

January 2001

Enhancing the Educational Experience: Policy Alternatives

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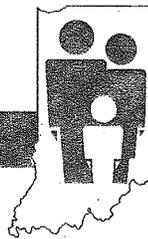
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Family Impact Seminars

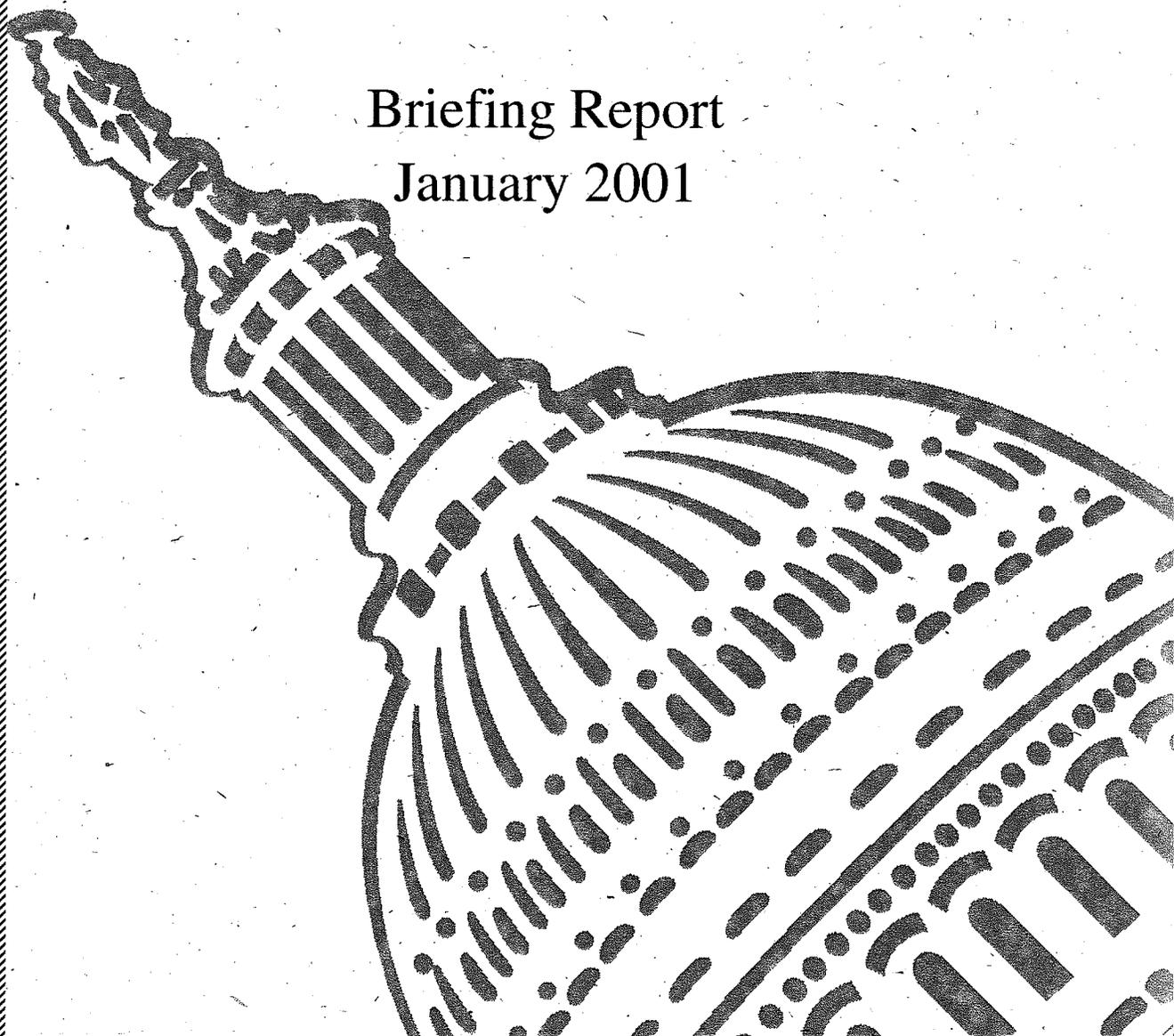


Indiana

Enhancing the Educational Experience: Policy Alternatives

Briefing Report

January 2001



Enhancing the Educational Experience: Policy Alternatives

Indiana Family Impact Seminars Briefing Report

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January 2001

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Purpose, Presenters and Publications

Family Impact Seminars have been well received by federal policymakers in Washington, DC, and Indiana is one of a handful of states to sponsor such seminars for state policymakers. Family Impact Seminars provide state-of-the-art research on current family issues for state legislators and their aides, Governor's Office staff, state agency representatives, educators, and service providers. Based on a growing realization that one of the best ways to help individuals is by strengthening their families, Family Impact Seminars analyze the consequences of an issue, policy or program may have for families.

The seminars provide objective nonpartisan information on current issues and do not lobby for particular policies. Seminar participants discuss policy options and identify common ground where it exists.

Enhancing the Educational Experience: Policy Alternatives is the third in a continuing series designed to bring a family focus to policymaking. This third seminar features the following speakers:

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Each seminar is accompanied by an in-depth briefing report that summarizes the latest research on a topic and identifies policy options from across the political spectrum. Copies may be obtained from The Center for Families at Purdue University, (765) 494-9878



A Checklist for Assessing the Impact of Policies and Programs on Families

The first step in developing family-friendly policies is to ask the right questions:

- ❖ What can government and community institutions do to enhance the family's capacity to help itself and others?
- ❖ What effect does (or will) this policy (or proposed program) have for families? Will it help or hurt, strengthen or weaken family life?

These questions sound simple, but they can be difficult to answer.

The Family Criteria (Ad Hoc) Task Force of the Consortium of Family Organizations (COFO) developed a checklist to assess the intended and unintended consequences of policies and programs on family stability, family relationships, and family responsibilities. The checklist includes six basic principles that serve as the criteria for the sensitivity and supportiveness of policies and programs. Each principle is accompanied by a series of family impact questions.

The principles are not rank ordered and sometimes they conflict with each other, requiring trade-offs. Cost effectiveness also must be considered. Some questions are value-neutral and others incorporate specific values. People may not always agree on these values, so sometimes the questions will require rephrasing. This tool, however, reflects a broad nonpartisan consensus, and it can be useful to people across the political spectrum.

For the questions that apply to your policy or program, record the impact on family well-being.

1

Principle 1. Family support and responsibilities.

Policies and programs should aim to support and supplement family functioning and provide substitute services only as a last resort.

Does the proposal or program:

- support and supplement parents' and other family members' ability to carry out their responsibilities?
- provide incentives for other persons to take over family functioning when doing so may not be necessary?
- set unrealistic expectations for families to assume financial and/or caregiving responsibilities for dependent, seriously ill, or disabled family members?
- enforce absent parents' obligations to provide financial support for their children?

2

Principle 2. Family membership and stability.

Whenever possible, policies and programs should encourage and reinforce marital, parental, and family commitment and stability, especially when children are involved.

Intervention in family membership and living arrangements is usually justified only to protect family members from serious harm or at the request of the family itself.

Does the policy or program:

- provide incentives or disincentives to marry, separate, or divorce?
- provide incentives or disincentives to give birth to, foster, or adopt children?
- strengthen marital commitment or parental obligations?
- use appropriate criteria to justify removal of a child or adult from the family?
- allocate resources to help keep the marriage or family together when this is the appropriate goal?
- recognize that major changes in family relationships such as divorce or adoption are processes that extend over time and require continuing support and attention?

Principle 3. Family involvement and interdependence.

Policies and programs must recognize the interdependence of family relationships, the strength and persistence of family ties and obligations, and the wealth of resources that families can mobilize to help their members.

To what extent does the policy or program:

- recognize the reciprocal influence of family needs on individual needs, and the influence of individual needs on family needs?
- recognize the complexity and responsibilities involved in caring for family members with special needs (e.g., physically or mentally disabled, or chronically ill)?
- involve immediate and extended family members in working toward a solution?
- acknowledge the power and persistence of family ties, even when they are problematic or destructive?
- build on informal social support networks (such as community/neighborhood organizations, religious communities) that are essential to families' lives?
- respect family decisions about the division of labor?
- address issues of power inequity in families?
- ensure perspectives of all family members are represented?
- assess and balance the competing needs, rights, and interests of various family members?
- protect the rights and safety of families while respecting parents' rights and family integrity?

Principle 4. Family partnership and empowerment.

Policies and programs must encourage individuals and their close family members to collaborate as partners with program professionals in delivery of services to an individual. In addition, parent and family representatives are an essential resource in policy development, program planning, and evaluation.

In what specific ways does the policy or program:

- provide full information and a range of choices to families?
- respect family autonomy and allow families to make their own decisions? On what principles are family autonomy breached and program staff allowed to intervene and make decisions?
- encourage professionals to work in collaboration with the families of their clients, patients, or students?
- take into account the family's need to coordinate the multiple services they may require and integrate well with other programs and services that the families use?
- make services easily accessible to families in terms of location, operating hours, and easy-to-use application and intake forms?
- prevent participating families from being devalued, stigmatized, or subjected to humiliating circumstances?
- involve parents and family representatives in policy and program development, implementation, and evaluation?

Principle 5. Family diversity.

Families come in many forms and configurations, and policies and programs must take into account their varying effects on different types of families. Policies and programs must acknowledge and value the diversity of family life and not discriminate against or penalize families solely for reasons of structure, roles, cultural values, or life stage.

How does the policy or program:

- affect various types of families?
- acknowledge intergenerational relationships and responsibilities among family members?
- provide good justification for targeting only certain family types, for example, only employed parents or single parents? Does it discriminate against or penalize other types of families for insufficient reason?
- identify and respect the different values, attitudes, and behavior of families from various racial, ethnic, religious, cultural, and geographic backgrounds that are relevant to program effectiveness?

Principle 6. Support of vulnerable families.

Families in greatest economic and social need, as well as those determined to be most vulnerable to breakdown, should be included in government policies and programs.

