demonstration programs may be considered for funding.

Schools are selected to participate in the demonstration program on the basis of applications submitted to the State Board of Education. To be eligible, a school district must be designated as a "poverty and social tension area" by the State Department of Education, pursuant to Education Code Section 54483 (Compensatory Education Programs).

In funding new (as opposed to ongoing) demonstration programs, the State Board of Education in recent years has selected several programs which, at least initially, utilized the same methodology as another demonstration program. (In some cases, these programs subsequently were modified to meet local needs.)

We question the desirability of using limited resources to fund new demonstration programs that, in large part, duplicate existing programs. Once the effectiveness of a particular instructional methodology has been established, regional workshops can be used to demonstrate these techniques to other schools. This will allow funds that become available for new demonstration programs to be used for testing other instructional techniques, thus increasing the demonstration value of the program.

Accordingly, we recommend that the Legislature require the department to use any state funds that become available for new demonstration programs to support instructional strategies or curricula which differ significantly from those being used by existing demonstration projects.

Allocation of Funds Among Individual Projects

The department's report does not indicate how available funds are allocated among schools selected to participate in the program. According to the program administrator, allocations are made "at the discretion of the department," based on the amount requested in the application, the responsibilities assigned to the project, and the historical pattern of funding in the program. In 1983-84, project funding ranged from $75,400 to $218,325.

One reason for the wide variation in funding levels is that the amounts expended for program dissemination and replication activities differ significantly from project to project. Some programs receive no funding for dissemination. Of those that were funded for this purpose in 1982-83, the amount allocated for dissemination and replication ranged from 6 percent to 39 percent of the project's budget.

The allocation of demonstration program funds among the individual projects is the result of administrative decisions by the Department of Education. The department provided no clear explanation for the wide variation in funding for dissemination and replication, reflecting the absence of any departmental policy on how funds are to be distributed for these important activities.

Our recommendation that the Legislature limit state support for programs that have been funded for three years to curriculum development and dissemination/replication would, if adopted, lead to greater emphasis on these activities.

Review Program Expenditures

We recommend that the Department of Education review the expenditures of each demonstration program in order to ensure that all program funds are allocated for costs associated directly with the project.

Demonstration program funds should be expended only for the program itself--for example, the project director, teachers and aides who provide instruction in a demonstration program reading or mathematics lab, and curriculum materials. In one program that we visited, however, demonstration program funds were used to employ a teacher who provided instruction in the school's regular mathematics courses. Since this activity was not part of the demonstration program, it should be supported from general school aid apportionments--not with demonstration program funds.

We recommend that the department review the expenditures of each demonstration program in order to verify that funds are being expended only for activities associated directly with the project.

IV. CONTINUATION OF THE PROGRAM

We recommend that legislation be enacted to (1) continue the demonstration programs in reading and mathematics beyond the statutory termination date and (2) revise the programs along the lines recommended in this report.

The Department of Education, in its report, recommended that legislation be enacted to continue the demonstration programs beyond the statutory termination date. The department also recommends that demonstration programs be expanded to new curricular areas, such as science.

Our evaluation of the demonstration programs indicates that they have been effective in identifying instructional techniques for improving student performance. As such, they warrant continuation. We believe, however, that the effectiveness and accountability of these programs would be enhanced if the programs were modified as we recommend in this report.

We also believe that expansion of the demonstration program concept to new subject areas, although desirable, should be deferred until the Department of Education has achieved a high degree of replication among existing demonstration programs.