Education Reforms and Student Achievement in the American States

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Abstract

The educational reforms by the states in the early 1980s were aimed at toughening the school environment and enriching student learning. Critics said that gains in schooling and learning are incompatible goals. We found small but consistent gains in learning, but inconsistent consequences of reform on schooling. State-imposed reforms accomplished more in learning than schooling, but the measurement of educational changes are too rough to make elaborate statistical analyses fruitful.

"Legislators legislated. Bureaucrats regulated. Commissions wrote reports. And all these groups pointed fingers and accused. The result was inability to address the real issues of schooling in America."

Mary Hatwood Futrell (1989)

"Don't destroy education reform now; it's working."

Bill Honig (1990)

"Many states have beefed up academic requirements for high school graduation. Much has been heard of stiffer certification requirements for teachers. The spasms have given us more homework for students, merit pay for teachers, career ladders, alternative schools, something for everyone. And the level of academic achievement across the nation is pathetic.

James Kilpatrick (1990)

"Reforms in public schools to date have been superficial and that nothing short of restructuring is needed."

Chris Pipho (1989a)

The quality of education in our public schools has been a major issue in state politics for most of the last decade. Since the U.S. Department of Education released its report, *A Nation at Risk* in April 1983, all the states have made serious

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efforts to improve the quality of public education. From Alaska to florida the state legislatures, governors, and boards of education have sought to improve public education by raising academic standards, up grading the teaching force, and enhancing financial support for schools (Kirst, 1988; Firestone, Fuhrman and Kirst, 1989; Timar and Kirp, 1988a).

According to Education Commission of the States (Pipho, 1987), at least 45 states have raised high school graduation requirements. As a result, high school students these days, on the average, need 3 more units of credit for their graduation than what was required in the early 1980s. In 19 states, moreover, they must pass a test to receive diplomas. Forty-six states have also mandated competency tests for new teachers and 30 states have done something with the idea of setting up career ladders for teachers. According to the U.S. Department of Education's (1990) seventh annual state education performance chart, the state average share of public education funds has also increased significantly from 47.6 to 49.5 percent since 1982 while the Federal and local shares have declined steadily over the same period.

These and other statistics on education reforms make it clear that "not since the formation of the common school system has the level of state policy activity in education been so high" (Firestone, Fuhrman and Kirst, 1989, p. 8). Moreover, the same statistics make it clear that the efforts of state governments to reform public education are far greater than those of their counterparts at the federal and local levels. As a case in point, the National Governors' Association has recently launched a 10-year joint venture to reform primary and secondary schools and to monitor their progress on the basis of six national goals in education upon which its members agreed unanimously (Fiske, 1990).

As state governments figure prominently in the education reform movement, the natural question is, how effective have their efforts been in improving public education? This paper has sought to explore this difficult question with a small set of state-by-state data currently available from the U.S. Department of Education.

The paper is organized in four sections. In the first section, we briefly examine the literature that is highly critical of the roles which many state governments played, especially in the first wave of education reforms. In the second section, we describe the research design underlying the study reported here and discuss the various limitations involved in it. In the third section, we present specific findings on the states regarding changes in schooling and learning in public schools consequent to school reform efforts. Finally, we discuss the implications of the findings in relationship with future research on the education reform movement in the states.

I. A Review of the Literature

The existing literature on the education reform mvoement is concerned mostly with the levels and sources of reform efforts across the 50 states. As reviewed in a recent study (shin and Van Der Slik, 1988), most of prior empirical research dealt with the questions of which states have done what, when, how, and why. Until now, we have not concerned ourselves about the impact of state education reforms on student achievement. However, it is desirable to determine what differences the state reforms have made in the daily performance of students in public schools. Which states have been most successful in improving student performance? Which states have been least successful in doing it? Why have some states been more successful than others in keeping school-age children in schools and equipping them with knowledg and skills? These important questions are yet to be explored systematically with a set of data which covers all or most of the American states.

In the meantime, many people, especially from education circles and the scholarly community, are highly critical of the roles which state governments have recently played in the process of the recent education reform movement (Chubb and Moe, 1989; Futrell, 1989; Kilpartick, 1990; Pipho, 1989a; Timar and Kirp, 1988).[1)] Most of their criticisms are directed at the extensive reform programs mandated by state legislatures, governors, and boards of educations during the three-year period of 1983-85. These programs, which were often of a sweeping nature and were supported with funds from new taxes, are now called the first wave of education reforms.