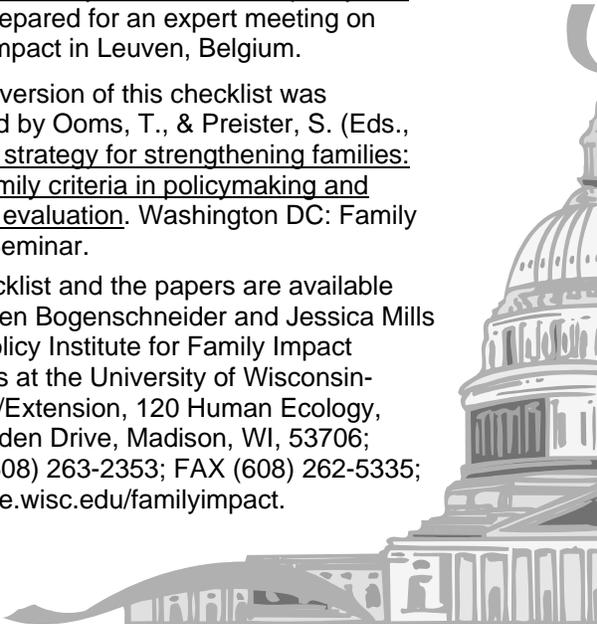
Does the policy or program:

- identify and publicly support services for families in the most extreme economic or social need?
- give support to families who are most vulnerable to breakdown and have the fewest resources?
- target efforts and resources toward preventing family problems before they become serious crises or chronic situations?

Adapted from Ooms, T. (1995). Taking families seriously as an essential policy tool. Paper prepared for an expert meeting on Family Impact in Leuven, Belgium.

The first version of this checklist was published by Ooms, T., & Preister, S. (Eds., 1988). A strategy for strengthening families: Using family criteria in policymaking and program evaluation. Washington DC: Family Impact Seminar.

The checklist and the papers are available from Karen Bogenschneider and Jessica Mills of the Policy Institute for Family Impact Seminars at the University of Wisconsin-Madison/Extension, 120 Human Ecology, 1300 Linden Drive, Madison, WI, 53706; phone (608) 263-2353; FAX (608) 262-5335; <http://sohe.wisc.edu/familyimpact>.



The Impact and Implementation of Full-Day Kindergarten

presented by Linda Foley

In 1984 the Ohio Department of Education (ODE) initiated a comprehensive effort to evaluate the effects of various kindergarten schedules and preschool attendance that were relevant to statewide policy making in the area of early childhood education.

Existing studies that focused on the effects of different kindergarten schedules involved only small samples or unique populations and generally failed to apply rigorous standards, pointing to the need for data on large numbers of children representing the entire range of socioeconomic circumstances found in the state. Additional factors promoting success in Ohio elementary schools also needed to be identified. As a result, a series of statewide **Impact Studies** was conducted from 1985 to 1991.

Following these studies, the Ohio General Assembly funded several initiatives to increase instructional attention for students from kindergarten through grade three, and to provide a safe learning environment. An **Implementation Study** examined the challenges that school districts faced in implementing these initiatives, providing a thoughtful look at the issues for policy-makers. Both the impact studies and the implementation study are summarized in this paper.

IMPACT STUDIES

Two studies were conducted by the Ohio Department of Education's Division of Early Childhood Education to examine the impact of full-day schedules on child outcomes. The first was a **Retrospective Impact Study** of 8,290 children who entered kindergarten in the fall of 1982, 1983 or 1984. The second was a **Prospective Longitudinal Impact Study** of two groups, totaling almost 6,000 children entering kindergarten in the fall of 1986 or 1987. The effects of attending one of three kindergarten schedules were examined:

- Half-day, typically 5 days per week, 2.5 hours per day
- Alternate day, typically 5 days every 2 weeks, 5 hours per day
- Full day, typically 5 days per week, 5 hours per day

Data collected in both the retrospective and prospective studies included:

- Kindergarten schedule
- Gender
- Age at initial kindergarten entrance
- Previously existing standardized test data
- Incidence of grade retention
- Incidence of Chapter 1 placement
- Incidence of special education placement

Additional data gathered during the prospective longitudinal study included:

- Standardized test data on Metropolitan Readiness Tests
- Standardized test data on Metropolitan Achievement Tests (MAT) in first (1986 cohort) or second (1987 cohort) grade
- Kindergarten teacher observations of children's behavior in kindergarten
- Preschool attendance in the year prior to kindergarten entrance
- Kindergarten teacher ratings of children's behavior
- Kindergarten teacher activities by schedule

Data Collection

Retrospective data were gathered in 1986 and reflected outcomes in kindergarten and grades 1, 2, 3 and 4. Prospective data were gathered from 1986 to 1990. Children in the prospective study who had not been retained (i.e., held back) were in grade 4 (1986 cohort) or grade 3 (1987 cohort) in the fall of 1990.

Participating School District Characteristics

Schools were selected based on geographic location and demographic characteristics using the following sampling procedures:

- Those districts having two or more current kindergarten scheduling options (excluding Chapter 1 extended-day kindergartens) were asked to participate whenever possible.
- Because only a small number of Ohio districts offered full-day kindergarten programs (excluding Chapter 1 full-day classrooms), all districts offering full-day kindergarten (excluding Chapter 1 full-day classes) were invited and matched with demographically equivalent districts in the same county offering an alternative kindergarten option. Demographic variables considered in matching the districts included socioeconomic status (SES), per pupil expenditures, district size, number of schools, and number of kindergarten classes.
- Adequate geographic balance and representation of urban/central, urban, suburban, and rural school districts was achieved by matching districts that offered only half-day kindergarten with demographically equivalent districts in the same county that offered alternate-day kindergarten. Demographic variables considered in making the matches included SES, per pupil expenditures, district size, number of schools, and number of kindergarten classes.

Research Designs

Retrospective study. The study involved identifying kindergarten teachers in 27 diverse districts throughout Ohio, selected on the characteristics noted above. Cumulative folders of children who had graduated from those 120 kindergarten classes two, three and four years earlier were then located and analyzed. A total of 76,313 unique test scores were obtained for 8,290 children.

Prospective study. Using the selection characteristics noted above, 27 districts and 120 kindergarten classes were identified in the fall of 1986; 32 districts and 130 classes were identified in the fall of 1987. Using a systematic observation tool researchers conducted three observations in each class, observing length of day, coding teacher behaviors at five-minute intervals, and randomly sampling children at 15-minute intervals. Each child was then tested in the spring of each year, beginning with the kindergarten year and running through grade 3. Additionally, teacher analyses of children's behaviors, prior preschool attendance data and questionnaires mailed to those preschools were obtained. Cumulative folders for all pupils (2,821 in the 1986 cohort and 2,891 in the 1987 cohort) were then reviewed to determine the incidence of grade retention, Chapter 1 placement and special educational services.

Limitations of the Impact Studies

Retrospective study. This study has a number of limitations inherent in research conducted "after the fact" or based on respondent recollection. The quality of the various kindergarten programs could not be controlled or described, nor could the researchers describe why the schedules were selected for each child in the study. Enrollment in the full- and half-day programs may or may not have been elected due to parent work schedules. The extent to which subsequent school performance may have been related to the unknown selection process is not known. One encouraging factor is that pupil gender was quite similar across the various schedules.

The researchers recognize that classes in one type of kindergarten schedule may have varied from classes of another schedule in ways that are unrelated to the schedule, and attempted to control for this occurrence by careful selection of districts. This selection, however, was based upon district assessments made in the year prior to the study. Nevertheless, an encouraging similarity has been found in comparing retrospective to prospective data.

Finally, districts and classrooms were chosen primarily to provide a comparison of classroom schedules. Although a good geographic balance of school districts was obtained, the findings are not completely generalizable throughout the state of Ohio with scientific assurance. For example, no pre-existing full-day classes could be found in certain geographic locations. Thus, the study contains more full-day classes in the northeast section than it does in the southwest.

The researchers caution that retrospective research conducted after the fact without the benefit of random assignment should be cautiously interpreted. Although such data cannot provide a definitive answer to research questions, they do provide a strong indication (when strengthened by subset analyses of replication studies) of the possible effect of kindergarten schedules.

Prospective study. Although the prospective study shares some of the limitations found in the retrospective study, such as no benefit of random assignment of subjects to the schedules, these limitations are partially offset by subset analyses and matching. Additionally, the observational data provide a check in determining the instructional quality across the various schedule types. To the extent that children and classrooms in various kindergarten schedules are similar to those in this study, the study findings can be generalized. However, as with findings from the retrospective study, the prospective study findings cannot be generalized to the entire state of Ohio. In year two of this study (1987-88) six districts were

added and two were removed; expanding the base of districts increases, somewhat, the ability to generalize findings.

Findings Related to Kindergarten Schedules

Data from both the retrospective and prospective studies provide remarkably clear evidence that participation in full-day kindergarten is positively related to subsequent school performance. This strong beneficial relationship is evidenced in standardized test performance, grade retentions and Chapter 1 placements, with the effect of participation appearing to last at least to the second grade. The test performance of pupils in kindergarten through second grade is summarized in Figures 1, 2, and 3.

Data from both the retrospective and prospective studies provide remarkably clear evidence that participation in full-day kindergarten is positively related to subsequent school performance.

Chapter 1 placement and grade retention variables define more clearly the impact of kindergarten schedules. As indicated in Figures 4 and 5, half-day kindergarten pupils experience higher grade retention and Chapter 1 placement level than pupils in the other schedules. Children in full-day schedules experience the lowest Chapter 1 placement in both the prospective and retrospective studies, and show a lower retention rate in all comparisons with half-day children. Alternate-day pupils showed the lowest retention rates only in the retrospective study.

The quantitative differences that occur across the several studies are understandable in light of data collection timing and the grade level of children in the study. For example, the retrospective study children had been in school the longest (in some cases through the fourth grade) when data were collected, increasing the opportunity for retention or placement in Chapter 1. Children in the 1987 cohort of the prospective study were in school the shortest period of time (typically three years) when data were collected and were least likely to have experienced retention or placement.

Qualifications of the findings. Very few qualifications need be noted for the findings regarding impact of full-day kindergarten. Only a small percentage of pupils in the studies had to pay more for the full-day option; in most cases the total cost was covered by the district. One large school district offered one half-day and one full-day class in each of eight buildings with full-day enrollment provided on a space-available basis to any parent requesting it. Subset analysis results for that district were entirely consistent with the overall results noted in this report.

Figure 1
Performance on Standardized Tests:
Kindergarten

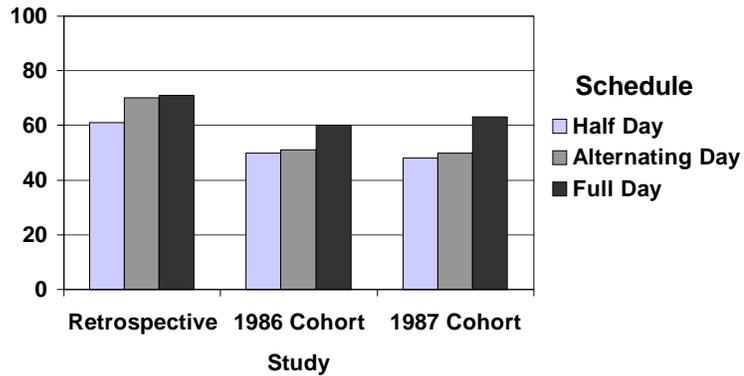


Figure 2
Performance on Standardized Tests:
First Grade

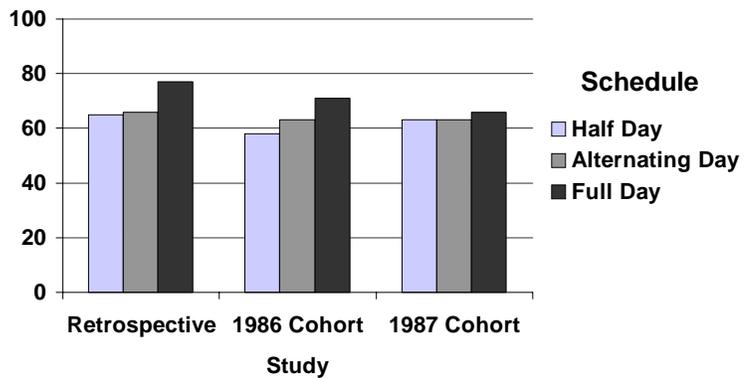


Figure 3
Performance on Standardized Tests:
Second Grade

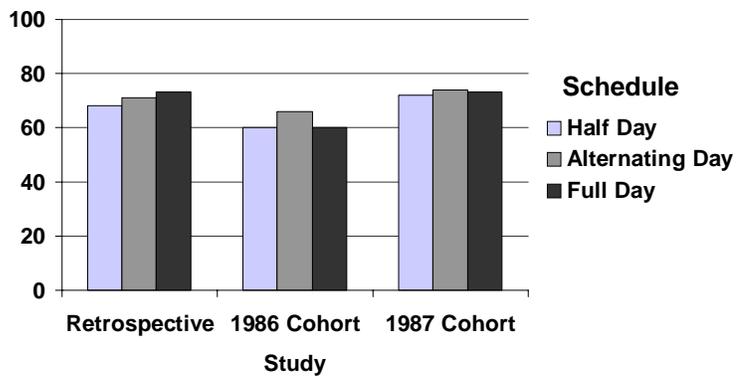


Figure 4
Percent of Students
in Chapter 1 Placement

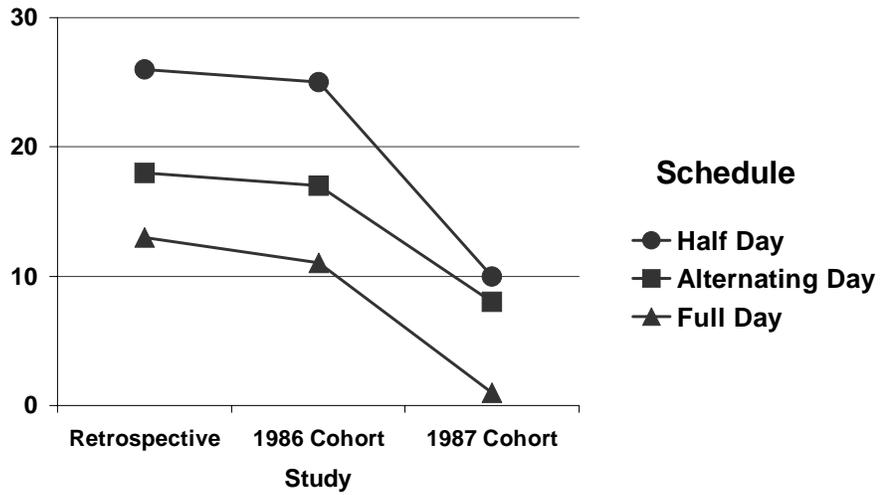
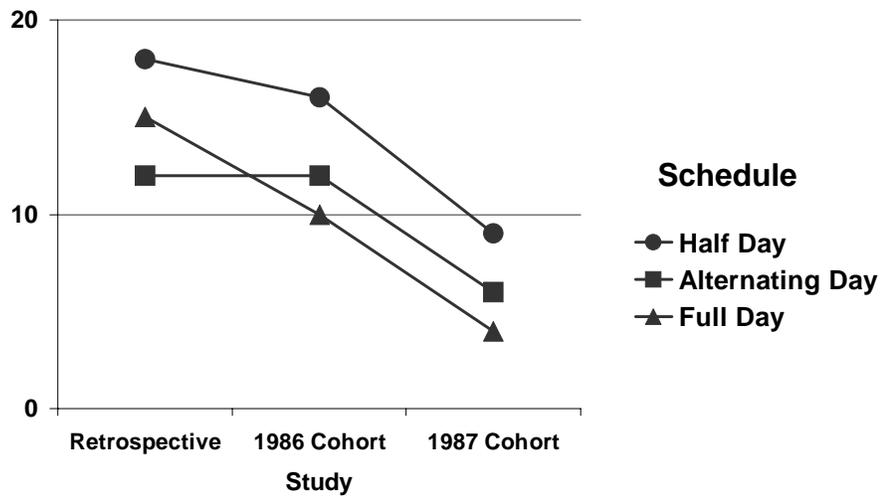


Figure 5
Percent of Students
Held Back



We found no interactions with regard to the impact of kindergarten schedule: the effects are consistent for boys and girls, for children attending preschool and those with no preschool experience, and for children irrespective of their age at kindergarten entrance.

Findings comparing the performance of full-versus half-day pupils probably underestimate the value of a full day's exposure to an educational environment. Previous research (Sheehan, 1988) indicates that more than half (56 percent) of half-day kindergarten pupils in Ohio spend at least some of the rest of their day in child-care programs outside the home. Some of these child-care programs are likely to have an educational component similar to the full-day programs that complements the impact of half-day kindergarten.

Findings comparing schedules are based upon a large number of children in a variety of school districts over a number of years. Subset analyses reveal no instances in which the average performance of full-day kindergarten pupils was lower than half-day pupils in the same district. In almost all instances the full-day pupils performed better than half-day pupils. We found no interactions with regard to the impact of kindergarten schedule: the effects are consistent for boys and girls; for children attending preschool and those with no preschool experience; and for children irrespective of their age at kindergarten entrance.

Findings Regarding School Behavior

As mentioned previously, the school behavior of kindergarten pupils in the prospective study was assessed in the winter and spring of the kindergarten year. Teachers used the Hahnemann Elementary School Behavior Rating Scale to evaluate children's classroom behavior along 14 dimensions:

| | |
|-------------------------|---------------------------|
| Originality | Irrelevant talk |
| Independent learning | Social (over) involvement |
| Involvement | Negative feelings |
| Productive with peers | Holding back/withdrawn |
| Intellectual dependency | Critical/competitive |
| Failure anxiety | Blaming |
| Unreflectiveness | Approach to teacher |

School Behavior As It Relates To Kindergarten Schedule Direction and Magnitude of The Impact

Both cohorts of the longitudinal study revealed a clear relationship between kindergarten schedule and classroom behavior. Compared to half-day pupils, teachers perceived full-day pupils to be:

- More original
- More independent in learning
- More involved in classroom activities
- More productive with peers
- Less intellectually dependent
- Less prone to failure anxiety
- Less unreflective
- Less holding back or withdrawn
- Less blaming
- More willing to approach the teacher

Table 1 and Figure 6 indicate no dimensions in which full-day pupils exhibited less-positive behavior than their half-day or alternate-day peers.

Figure 6
Ratings of Children's Behavior

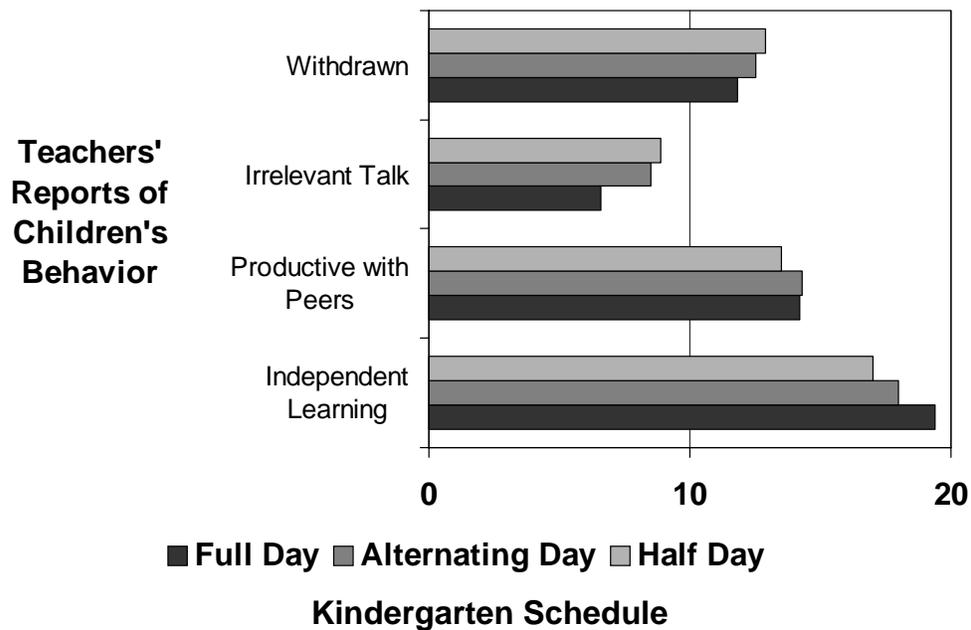


Table 1
Kindergarten Pupils' Reported Behaviors by Kindergarten Schedule

| Teacher Perception of Children's Behavior | 1986 Cohort | | | 1987 Cohort | | |
|--|-------------|------|------|-------------|------|------|
| | Schedule | | | Schedule | | |
| | Half | Alt. | Full | Half | Alt. | Full |
| *Originality | 11.1 | 11.0 | 12.4 | 10.8 | 10.0 | 11.6 |
| *Independent Learning | 17.0 | 18.0 | 19.4 | 17.5 | 17.5 | 18.5 |
| *Involvement | 17.3 | 18.2 | 19.0 | 17.0 | 17.5 | 18.5 |
| *Productive with Peers | 13.5 | 14.3 | 14.2 | 13.5 | 13.5 | 14.1 |
| Intellectual Dependency | 12.6 | 12.4 | 10.6 | 11.2 | 11.2 | 10.4 |
| Failure Anxiety | 12.8 | 11.2 | 10.9 | 11.0 | 10.5 | 10.0 |
| Unreflectiveness | 8.0 | 7.6 | 6.4 | 7.2 | 6.9 | 6.6 |
| Irrelevant Talk | 8.9 | 8.5 | 6.6 | 8.0 | 8.0 | 7.6 |
| Social (Over) Involvement | 11.2 | 10.6 | 9.1 | 10.0 | 10.0 | 9.6 |
| Negative Feelings | 8.5 | 7.2 | 7.2 | 7.5 | 7.5 | 7.5 |
| Holding Back/Withdrawn | 12.9 | 12.5 | 11.8 | 11.5 | 11.5 | 10.5 |
| Critical/Competitive | 8.7 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| Blaming | 8.2 | 6.6 | 6.9 | 7.2 | 6.8 | 6.8 |
| *Approach to Teacher | 16.1 | 15.9 | 16.3 | 15.6 | 15.2 | 17.2 |

*A high score for each of these items indicates positive behavior.