Specifically, three types of cirticisms are levelled at the first wave of reforms dominated by state governments. The first of these concerns its top-down approach to education reforms. As many critics point out correctly (Education Commission of the States, 1988, p. 6; see also Hawley, 1988; Pipho, 1989b; wise, 1988), the states relied on mandates and regulations as a means of bringing about improvements in student performance in public schools. Between 1983 and 1985, for example, state legislatures passed more than 700 statutes stipulating "what should be taught, when it should be taught, how it should be taught, and by whom it should be taught" (Futrell, 1989, p. 11).

As a result, a whole body of new rules were created to govern the activities of students, teachers, and administrators. According to Timar and Krip (1989),

> For students, there are rules about participation in sports and other extracurricular activities, about how much and what kind of homework must be done, and how many time students may miss school before they fail their courses. Then there are rules about what kind of courses student must take, about how much class time should be devoted to each subject each day, and about which topics must be

> covered in each class. For teacher, there are rules about placement on career ladders and about eligibility for merit pay. For prospective teachers, there are rules about certification, competency testing, and academic preparation. In some states, the law now prescribes how many times daily announcements may be made over a school's intercom system. In other states, schools and districts whose students perform poorly may be placed in receivership and taken over by the state. There are few teachers, students, and administrators across the country who have not been touched in some way by the effort to reform the school (p. 506).

This top-down wave of legislation and regulation is criticized for having stifled creativity and innovation in the classroom. It is also believed to have produced "a web of inefficiency" by "usurping the autority that appropriately belongs to teachers, principals, parents, and local communities" (Futrell, 1989, p. 11). In many school districts, moreover, top-down state mandates for education reforms were simply "sabotaged, fudged, or redirected" mainly by local school administrators and board officials who were more responsive to community needs and pressures than to the wishes of distant state officials (Timar and Kirp, 1989, p. 506).[2] By breeding fear and resentment while suppressing innovation and creativity at the local level, many of top-down reforms were described as being "short-term and cosmetic in nature, superficial rather than substantive" (McDaniel, 1989, p. 71).

A second type of criticisms, unlike the first one, has focused on the goals of the top-down reform movement that emanated from the statehouses. The reforms which evolved in the wake of *A Nation at Risk* were directed to meet "the twin challenges of substantially reducing the dropout rates and assuring that all students acquire the depth of knowledge and complex thinking skills required for future success" (National Governors's Association, 1988, p. 6). No one has questioned the need for public schools to meet these two challenges. Yet, many have questioned whether or not these two challenges can be met successfully at the same time through the same method (Firestone, Fuhrman, and Kirst, 1989; McDonnell, 1988; Timar and Kirp, 1988b).

To equip students with more intellectual skills and knowledge, for example, the states mandated tougher standards for promotion and graduation, including additional courses especially in the areas of mathematics and sciences. The states also authorized the elimination of electives and vocational courses and raised standards for participation in extracurricular activities. Tougher academic standards are believed to contribute to higher dropout rates by making it more difficult for at-risk students to complete school. And the elimination of electives and vocational courses accompanied by higher standards for participation in extracurricular activities are also considered to be contributing factors to higher dropout rates. This reduction in choices discourages at-risk students from staying in school (Firestone, Fuhrman and Kirst, 1989, p. 24). In short, the first wave of

school reform has been criticized for setting and pursuing two main goals that are not compatible with each other: (1) to keep students in school; and (2) to upgrade their preparation with more knowledge and skills.

Finally, the states have been criticized for their failure to consider alternaives to the existing structure of public education or school system. according to William Chance (1988) who appraised the first wave of reforms in seven states,

> Expanded high-school graduation requirements, attendance rule, indicators of performance, teacher salary increases, all logically if quietly presume the continuation of the design of the conventional education structure. They fit within the existing matrix. In this sense they are modifications and adjustments to the prototype rather than alternatives (p. 2).

The existing school structure is arguably as irrelevant to providing a high-quality education to all children in this era of post-industrialism as outmoded industrial plants are to high-tech industries. Because contemporary schools are simply a response to an earlier and simpler era of industrialization, reforms aimed only at "getting tough" will not be sufficient for the present and future needs of individual students and their workplaces.

There and other criticisms of top-down state mandates have ushered in the second wave of school reforms throughtout the nation. Unlike the first wave, it equally values excellence and equity in publich education. It prefers choices to prescriptive regulations as a means of improving public education. And it emphasizes the notion of restructuring schools over that of reforming them. In this second wave of the reform movement, the states are shifting their role to that of a "collaborative partner" from that of a "dictator" (National Governors' Association, 1987).

II. Research Design

How did the first wave of state education reform affect student achievement? To address this question of enormous complexity systematically, one needs to conduct research on the basis of an experimental design. Undoubtedly, changes in student achievement are not shaped by state policy activity alone. Therefore, an experimental research design, such as a multigroup or factorial design, is needed to control for other influences on those changes, including the activities of local and federal government, schools, and family (Coleman *et al.*, 1966).

Like most other works on state politics, the present study, however, was not conducted on the basis of an experimental design. It was based on a simple time-series design of a non-experimental nature and compared student achievement before and after the first wave of reforms mandated by the states. The choice of this simple design was dictated by the paucity of relevant time-series

data on student achievement as well as other major influences on it. With no control for any of those influences, our study can at best be considered to present a *partial* picture of how state mandates affected student achievement.

1. Changes in Student Achievement

Student achievement usually refers to the extent to which learning has actually occurred in schools. Specifically, it means increases in the amount of information, knowledge, and skills that students have concerning the variety of subject matters taught in school. It also means improvements in a variety of intellectual and communicatin skills, including those of reading, writing, and reasoning.

In the present inquiry, however, student achievement is conceptualized more broadly in view of the primary goals set forth in the first wave of reforms: (1) to keep student in school; and (2) to equip them with information, knowledge, and skills. Continual exposure to the school environment together with the amount of learning achieved there, therefore, are considered two distinct dimensions of student achievement in schools.

The first dimension of *schooling* is measured in terms of two indicators: (1) average daily attendance rate; and (2) high school graduation rate. The second dimension of *learning* is also measured in terms of two indicators: (1) ACT/SAT test scores; and (2) Advanced Placement (AP) candidates as a percent of graduates.

These four indicators are chosen for two reasons. First, data are available for their comparisons over time. More appropriate indicators, such as percentage of public high school students scoring 3 or above in advanced placement exams, are not available for such comparisons for the entire period surveyed in this study. Second, three of these indicators — high school graduation rate, attendance rate, and AP rate — were already measured in the same percentage unit whose scores range from a low of 0 to a high of 100. And the fourth indicator, ACT/SAT scores, could easily be rescaled so that its values range from a low of 0 to a high of 100.[3)]

To measure changes in student achievement, we originally planned to average the yearly percentage scores of four chosen indicators over a three-year period immediately before and after the first-wave of reforms was introduced during the period of 1983-85. This procedure would yield much more reliable estimates of the trends in student performance. The dearth of relevant time-series data especially for the period prior to 1982, however, ruled out the use of this technique in the present study. As a result, our estimates of changes in student achievement were made on the basis of annual data rather than period data.

Specifically, we first estimated for each state the magnitude and direction of change in each of its four domains over the 1982-88 period. This was done by

subtracting each index scores for 1982 from those for 1988. Scores resulting from this procedure were then transformed so that they could take one of three values: −1, 0, and +1. A new score of +1 was assigned to the significant improvements of one percentage point or more while a new score of −1 was assigned to the significant declines of one percentage or more. A score of 0, on the other hand, was assigned to the changes of less than one percentage point in either direction.[4)]

For each dimension of school achievement, we added up the rescaled scores of its two domain indicators. This resulted in a 5-point dimensional index, which ranges from a low of −2 to a high of +2. The signs and values of this index, like those for each domain, indicate the direction and magnitude of changes in student achievement over time.

Finally, scores of two dimensional indexes were compared to determine for each state whether or not its public schools have made improvements in none, one, or both dimensions of student achievement. This endeavor yielded a four-fold typology of student achievement. It includes: (1) no improvements in any dimension; (2) improvements only in the schooling dimension; (3) improvements only in the learning dimension; and (4) improvements in both dimensions.