Qualifications of the findings. There is little room for doubt about the nature of the impact of schedule on children's classroom behavior based on the consistency of these findings across two cohorts of children and the many dimensions of the standardized rating scale. The averages noted in the above table are well within normal ranges of expected behavior, but the full-day pupils exhibited more positive behavior than those in half- or alternate-day schedules.

Findings Regarding Teaching Practices and Observed Learning Behaviors

The behavior of both teachers and children differs in several ways based on kindergarten schedule. Overall, teachers in half-day kindergarten spend more time on administrative activities and large-group learning activities than do teachers on alternate- or full-day schedules. As noted in Table 2, half-day kindergarten teacher behaviors did not vary significantly between morning (a.m.) and afternoon (p.m.) sessions except in the area of circulating behavior.

Table 2
Teacher Activities by Type of Kindergarten Schedule
(as percent of observed activity)

| | Half Day a.m. | Half Day p.m. | Alternate Day | Full Day |
|-------------------------------|--------------------------|--------------------------|----------------------|-----------------|
| Administrative work | 11% | 12% | 8% | 9%* |
| Large-group learning activity | 33 | 35 | 27 | 27* |
| Small-group learning activity | 10 | 10 | 11 | 11 |
| Out of room | 7 | 6 | 16 | 13* |
| Transitional | 12 | 13 | 10 | 13* |
| Clean-up | 3 | 3 | 3 | 4 |
| Circulating | 12 | 9 | 11 | 12* |
| Other | 11 | 12 | 13 | 11 |

*p<.05 (statistically significant difference related to full day)

Children's behaviors also varied by kindergarten schedule. Consistent with the observed teacher behavior, children in half-day schedules spent more time in teacher-led large group learning activities. Alternate- and full-day pupils spent a greater percentage of their time in active free play than did half-day pupils. Note that children in alternate- or full-day schedules understandably spent more time eating than those in half-day schedules. Table 3 summarizes these data.

Table 3
Children's Activities by Type of Kindergarten Schedule
(as percent of observed activity)

| | Half Day a.m. | Half Day p.m. | Alternate Day | Full Day |
|-----------------------------------|--------------------------|--------------------------|----------------------|-----------------|
| Teacher-led large group | 40% | 40% | 35% | 33%* |
| Teacher-led small group | 5 | 4 | 5 | 4 |
| Non-teacher-led learning activity | 5 | 4 | 4 | 4 |
| Seat work done alone | 13 | 11 | 12 | 13 |
| Transitional activities | 14 | 18 | 10 | 14* |
| Socio-dramatic play | 1 | 1 | 1 | 1 |
| Active free play (recess) | 8 | 8 | 12 | 10* |
| Eating | 5 | 4 | 8 | 8* |
| Other activity | 4 | 5 | 6 | 8* |
| Out-of-room | 4 | 4 | 7 | 4* |

*p<.05 (statistically significant difference related to full day)

Summary and Conclusions

Designed to investigate the effects of kindergarten schedule and prior preschool attendance on elementary schoolchildren's success in Ohio, this statewide research effort included two studies: a retrospective analysis of children's outcomes related to kindergarten attendance in 1982, 1983 and 1984; and a prospective analysis of two cohorts of children entering kindergarten in the fall of 1986 and 1987. Student records were analyzed for the retrospective analysis, while outcome data for the ongoing study were gathered from the Metropolitan Readiness and Achievement tests.

A number of interactions were hypothesized for the findings in planning these studies and initiating the data analyses. There were, however, NO interactions in the results: each factor discussed in this report operated independently as a powerful main effect. Results from both studies indicate that full-day kindergarten participation is positively related to subsequent school performance.

It helps to be a girl in the elementary grades and it is risky to attend kindergarten as one of the youngest children in the class. The variables are additive: The child most likely to succeed in the elementary grades is a girl who attended preschool, turned five in January of the year preceding kindergarten entrance, and attended a full-day kindergarten. The child at greatest risk is a boy, younger than most of his peers, who attended half-day kindergarten without benefit of prior preschool attendance.

Implications

- Full-day kindergarten experience is beneficial for children, resulting in lower retention rates and fewer placements in Chapter 1 remedial programs.
- Full- or alternate-day schedules provide continuity and consistency for a child spending all day with the same person, especially if that child is considered young at kindergarten entrance.
- Reduced retention and Chapter 1 placement rates result in educational and long-term cost benefits.
- Full-day kindergarten programs should provide an unhurried learning environment that reflects a developmental program and resists the inclination to increase academic pressure.

Full-day kindergarten participation is positively related to subsequent school performance.

LESSONS LEARNED FROM IMPLEMENTING FULL-DAY KINDERGARTEN

Over the last 10 years the Ohio General Assembly has steadily increased the amount of funding dedicated to Disadvantaged Pupil Impact Aid (DPIA), a supplemental payment to school districts with substantial portions of families living in poverty, while simultaneously shifting the focus of the program to school districts with the highest concentrations of poverty.

Since 1998-99, the focus has been on three initiatives: all-day kindergarten; reduction of class size; and safety, security and remediation programs. The general purpose of these three initiatives is to increase the amount of instructional attention students receive in grades kindergarten through three, and to provide a safe learning environment.

The 106 school districts with the highest concentrations of poverty were eligible for the greatest amount of DPIA funding. They received approximately \$326 million in fiscal year 1999. However, these districts are also subject to the most restrictive spending requirements. Districts must spend their entire all-day kindergarten allocation on all-day kindergarten. If more resources are needed to pay for all-day kindergarten, districts may draw from their allocations for class size reduction and safety, security and remediation.

In Am. Sub. H.B. 650, the 122nd General Assembly required the Legislative Office of Education Oversight (LOEO) to study both the implementation and impact of the all-day kindergarten and class size reduction initiatives. The results of that analysis are summarized here.

LOEO's *All-day Kindergarten and Class Size Reduction: Implementation Report (2000)* describes the extent to which districts were successful in implementing these programs and the challenges districts faced during the first school year, 1998-99; identifies the conditions that helped and hindered school districts' implementation of the all-day kindergarten and class size reduction initiatives during the first year; and provides issues to examine when considering future policy decisions. Subsequent reports will examine the impact of these initiatives on educational practices and student achievement.

The Rationale for All-day Kindergarten and Class Size Reduction Efforts

National research has found a positive relationship between participation in all-day kindergarten and later school performance. For example, studies have found that children in all-day programs, particularly those identified as at-risk, tend to test higher and maintain better scores through the second grade, at which time any effects begin to diminish.

Furthermore, children coming from all-day, every-day programs have less need for remedial services and lower retention rates (i.e., less likely to be held back). They also exhibit more positive behaviors and are rated higher on originality, participation and productive peer interaction.

Studies in both Ohio and Indiana have found, however, that students are less likely to benefit if teachers engage in only whole-group instructions. Studies have found that effective all-day kindergarten programs must do the following:

- offer a balance of small group, large group and individual activities
- emphasize language development and appropriate pre-literacy experiences
- develop children's social skills
- involve children in hands-on activities and informal interactions with children and adults

A complete list of the literature reviewed for the LOEO report can be found in Appendix A.

Study Scope and Methods

The implementation analysis focuses primarily on the 106 school districts with the greatest concentrations of poverty that received Disadvantaged Pupil Impact Aid funding in fiscal year 1999 for both the all-day kindergarten and class size reduction initiatives. An additional 80 school districts received a class size reduction allocation, and some of their successes and challenges are also included in the LOEO report.

The following research methods were used to complete the LOEO implementation analysis:

1. Reviewed over 75 documents, including journal articles, web sites, reports of major studies, and newspaper articles regarding all-day kindergarten and class size reduction initiatives.
2. Interviewed state-level representatives from the Ohio School Facilities Commission, the Ohio Department of Education, and the Auditor of State, in addition to legislators and legislative staff.
3. Visited five school districts located in urban, suburban and rural areas of Ohio that received DPIA funding in fiscal year 1999, and also observed over 175 classrooms in grades K - 3. Classroom visits included counting the actual number of students in each classroom. In many cases this was compared with classroom rosters. Other classroom visits included more in-depth conversations with teachers and administrators.
4. Conducted 12 telephone interviews with district superintendents to inform the design of the mail survey. These districts were not included in the mail survey.
5. Surveyed by mail a total of 174 school districts that received DPIA funding in fiscal year 1999 for the all-day kindergarten and class size reduction initiatives. The response rate was 80%.
6. Analyzed the data collected through LOEO's involvement in the DPIA monitoring process to examine how eligible school districts spent their all-day kindergarten, class size reduction, and safety, security and remediation allocations during the 1998-99 school year.

Administration of Funds

DPIA allocations and spending. Of the \$326 million in DPIA funding received by the 106 school districts, the largest allocation was for class size reduction. The majority of DPIA spending, however, was on all-day kindergarten.

Because spending on all-day kindergarten exceeded the allocation, school districts used portions of their allocations for class size reduction, DPIA guarantees, and safety, security and remediation; class size reduction; and DPIA guarantee allocations to supplement the cost of providing all-day kindergarten.

The General Assembly's spending restrictions and the amount districts actually spend on all-day kindergarten make it a priority over the other two initiatives. In fact, DPIA is more accurately characterized as primarily an all-day kindergarten program for districts with the highest concentrations of poverty.

Eligibility. The DPIA all-day formula provides funding for the "second half" of the base cost per-pupil amount. Through the regular school funding formula, all school districts currently receive half of the per-pupil base cost amount for kindergartners, assuming that these students are coming to school only half the day or half the week. This DPIA program pays the other half of the base cost amount to provide all-day kindergarten.

DPIA pays for one-half of the cost of all-day kindergarten, but does not include the "cost-of-doing-business" factor. Eligible school districts only receive all-day kindergarten funding for the percent of students that they report will actually receive all-day kindergarten in that school year.

All-day kindergarten. The Ohio Revised Code defines all-day kindergarten as "a kindergarten class that is in session five days per week for not less than the same number of clock hours each day as for pupils in grades one through six." For the purpose of this report all-day kindergarten has the same meaning as all-day, every-day kindergarten.

Program Implementation Issues

In fiscal year 1999, 87% of the 106 school districts that were eligible to receive all-day kindergarten funding provided this program, according to data submitted to the Education Management Information System (EMIS). In contrast, during the previous fiscal year and prior to AM. Sub. H.B. 650 and Am. Sub. H.B. 770, only about half of these same districts provided all-day kindergarten.

In addition to the overall increase in the number of districts providing all-day kindergarten, there was also an increase in the districts serving 100% of their kindergarten population in an all-day program. In fiscal year 1999, approximately 66% of the 106 eligible school districts provided all-day programs to 100% of their kindergarten population. In contrast only 19% of the same districts provided all-day programs to 100% in fiscal year 1998.

Table 4 summarizes the increase in all-day kindergarten as a result of the new DPIA spending requirements on the 106 school districts with the highest concentrations of poverty.

Table 4
Provision of All-day Kindergarten
Fiscal Years 1998 and 1999
 106 School Districts with DPIA Index Greater Than or Equal to 1.0

| | Fiscal Year 1998 | | Fiscal Year 1999 | |
|--|------------------|---------|------------------|---------|
| | Number | Percent | Number | Percent |
| Districts providing all-day kindergarten | 50 | 47% | 92 | 87% |
| Districts providing all-day kindergarten to 100% of their students | 19 | 18% | 70 | 66% |

Reasons for not providing all-day kindergarten. While districts are eligible to receive DPIA funding for the number of students to whom they actually provide all-day kindergarten, some districts chose not to serve 100% of their kindergarten population. In districts where fewer than 100% were served, the most cited reason was lack of parental interest. Although most parents are in favor of all-day kindergarten, some prefer half-day kindergarten or all-day/every other day kindergarten programs for their children.

The superintendent of one school district explained that roughly 70% of their students attended all-day kindergarten. The district had surveyed parents to determine the type of program they wanted and found that not all parents wanted their children enrolled in all-day kindergarten. As a result, the district provides a combination of all- and half-day kindergarten programs.

The increase from fiscal year 1998 to fiscal year 1999 in the number of all-day kindergarten programs in the state and the percent of students who attend them demonstrate the importance of DPIA funding in increasing the number of all-day programs. In fact, most of the districts surveyed indicated that they would not continue to provide all-day kindergarten if DPIA funding were no longer available.

Implementation Barriers

Classroom space and funding issues were the greatest challenges in implementing the all-day kindergarten and class size reduction initiatives.

Lack of classroom space. School districts surveyed and visited cited a lack of adequate classroom space as a barrier to implementing both all-day kindergarten and increased instructional attention initiatives.

In some cases, districts claimed they could not spend all of their class size reduction funding because they did not have the classroom space necessary to accommodate additional teachers. Therefore, they were saving their class size reduction funding for the following school year when they would be permitted to spend a portion of their funding on facilities. To address this issue, the 123rd General Assembly in Am. Sub. H.B. 282 allowed school districts to use portions of their all-day kindergarten and class size reduction allocations for facilities.

For many districts, adequate classroom space is most problematic in providing all-day kindergarten. For districts choosing to provide all-day kindergarten, the number of kindergarten classes often doubled. The districts visited explained that most school buildings typically have one or two classrooms specifically designed for kindergarten use. The room is usually larger than a regular classroom to accommodate the variety of hands-on activities inherent in the early childhood curriculum.

Therefore, when districts choose to provide all-day kindergarten, they often experience a shortage of kindergarten-designed classroom space. In most cases districts chose to handle this shortage by placing kindergarten classes in "regular-sized" rooms that are smaller and less accommodating to the material needed to provide kindergarten.

However, given the limited number of "extra" classrooms, this approach often precluded school districts from also reducing the actual number of kindergarten students in each classroom.

Creating space. School districts were surveyed to learn what strategies, if any, were being used to address facilities needs. For both the all-day kindergarten and increased instructional attention initiatives a slight majority of districts (53%) chose to create additional classroom space by converting non-classroom space (e.g., libraries, office workspace, etc.). Other approaches included using modular units, moving grades to other buildings, and sharing classroom space with other classes or grades.

Of the school districts reporting facility needs for both initiatives, slightly more than half are working with the Ohio School Facilities commission to resolve their facilities problems. It is important to note that the districts reporting facilities as a problem for all-day kindergarten are not necessarily all of the same districts identifying facilities as a problem for increased instructional attention. For example, some of those districts may have a greater need for larger classrooms designed specifically for kindergarten.

Relative definition of need for space. Although districts reported inadequate classroom space as the greatest barrier to providing all-day kindergarten and increased instructional attention, visits to districts revealed a "relative" perception of what constitutes "adequate" classroom space. These perceptions, in turn, influenced the extent to which districts implemented the initiatives.

One district went to great lengths to create additional classroom space in an effort to increase instructional attention. For example, classrooms were divided, non-classroom space was converted for classroom use, partitions were constructed in a school's lobby to create classrooms, and one class was taught in a basement hallway.

While some of the approaches are less than desirable, the district believes that reducing class size and increasing instructional attention is more important than where a class is convened.

In contrast, other districts claiming to have "space problems" demonstrated an unwillingness to explore strategies for creating additional space. For example, several empty classrooms were observed and little evidence of converted offices or other non-classroom space was found in some locations.

Use of personnel. Focusing on reducing the number of students in a classroom taught by a single certified teacher rather than on alternative approaches for increasing instructional attention quickly exhausted available classroom space in some districts. For example, some districts were resistant to hiring aides and paraprofessionals or implementing a team-teaching approach, which could be accommodated in the available space. As a result, a lack of space quickly became an issue for these districts.

Despite reporting difficulty in finding certified teachers, districts chose not to explore alternative approaches to using personnel. In general, "class size reduction" was not being considered in terms of "increasing instructional attention" by adding aides, team teaching or extending the school day or year. Of the districts surveyed, about one-third (35%) chose to hire aides or paraprofessionals, whereas 78% chose to increase instructional attention by hiring certified teachers. This "mindset" is of particular concern for school districts located in urban and rural areas where there are existing shortages of certified teachers.

Funding Challenges

Beyond facilities, the barrier most frequently identified by districts implementing the all-day kindergarten and increased instructional attention initiatives was "insufficient funding."

Insufficient funding. The majority of districts surveyed reported that DPIA funding did not cover the full costs of providing all-day kindergarten and increased instructional attention. As a result, district funds were used to supplement the cost of providing these programs.

Although school districts received funding to provide all-day kindergarten to 100% of their eligible students, it actually cost the majority of districts more to provide all-day kindergarten than the amount they received.

As noted, through DPIA the state provides the "second half" of the base cost per-pupil amount for pupils who stay all day. For fiscal year 1999, the state ensured that every district had a base cost amount of \$3,851 per pupil, which is typically less than what school districts spend per pupil.

As a result, the DPIA amount provided for the second half of the school day did not cover the full cost of what district had to spend for the salaries of experienced teachers, supplies and the other costs of full-day kindergarten. Therefore, most districts used their allocations for DPIA guarantees, class size reductions, and safety, security, and remediation to supplement the cost of providing all-day kindergarten.

Determining the legitimacy of the claim of "insufficient funding" for the increased instructional attention initiative is slightly more complicated due to the "phase-in" provision included in Am. Sub. H.B. 770, which provided a timeline by which school districts were permitted to "phase in" the amount of DPIA funding spent from their class size reduction and safety, security and remediation allocations.

In the first year of implementation, school districts were only required to spend 25% of these allocations on DPIA programs. Any remaining funding could go into their general revenue fund. The law noted that this spending requirement would increase to 50% in fiscal year 2000, 75% in fiscal year 2001, and 100% in fiscal year 2002.

Because so many districts did not spend their entire DPIA allocation on these initiatives, it is hard to say whether they have a legitimate claim that DPIA funding does not cover the "full cost" of providing increased instructional attention. In fact, there were only two districts with a DPIA index greater than 1.0 that spent their entire DPIA allocation on DPIA programs. These two districts may have the only legitimate claim that DPIA does not cover the full costs of these initiatives.

Until school districts are required to spend 100% of their DPIA funds on DPIA programs in fiscal year 2002, it is difficult to determine how much local funds are used to supplement these programs.

However, it is also important to note that DPIA funding is a supplemental payment to districts. The General Assembly's all-day kindergarten, class size reduction, and safety, security and remediation allocations are "estimates" of what it would cost districts to provide these programs. These allocations were not designed to fund all of the costs associated with implementing the programs.

Predictability of funding. Another dilemma regarding DPIA funding for school districts is its predictability. To make the necessary commitments for the all-day kindergarten and increased instructional attention initiatives, such as hiring additional teachers and acquiring additional classrooms, it is essential to know that the state's supplemental payments will continue. Similar to the concern over federal funding, without knowing that a particular amount will be dedicated to these initiatives, school districts are understandably reluctant to begin implementation.

Summary and Conclusions

- State policy was very effective in encouraging school districts to offer full-day kindergarten.
- In districts where fewer than 100% of the kindergarten population was served, the main reason cited was lack of parental interest. Most parents, however, favor full-day kindergarten.
- Barriers to implementation included lack of classroom space, reluctance to rely on aides and paraprofessionals, and insufficient funding.

The preceding report was prepared using:

A Longitudinal Research Study of the Effects of Preschool Attendance and Kindergarten Schedule (1992)

All-day Kindergarten and Class Size Reduction: Implementation Report (2000)

Appendix A

- Cryan, J., Sheehan, J., Weichel, J., & Bandy-Hedden, I. (1992). Success outcomes of full-day kindergarten: More positive behavior and increased achievement in the years after. *Early Childhood Research Quarterly, 7*(2): 187-203.
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- Gullo, D. (1990). The changing family context: Implications for the development of all-day kindergarten. *Young Children, 45*(4): 35-39.
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Early Childhood Education

by Douglas R. Powell

Research-based blueprints for federal, state and local early childhood policies and programs have been issued in unprecedented numbers in the past decade, providing a well-developed agenda for promoting competence in young children as we enter the 21st century. Never before has there been a clearer set of informed recommendations for strengthening early childhood development than is now available to policymakers, professionals and parents, as illustrated in Table 1.

Table 1. Selected National Policy Reports on Early Childhood

Never before has there been a clearer set of informed recommendations for strengthening early childhood development than is now available to policymakers, professionals and parents.