2. Education Reforms Mandated by the States

Since 1983, the states have played divergent roles as a reformer of public education. Their role as mandator rather than a collaborative partner is the main concern of this inquiry. For this reason, we focused on the school reform activities in which the states engaged during the first-wave period of 1983-85. These include all the legislation passed by their legislatures, and a variety of regulations issues by their governors and boards of education.

State education activities were measured mainly in relation to the recommendations included in the national Commission on Excellence in Education's 1983 report, *A Nation at Risk*. Emphasizing that "the educational foundations of our society are presently being eroded by a rising tide of mediocrity," the Commission recommended a number of specific changes in six important areas of public education: (1) high school requirements; (2) academic standards; (3) learning; (4) teaching; (5) finance; and (6) leadership. Out of these six areas, the first four were selected for the present analysis because they relate most directly to student performance.[5)]

As Table 1 indicates, we combined the Commission's recommendation in the four areas into 30 broad categories. In each category, we first determined whether or not the states issued school reform mandates or regulations. Then we counted the number of categories in which they issued such mandates or regulations to construct an overall index of state education reforms. Using the index's average

〈Table 1〉 A List of School Reform Recommendations

I. High School Graduation Requirements
- 1) Four years of English
- 2) Four years of mathematics
- 3) Four years of science
- 4) Three years of social studies
- 5) One-half year of computer science
- 6) Two years of foreign language for college-bound students
- 7) Competence test for graduation

II. Academic Standards
- 8) To rely on grades as evidence of students' readiness for further study.
- 9) To raise college admission requirements.
- 10) To administer achievement tests at major transition points from one level of schooling to another.
- 11) To evaluate and upgrade textbooks and other tools of learning.
- 12) To support textbook development for disadvantages students, learning disabled and the gifted and talented.
- 13) To reflect the most current applications of technology in appropriate curriculum areas, the best scholarship in each discipline and research in learning and teaching.
- 14) To promote students on the basis of their academic progress rather than their age.

III. Learning
- 15) To assign more homework.
- 16) To introduce study and work skills in the early grades.
- 17) To consider 7-hour school days and 200 to 220 day school year.
- 18) To expand the time available for learning through better classroom management and organization of the school days.
- 19) To develop and enforce consistently firm and fair codes of student conduct.
- 20) To develop and enforce attendance policy with clear incentives and sanctions.
- 21) To add time for teaching and learning by reducing administrative burdens on the teacher and related intrusion into the school day.
- 22) To arrange additional learning time for slow learners and the gifted.

IV. Teaching
- 23) To require competence tests for certification and recertification.
- 24) To increase salaries for the teaching profession.
- 25) To adopt an 11-month contract for teachers.
- 26) To develop career ladders for teachers.
- 27) To evaluate the performance of teachers regularly.
- 28) To develop a special program for the solution of the immediate problem of the shortage of math and science teachers.
- 29) To offer special incentives to attract outstanding students to the teaching profession.
- 30) To involve master teacher in designing teacher preparation programs and in supervising new teachers.

score of 11 as a cut off point, we divided the 50 states into 2 groups: (1) low-reform states; and (2) high-reform states. The two groups of states were compared on their average scores on all three — domain, dimension, and overall — types of indexes measuring changes in student achievement.

III. Empirical Findings

1. School Reforms and Student Achievement

We now examine the relationship between the education reforms mandated by the states and student achievement in their public schools. For each of the two groups of the states defined by levels of school reforms, Table 2 estimates changes in the achievement of students in their public schools. Of the two groups, it is the low-reform group of states that has been more successful in getting high school students to complete their education. It is also the low-reform states that have been more successful in retaining student class attendance. In broadening the depth of their knowledge and cultivating their intellectual skills, however, high-reform states have been more successful than their low-

〈**Table 2**〉 Changes in Student Achievement by Levels of School Reforms in the States 1982 and 1988

Achievement Domain	Reform Level		Difference (B-A)
	Low (A)	High (B)	
Graduation	2.8%	1.7%	−1.1%
Attendance	−0.5	−0.6	−0.1
Advance Placement	5.0	5.5	+0.5
ACT/SAT	0.8	0.9	+0.1

〈**Table 3**〉 Percentages of the States Experiencing *Significant Improvements* in Student Achievement by Levels of School Reform

Achievement Domain	Reform Level		Difference (B-A)
	Low (A)	High (B)	
Graduation	62.5%	46.2*	−16.3%
Attendance	16.7	11.5	−5.2
Advance Placement	95.8	100.0	+4.2
ACT/SAT	41.7	46.2	+4.5
(N)	(24)	(26)	

reform counterparts.