Ready to Learn: A Mandate for the Nation, Carnegie Foundation for the Advancement of Teaching (Boyer 1991)

Caring Communities: Supporting Young Children and Families, National Task Force on School Readiness, National Association of State Boards of Education (1991)

Starting Points: Meeting the Needs of Our Youngest Children, Carnegie Task Force on Meeting the Needs of Young Children (1994)

Years of Promise: A Comprehensive Learning Strategy for America's Children, Carnegie Task Force on Learning in the Primary Grades (1996)

Not by Chance: Creating an Early Care and Education System for America's Children, Quality 2000 Initiative (Kagan & Cohen 1997)

Ready Schools, National Education Goals Panel (Shore 1998)

Learning to Read and Write: Developmentally Appropriate Practices for Young Children, International Reading Association and the National Association for the Education of Young Children (1998)

Preventing Reading Difficulties in Young Children, Committee on the Prevention of Reading Difficulties in Young Children, Commission of Behavioral and Social Sciences and Education, National Research Council (Snow et al. 1998)

Eager to Learn: Educating Our Preschoolers, Committee on Early Childhood Pedagogy, National Research Council (Bowman, Donovan, & Burns, 2000)

From Neurons to Neighborhoods, Committee on Integrating the Science of Early Childhood Development, National Research Council and Institute of Medicine (Shonkoff & Phillips, 2000)

The recommendations vary in emphasis but the commonalities are striking, reflecting a growing consensus that all children are entitled to environments that are developmentally stimulating, nurturing and challenging. The first goal of the National Education Goals adopted by the 50 governors and President George H. Bush in 1989 makes the strongest national statement about this concern. Subsequently incorporated into the "Goals 2000: Educate America Act" that was signed into law by President Bill Clinton in 1994, the goal states that "by the year 2000, all children in America will start school ready to learn." Toward this end it calls for:

- All children to have access to high-quality and developmentally appropriate preschool programs to prepare them for school;
- Every parent in the United States to be a child's first teacher and to devote time daily helping the child to learn; and
- All children to receive the nutrition, physical activity experiences, and healthcare needed to arrive at school with healthy minds and bodies; and the mental alertness necessary for learning.

Why the Press to Improve Early Childhood Outcomes?

A number of factors have stimulated this interest in the early years and are driving current ideas about how to facilitate the development of young children into competent and productive adults.

Indicators of Early Childhood Well-being Point to Problems

The United States does not compare well with most other industrialized countries on many indicators of childhood well-being. Included in these indicators are: infant mortality rate, percentage of low birthweight babies, proportion of babies immunized against childhood diseases, and the rate of babies born to adolescent mothers.

- **Too many young children are living in poverty.** About 20 percent of American children and youth live in families below the poverty level, with the greatest prevalence among younger children; one in four infants and toddlers live below the poverty line. While the percentage of children living in poverty has remained fairly steady since 1981, income disparities have grown significantly: The percentage of children in both high-income and extreme-poverty families has risen, while the percentage of children living in medium-income families has fallen (Federal Interagency Forum on Child and Family Statistics 1998).
- **The detrimental effects of poverty begin early.** Children living below the poverty line are more likely to experience poor general health and high levels of blood lead, housing problems, and hunger. They are less likely to be up to date on immunizations or to have a regular source of healthcare, to be enrolled in early childhood education, or to have a parent working full time. Research consistently shows that persistent poverty has greater detrimental effects on IQ, school achievement and socioemotional functioning than short-term or transitory poverty. Children experiencing both types of poverty typically fare less well than those not experiencing socioeconomic disadvantage (McLoyd 1998).

- **Early childhood enrichment is lacking in many homes.** Survey data on family practices that can enable the development of children's reading and writing skills point to a lack of literacy-rich environments in the homes of many children. A 1996 survey found that only 57 percent of children ages 3 to 5 were read aloud to every day (Federal Interagency Forum on Child and Family Statistics 1998).

The Early Years Matter

The early years of life constitute a formative or critical period that shapes the course of development. An influential report on the early years issued by the National Research Council and Institute of Medicine (Shonkoff & Phillips, 2000) concludes: "From birth to age 5, children rapidly develop foundational capabilities on which subsequent development builds. In addition to their remarkable linguistic and cognitive gains, they exhibit dramatic progress in their emotional, social, regulatory, and moral capacities. All of these critical dimensions of early development are intertwined, and each requires focused attention."

There is far more extensive development in the first year of life than had been previously demonstrated, pointing to the risk of serious developmental problems caused by adverse early environments.

Research on brain functioning points to the lasting effects of the early years. Sophisticated tools for brain scans allow researchers to examine the impact of environments on the structure and functioning of the developing brain (Nelson & Bloom 1997). There is far more extensive development in the first year of life than had been previously demonstrated, pointing to the risk of serious developmental problems caused by adverse early environments.

High-quality Early Childhood Programs Are Effective

Many evaluations of early childhood programs have been conducted with disadvantaged populations. Among children from low-income families, significant gains in intellectual performance and socioemotional development have been measured at the end of only one year of intervention through model early childhood programs. These programs also produce strong, positive effects on special education placement and grade retention, and yield positive impacts on life success factors such as teenage pregnancy, delinquency, welfare participation and employment. [For a recent review, see Barnett (1995).]

The Perry Preschool Project in Ypsilanti, Michigan followed preschool (3 and 4 years of age) participants to age 27. Program participants had half as many criminal arrests, higher earnings and property wealth, and greater commitment to marriage than did their counterparts who had not attended preschool (Schweinhart et al. 1993). The economic benefits to participants and to the general public greatly exceeded the program costs; the benefit-cost ratio in excess of 7:1 accrued to the public largely through reductions in crime (Barnett 1993).

Early Childhood Program Quality Is Generally Low and Unevenly Distributed

Six out of 10 children under the age of 6—more than 12.9 million—who had not yet entered kindergarten received childcare and education on a regular basis from someone other than their parents in 1995 (Federal Interagency Forum on Child and Family Statistics 1998). Studies indicate that a majority of these children were in mediocre or substandard childcare arrangements. Researchers found that only one in seven centers provided an environment that promoted healthy development, according to one national study sample of 401 centers (Helburn 1995). An earlier study found that only 12 percent of the classrooms in 227 licensed, full-day center-based programs in five metropolitan areas met or exceeded a good level of quality (Whitebook et al. 1989).

About one-third of the arrangements used by employed mothers with children under 5 are family childcare homes with nonrelative providers or nonparent relatives (such as a child's grandmother). An observational study of 226 such providers in three communities in California, Texas and North Carolina determined that 9 percent of the homes were of good quality; 35 percent were rated as inadequate; and the remaining 56 percent were rated as adequate (Kontos et al. 1995).

We know less about the early childhood programs offered through public schools, although available research points to a lack of quality. A large study of early childhood classrooms sponsored by Head Start, public school and private childcare found that while the programs generally provided adequate levels of quality, none was rated as excellent; the amount of individual attention provided to children was low across all settings (Layzer et al. 1993). Studies of public early childhood and kindergarten programs reveal a wide variation in quality, particularly in the area of using developmentally appropriate materials (Mitchell et al. 1989, Bryant et al. 1991). An investigation of public school preschool programs in South Carolina, however, revealed that large-scale programs can provide developmentally appropriate experiences (Frede & Barnett 1992).

What we do know is that, in general, it is children from working poor and lower middle-class families who receive lower quality care; their families are prohibited financially from purchasing high-quality care or lack access to government subsidies (Phillips et al. 1994).

We Know How to Improve Outcomes

Schorr and Schorr (1988) promoted the idea that there is a sufficient body of knowledge to improve the functioning of children at greatest risk of failure in their book, *Within Our Reach*. Schorr and Schorr dismiss the notion that educational and human service programs for the disadvantaged are an exercise in "throwing money" at problems, assembling instead an impressive collection of data that documents the huge public and private costs of ignoring the early childhoods of vulnerable populations, and documenting the solutions that lie "within our reach" for improving the early lives of several million American children at risk.

How Can We Improve Child Outcomes?

Recent recommendations for improving child outcomes focus on the discrete components of high-quality environments for young children, building on a base of research knowledge that has expanded exponentially over the last 20 years. Four areas define the essential ingredients for achieving and sustaining positive outcomes in early childhood:

- supports for families
- early childhood program curricula
- staff credentials and program standards
- schools that respond flexibly to a diverse range of child abilities and backgrounds

Families

Compelling evidence points to the enduring effects of early home environment on children's learning and development. The following parent beliefs and practices emerged as important contributors to child outcomes:

- Parental teaching strategies that stimulate the child's own thinking and encourage active, verbal engagement in a task
- Providing reading and writing materials (e.g., picture dictionaries) and parental reading behavior as supports for early literacy development
- Parental understanding of the complex process of child development and involving the child as an active contributor to his or her own development
- Appropriate parental expectations of the child's abilities

Ensuring these positive effects of parents on children is commonly provided through education and support programs that strengthen the quality of the home environment and interactions between parents and their children. As noted earlier, the National Education Goals Panel recommended training and support to enable parents to spend time daily helping their children to learn. Many programs focus on parent education and emphasize early, comprehensive prenatal care. Early childhood programs that work directly with children and include systematic provisions for developing and sustaining supportive relationships with parents have produced positive effects on a range of parent outcomes (for a review, see Powell [1995]). Furthermore, parent involvement is associated with positive child outcomes (e.g., Reynolds [1992]).

Less robust outcomes are found in programs that work exclusively with parents; home visiting programs focused on parents yield mixed results (e.g., Olds & Kitzman [1993]). Multiple, powerful determinants of parenting beliefs and practices are not easily influenced; thus, programs of minimal or modest intensity in terms of duration or frequency of contact are unlikely to support meaningful change (Larner 1992).

Good practices for engaging parents include:

- Recognizing that supportive relationships are best fostered by staff and parent confidence in one another.

- Using multiple instructional methods that enable parents to understand and practice behaviors that support children's development and learning.
- Sensitizing staff to the situational contexts, needs and interests of parents.
- Opportunities for parents to have input into shaping the content and methods of parenting issues programs.
- Providing opportunities for parents to form mutually beneficial ties with one another and to gain access to community resources in order to strength their support system.

Research and sustained contact with families participating in programs indicate that the vast majority of parents wish to do well by their children, and this holds true across economic strata (e.g., Hart & Risley [1995]). It is important to emphasize this in developing strategies for working with lower-income parents, where a profound commitment to being a good mother is evident (Holloway et al. 1997).

Policymakers and professionals interested in supporting optimal environments for parenting and child development are examining conditions of family functioning such as poverty, unsafe neighborhoods and stressful work situations in turn developing strategies for policy recommendations that improve the existing contexts of parenting.

Research and sustained contact with families participating in programs indicate that the vast majority of parents wish to do well by their children, and this holds true across economic strata

- The *Caring Communities* report of the National Association of State Boards of Education (1991) recommends that employers establish policies for parental leave; and to provide release or flextime for locating an early childhood program, helping their child adjust to a new program, and visiting and volunteering in such a program.
- The Carnegie Task Force on Meeting the Needs of Young Children (1994) recommends broad-based action for fostering family-centered communities—a community-level "culture of responsibility"—that includes strong local leadership, community assessments of needs and existing program capacities, and an emphasis on results.

Curriculum

Professionals and the lay public are far from reaching general agreement on *what* and *how* young children should be taught. Recently, however, important advances in specific recommendations and research directly address the goals and methods of early childhood programs. The National Education Goals Panel (1992) recommended that high-quality environments in the early years focus on five dimensions of early learning and development that prepare a child for school:

- physical well-being and motor development
- social and emotional development
- dispositional and stylistic approaches toward learning
- language usage
- cognitive and general knowledge

Head Start, the nation's largest early childhood program, uses such indicators of social competence as guides to programming and assessing desired outcomes (Zigler 1998).

Guidelines for developmentally appropriate practices with young children were developed by the National Association for the Education of Young Children (NAEYC) in the early 1980s (Bredekamp 1987), and revised 10 years later (Bredekamp & Copple 1997). These guidelines give attention to age and individual appropriateness, calling for curriculum emphasis on the whole child, active learning that flows from the child's interests, and concrete activities that are relevant to young children's lives. They are incorporated into numerous standards statements, including the National Education Goal Panel legislation.

Positive outcomes are related to developmentally appropriate practices, with studies indicating that children in classrooms characterized by child-initiated activities score higher on many measures than do children in teacher-directed activities. These measures include: creativity, language outcomes, verbal skills, child confidence in cognitive skills, academic achievement in first grade, attitudes toward school, and stress behaviors in the classroom. Some findings, however, reveal no differences due to the use of developmentally appropriate practices in children's social development, and one study found that literacy achievement was higher in didactic, teacher-directed classrooms compared to child-initiated classrooms (for a review, see Dunn & Kontos [1997]).

Credentials and Standards

State regulations for early childhood programs typically require their staff to have minimal or no formal professional training in child development or early education, reflecting the persistent myth in the United States that such work is not an intellectually challenging enterprise.

Research literature, however, shows that teachers with higher levels of education and training have more positive interactions with children; and the children in their care have better outcomes (e.g. Whitebook et al. 1989). An analysis of data from two major studies demonstrated that teachers with a bachelor's or more advanced degree in early childhood education were more effective (Howes 1997).

The need to significantly upgrade the educational credentials of early childhood teachers is a central component of most policy recommendations on improving early childhood outcomes. The Carnegie Task Force on Learning in the Primary Grades (1996) report endorses the idea of rewarding advanced levels of professional preparation with pay and title. The Quality 2000 Initiative recommends a three-tier approach to licensing individuals caring for young children, including early childhood administrator, educator and associate educator licenses (Kagan & Cohen 1997).

Positive child outcomes are produced when well-prepared teachers operate within supportive classroom conditions. One particularly influential condition is the number of students per teacher, or child:staff ratio. Studies show that more positive developmental outcomes occur in classrooms with a smaller number of children per teacher (for a review, see Hayes, Palmer and Zaslow [1990]).

Since both teacher background (credentials) and child:staff ratio are cost-sensitive issues, a key policy question is whether the effectiveness of highly-trained teachers is diminished when there are more children in the classroom. The Howes (1997) analysis suggests that advanced training does not enable teachers operating within less stringent child:staff ratios to be as effective as teachers with less training operating with more stringent ratios.

State regulations for early childhood programs typically require their staff to have minimal or no formal professional training in child development or early education, reflecting the persistent myth in the United States that such work is not an intellectually challenging enterprise.

Ready Schools

Central to most policy recommendations issued in recent years is the theme that children's outcomes are improved when schools are prepared to work in flexible and effective ways with a heterogeneous population of children and families.

- The Carnegie Task Force on Learning in the Primary Grades (1996) calls for schools to provide varied learning environments that offer the highest quality of instruction for all children, including those of diverse linguistic and cultural backgrounds.
- The *Ready Schools* report of the National Education Goals Panel recommends that schools be responsive to children's individual needs (including the provision of intensive help when needed). It calls for schools to be "committed to the success of every child" and to "alter practices and programs if they do not benefit children" (Shore 1998, p. 5).

Research evidence supports these recommendations. The effects of early childhood programs for children from disadvantaged backgrounds are strengthened by continued intervention in the early school grades. Schools can accommodate a range of child abilities (Boyer 1991; National Association of State Boards of Education 1991) through the use of developmentally appropriate practice in kindergarten classrooms.

Additionally, research findings indicate that children in developmentally appropriate classrooms exhibit less overall stress than children in developmentally inappropriate classrooms (Burts et al. 1992), and that first-graders who had participated in developmentally appropriate kindergarten classrooms had higher reading comprehension scores than those who had participated in less appropriate kindergarten classrooms (Burts et al. 1993).

Expanding the kindergarten day has shown some modest academic effects on children, but benefits for middle-class children are not consistent across studies (Karweit 1994). One-on-one tutoring programs using teachers rather than aides have been effective (Wasik & Slavin 1993). No compelling evidence exists to date on the veracity of raising kindergarten age requirements or adding a year of "developmental" or "junior kindergarten" for children at risk. It appears that, at best, the extra-year programs add a temporary boost in achievement that fades over time (Karweit & Wasik 1994).

How Can We Build on the Lessons of Improved Outcomes?

Promote Basic Understandings

Ambitious public awareness strategies aimed at dispelling myths and promoting basic understandings about the early childhood period are essential to the creation and adoption of policies and practices that support healthy functioning in the early years. The facts are that learning begins long before a child enters school; poor child outcomes are not necessarily due to bad parenting; the care and education of young children must be put in the hands of qualified teachers; and a consensus on what constitutes appropriate learning experiences must be reached between parents and staff in order to develop supportive relationships.

- Significant benefits accrue to society from investments in early childhood programs for disadvantaged populations; cost-benefit analyses demonstrate a remarkable long-term return on program costs.
- Most parents are not financially able to pay the actual expenses of high-quality early childhood programs. Furthermore, high-quality programs require subsidies or in-kind donations beyond the revenues generated through parent fees, leading to the call for the expansion of publicly supported programs such as Head Start.
- Stereotypes about the child-rearing motivation and practices of lower income parents inhibit funding for family-centered early childhood programs and function as barriers to developing healthy teacher-parent relationships. Research offers a different picture of these parents, one that includes profound interest in and big dreams for their children's futures.
- Definitions of program quality are generated by professionals without contributions from parents who often use selection criteria that is not considered in assessments of program quality. The developmentally appropriate practice concept is foreign to many parents of disadvantaged populations. Thus, it is important to craft an understanding of what constitutes quality program experiences based on expert knowledge and respectful of family traditions. A focus on the knowledge and skills a young child should possess will be useful for discussions at local, state and national levels.

Set and Enforce Standards

An apt description of the direction needed, but not currently required, to ensure the sought-for quality in early childhood programs is found in the title of the Quality 2000 Initiative report: *Not by Chance*.

- Requiring all staff to be licensed and enforcing program licensing requirements for all programs is the best strategy for improving and maintaining program quality. Further, the Quality 2000 Initiative report recommends financial and other incentives for voluntary accreditation through the National Academy of Early Childhood Programs (which is affiliated with the NAEYC).
- Parent choice as a strategy for improving quality is based on the assumption that demand for quality programs will stimulate upgrades. Research, however, reveals that parents typically use criteria that are in conflict with professional benchmarks of quality (Holloway & Fuller 1992). Existing information services that assist parents in identifying and selecting high-quality programs are valuable, but cannot be counted on to single-handedly shape appropriate decision-making.

Conclusion

The Quality 2000 Initiative calls for a broad contingency of groups—including business, government, parents and community organizations—to generate the needed funds for the hoped-for programs. Further, the Initiative recommends that 10 percent of public early care and education funds be invested in infrastructure and quality enhancements for early childhood programs, and that states and localities form permanent boards charged with responsibility for the infrastructure and governance of early care and education (Kagan & Cohen 1997).

A well-formulated agenda for moving the early childhood program experience toward the direction of positive outcomes exists. The biggest challenge is marshaling the resources and realizing a broad-based political will to achieve better futures for our children.

Most parents are not financially able to pay the actual expenses of high-quality early childhood programs... high-quality programs require subsidies or in-kind donations beyond the revenues generated through parent fees.

This article is based on the following:

Powell, D.R. (1999). Early childhood development. In A.J. Reynolds, H.J. Walberg, & R.P. Weissberg (Eds.), *Promoting positive outcomes in children* (pp. 45-71), Washington, DC: CWLA Press.

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Strategies For Improving Student Achievement

by David W. Grissmer

Researchers attempting to assess the effectiveness of different educational strategies have had a rich database from which to draw. Since the early 1980s individual states have leveraged the reform powers found in funding formulas to create varying policies that influence who teaches and what is taught. Additionally, state courts have played a role in deciding whether educational funds are adequate and fairly distributed. This combination of factors has created a widely diverse set of state educational systems.

If research and evaluation can identify the successful and unsuccessful approaches in this variety of systems, they can provide valuable information for states to use in the ongoing process of refining and adapting successful policies. Evaluating the effects of different levels and uses of resources and changing state policies, then becomes critical to improving schools and student outcomes.

Assessing the Effect of Resources

The question of whether additional educational resources affect educational outcomes has not been definitively answered through empirical nonexperimental research. Experimental research, in combination with new reviews and interpretations of the empirical literature, is pointing to a hypothesis that additional resources primarily affect disadvantaged students. Because of wide state variances in the proportions of disadvantaged students and per-pupil expenditures, an analysis of state achievement scores can help test this hypothesis.

Since resources are spent differently across states, estimates of the effectiveness of the different uses can be made. More importantly, the different ways in which resources are used can provide measures of both the marginal cost and marginal achievement benefit of changing resource usage, allowing cost-effectiveness comparisons. These measures can help answer two important questions:

- What uses of resources are most cost-effective in boosting student achievement?
- To what extent do resources affect achievement for disadvantaged students?

Until 1990, when the Department of Education (DOE) began to use the National Assessment of Educational Progress (NAEP) test, no test gave representative samples of students in each state the same test, and achievement could not be validly compared across states. The DOE used the NAEP to test representative samples of students in participating states, testing them in reading and math at the 4th- and 8th-grade levels for seven years from 1990 to 1996. It is probably too early to use this period as a definitive test of whether reforms are successful, since reform initiatives are expected to take years to be fully reflected in achievement outcomes. Evidence of no achievement gains, however, would certainly challenge current reform directions.