More specifically, we see in Table 3 that, in nearly two-thirds of low-reform states (63 percent), the percentage of high school students who complete their education has increased markedly after the first wave of reforms. In high-reform states, however, less than a majority (46 percent) have done so. Comparison of these figures suggests that public schools in the high-reform group are 16 percent more likely to fail in their efforts to reduce the dropout rates than those in the low-reform group. In their attempt to improve the depth of knowledge and skills among high school students, the former are 4 or 5 percent more likely to succeed than the latter.

The differences between the two groups of the American states in improving public education become blurred when they are compared in their capacity to meet the twin challenges of keeping students in school and equipping them with more advanced knowledge and skills. As Table 4 shows, there is virtually no difference between the two groups in meeting these two challenges successfully. In each group, two out of three states (42 percent) are found to have brought about significant improvements in the schooling and learning dimensions of student achievement. Based on this finding, it can be argued that mandating school reforms from the statehouses does not appear to be an effective, short-term strategy for addressing the most serious educational facing the nation.

IV. Conclustions

The educational reforms mandated by the states in the early 1980s were directed to meet two challenges: (1) to keep students in school; and (2) to equip them with more knowledge and skills. What tentative conclusions are reached about the effectiveness of state legislative mandates at meeting these two educa-

〈**Table 4**〉 Types of Student Achievement by Levels of School Reforms

Type of Student Achievement[a]		Level of School Reform[b]	
Schooling	Learning	Low	High
0	0	4.2%	0.0%
0	+	54.2	57.7
+	0	0.0	0.0
+	+	41.7	42.3
(N)		(24)	(26)

Notes: [a]0 means no improvement while + means an improvement in school achievement.

[b]Entries are precentages of States in each level of school reform.

tional challenges on the basis of the findings presented above?

First, state-imposed reforms appeared to be *marginally effective in improving the quality of public education. Both measures of schooling and learning revealed only small change over the period of 1982*-1988. During this six-year period, the nation as a whole experienced 1.6-percentage point increase in attendance rate; 0.2 percentage point decrease in graduation rate; 1 percentage point increase in ACT/SAT scores; and 5.9-percentage point increase in enrolling students in advanced placement course of study. The magnitude of these changes in schooling and learning, when considered together, indicates that the states alone are not capable of effecting substantial improvements in the quality of public education over a short span of time by issuing a new set of rules and regulations.

Second, state-imposed reforms appeared to be *unevenly* effective in improving the quality of public education. Only in learning, one of the two domains of student achievement surveyed in this study, high reform states were found to be more effective than their low reform counterparts. In the other domain of schooling, however, the former were found to be less effective than the latter. As critics of the first wave reform have argued, the top-down reform movement emanating from the statehouses could not produce positive results in both learning and schooling.

Finally, it can be concluded that without better data on education outcomes, education reforms will not be assessed any more meaningfully than in the present study. The indicators of schooling and learning currently available are few and very crude. Worse, they have not been measured on an ongoing basis. The actual scores of public high school graduates on the advanced placement examination, for example, could not be used as a measure of learning because figures for states were not available for the pre-reform period. As the Council of Chief State School Officers' most recent report (1990: 67) points out, "in order to know how well the system is doing we need sound data on educational outcomes; we need that bottom line, and we need to complete that component for a full model of the educational system."

Notes

1) The August and November 1988 issues of *Education Administration Quarterly* are devoted to this subject.
2) According to Pipho (1985), the Board of Education in Halifax County of North Carolina lengthened its school day and school year as part of the state program to field test a longer school day and school year in 1983. At the end of the second year of the trial, the board was unseate. New board members, who ran on the grounds that the program should be stopped, terminated it immediately.
3) ACT scores, for example, were multiplied by a factor of 2.78 while SAT scores were divided by a factor of 16.

4) A change of 1 percentage point or more in the values of student achievement indicators is considered significant in a substantive sense.
5) For further details, see Shinn and Van Der Slik (1988, pp. 542-544).

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