The RAND report (Grissmer et. al, 2000) uses data from the NAEP to estimate score gains both nationally and by state, to estimate the effects of varying levels and uses of per-pupil expenditures on student achievement, and to estimate the cost-effectiveness of the major alternatives for utilizing educational resources.

RAND Study Objectives

This study had several specific objectives:

- Compare raw achievement scores across states and determine which states have statistically significant improvements, taking account of all NAEP tests between 1990 and 1996.
- Estimate NAEP scores for students with similar family characteristics across states to develop a better measure for the overall effects of educational policies and environments.
- Determine whether trends and differences in scores across states for students from similar family backgrounds can be statistically linked to differences in state educational system characteristics that are resource intensive. (These characteristics include per-pupil expenditures, pupil-teacher ratios, public prekindergarten participation rates, teacher-reported adequacy of resources for teaching, teacher salary levels, teacher education, and teacher experience.)
- Determine whether significant trends exist (unaccounted for by these resource-intensive variables) that might suggest effects from unobserved variables linked to reform efforts.
- Estimate the costs of changing these resource-intensive policies and characteristics, and compare their cost-effectiveness in improving scores.
- Propose a broader explanation for the pattern of achievement results (in the NAEP study and in the empirical literature) that incorporates new experimental class-size results and the historical pattern of spending and achievement in the nation.

Given the RAND results, the study authors propose a broader explanation of the effectiveness of resources in the public school system as follows:

Additional resources provided to public schools mainly affect minority and less-advantaged students; these effects can be large and significant if properly allocated and targeted. Additional resources deployed in historical ways have had much less, if any, effect on more-advantaged students.

Methodology

Comparative state analysis became possible when the DOE gave the NAEP tests to representative samples of students across a voluntary sample of states in 1990, 1992, 1994, and 1996. Seven tests were given in reading and mathematics at either the 4th- or 8th-grade level; each test was administered to approximately 2,500 students in 44 states.

Barriers to Analysis

Although these tests represented the first valid, comparable measures of achievement for representative samples of children in various states, there remained significant barriers to carrying out analysis and obtaining the kind of reliable results policymakers need.

1. Because of the wide variation in state demographic composition and family characteristics, previous research suggests that family variables could account for a substantial part of the variation of scores across states. Family variables collected by NAEP were limited; those collected were reported by 4th- and 8th-graders, making their quality problematic.
2. The sample was small. State scores lacked independence across tests, and states participated in an unequal number of tests.
3. The credibility of results derived from models aggregated across states is at issue. Previous studies using state-level data have shown that educational resources have consistent positive, statistically significant effects on educational outcomes, dissimilar from the generally null effects found at low levels of aggregation.
4. Models using nonexperimental data are deemed more credible if they agree with results using experimental data.

... these tests represented the first valid, comparable measures of achievement for representative samples of children in various states...

Addressing the Barriers to Analysis

Instead of relying on NAEP-reported family variables, RAND used Census data and data from the National Educational Longitudinal Survey (the largest survey that collected both achievement scores and parent-reported family characteristics) to develop three sets of family variables that use different sources of data and methods of weighting the influence of family characteristics.

A Tennessee Student-Teacher Achievement Ratio (STAR) class size experiment showed that reducing class size in K-3 had positive and statistically significant effects through 8th grade; a more recent quasi-experiment in Wisconsin showed initial results similar to Tennessee's. This analysis used a model specification consistent with the results from the Tennessee class-size

experiment, compared the results to the experimentally determined results from Tennessee, and showed agreement.

Main Findings

Highlights

The results paint a more positive picture of public education in America than is commonly portrayed, especially with respect to effective allocation of resources. Following are some highlights:

- Public elementary students across states in this sample showed statistically significant gains (about 1 percentile point) in mathematics between 1990 and 1996 (The reading data are insufficient for analysis until the 1998 state NAEP reading data are included.)
- There is a disparity in progress made by states: The math gains across states showed that a few made gains of around 2 percentile points a year, while other had almost no gains.
- The highest average achievement scores were found in the more-rural northern states; southern states were usually among the lowest. The more-urban northern states generally fell in the middle of the score distribution. This distribution is explained primarily by family rather than school characteristics.
- Statistically significant differences—as large as 11 to 12 percentile points—were found among students with similar family characteristics across states, with all regions of the country having states with both higher and lower student scores from similar families.
- Both the level of expenditure per pupil and allocation affected student achievement, particularly for states with disproportionately higher numbers of minority and less-advantaged students.
- Some educational expenditures were much more cost-effective, with the difference depending on how the expenditures were directed. Cost-effectiveness also varied markedly depending on the SES level of the state, the current allocation of expenditures, and the grades targeted.

Evidence for the Effects of Reform

Math scores increased from 1990 through 1996 in most states for public school students. Reform efforts are the leading candidates to explain the gains.

Controlling for population changes and participation rates, this analysis provides strong evidence that math scores from 1990 through 1996 increased in most states for public school students by statistically significant amounts. Small changes in resource-intensive variables during this period do not explain this improvement, suggesting reform efforts as the leading candidates to explain the gains.

Additional research is necessary, however, to adequately test whether and which reform efforts are linked to achievement gains.

States varied in their estimated math gains, with some gaining 2 percentile points and others showing little gain. Texas and North Carolina were among the states making large, statistically significant gains; state administered tests during this period also showed large gains. Resource-intensive variables included in the analysis did not explain much of these gains over time. Thus, reform efforts emerge as the leading candidates.

Trends in reading scores cannot be assessed with the current data, with only two reading tests given two years apart currently available.

Scores for Students from Similar Backgrounds

Scores of students with similar family and demographic characteristics varied as much as 12 percentile points. This analysis distinguished three groups of states: those whose scores for students from similar families are significantly above the median state, those whose scores are below, and a broad middle group. Statistically significant differences for students with similar family characteristics are found in adjoining and other states.

These score differences can be traced, in part, to several systemic features:

- lower pupil-teacher ratios
- higher public prekindergarten participation
- lower teacher turnover
- higher levels of teacher-reported adequacy of resources for teaching

Scores for students from similar families placed Texas in the highest group of states and California in the lowest. Contributing to the higher Texas scores are lower pupil-teacher ratios, a larger percentage of children in public pre-kindergarten, and teachers with greater resources. Using these measures as a guide, an analysis can reveal what creates the differences.

Effects and Cost-effectiveness of Educational Resource Allocation

NAEP scores are higher in states that have:

- higher per-pupil expenditures
- lower pupil-teacher ratios in lower grades
- higher levels of teacher-reported adequacy of resources for teaching
- higher public prekindergarten participation
- lower teacher turnover

States with higher teacher salaries or greater percentage of teachers with master's degrees did not have higher scores. Further research is needed to identify the reason for a lack of effect from direct investment in salaries. Possible explanations include:

- Interstate differences in salary may be less sensitive to student achievement than are intrastate salary differences.

- Teacher salary is a variable that correlates highly with family SES variables; it may be difficult to separate salary and social-capital effects.
- These measurements occurred during a period of adequate teacher supply, and lower salary sensitivity is expected when supply is more readily available. Labor market conditions are changing markedly, however, because of demand increases due to retirements, lower class sizes and attrition rates.
- The results could reflect the inefficient structure of the current teacher-compensation system that rewards experience and education, neither of which is strongly related to producing higher achievement. If higher compensation could be provided to higher-quality teachers and those who are effective with lower-scoring students, then one could expect compensation to be more effective.

An examination of the effects of factors that influence achievement must take into account the type of students targeted and current program funding. Lowering pupil-teacher ratios in states with high SES levels that already have ratios below the national average appears to have little effect. Conversely, lowering pupil-teacher ratios for students in lower grades in states with low SES and higher than average ratios has large predicted effects. Prekindergarten has stronger effects in states with lower SES. The adequacy of teacher resources, however, appears to have significant effects regardless of family characteristics.

The cost-effectiveness of resource expenditures could change by more than a factor of 25, depending on the program or policy, which types of students are grades are targeted, and the current program levels. This analysis predicted the most cost-effective policies to be:

- Provide teachers with greater discretionary resources in all states.
- Lower pupil-teacher ratios in the lower grades to below the national average, expand public prekindergarten, and provide additional teaching resources in states with a disproportionate percentage of lower-SES students.
- Lower pupil-teacher ratios in the lower grades to equal the national average in states with average SES characteristics.

This analysis also estimates that the use of in-classroom teacher aides is far less cost-effective than the above recommendations.

In summary, investing in better working conditions to make teachers more productive can produce significant gains in achievement. Although increasing the quality of teachers is important in the long run, this analysis suggests that significant productivity gains can be achieved now with the current teaching force if working conditions are improved.

The Bigger Picture: Understanding Effects of Investment in Public Schools

Any general theory about the effects of public-school expenditures must account for the following:

- The pattern of results in previous nonexperimental measurements
- The results of the Tennessee experiment and the Wisconsin quasi-experiment
- The pattern of national score gains and expenditure growth from 1970 through 1996

One frequently advanced explanation holding that public schools lack a consistent ability to utilize additional resources to improve outcomes depends on the inconsistency in nonexperimental measurements at levels of aggregation below the state level. This explanation assumes that the inconsistency in measurements is a result of inconsistency in the utilization of resources, but overlooks the possibility of inconsistency in the measurement process itself. This explanation is not consistent with the experimental results from Tennessee and Wisconsin,—where the 1970s and 1980s brought large score gains for minority and disadvantaged students—and with positive and consistent nonexperimental results at the state level of aggregation.

RAND researchers propose a different explanation—consistent with the current experimental and nonexperimental evidence, and historical expenditure and achievement trends—suggesting that additional resources are effective for minority and disadvantaged students, but that resources directed toward more-advantaged students have only small, if any, effects. This is consistent with the pattern of national score gains and expenditures from 1970 through 1996: Minority and lower-SES white students made significant gains, but more-advantaged students made much smaller, if any, gains.

The Tennessee experiment and Wisconsin quasi-experiment results show positive, statistically significant long-term effects on achievement, but were based on samples that were disproportionately drawn from minority and disadvantaged student populations. RAND's state-level results also produced estimates for pupil-teacher ratio consistent with the size of effects measured in the Tennessee experiment, and produced a similar pattern of larger effects for minority and lower-SES students, suggesting that aggregate-level measurements may provide more unbiased effects than less-aggregate models.

This analysis does not account for the lower, and inconsistent, pattern of previous measurements at levels of aggregation below the state level. Most independent literature reviews conclude that previous nonexperimental results show the effects of additional resources on educational outcomes as generally positive. These reviews, however, have not yet explained the wide variance in previous results, nor why more-aggregate measurements show more positive and consistent effects than measures at lower levels of aggregation. RAND researchers hypothesize that the inconsistency reflects the measurement process itself rather than an inconsistency in the use of resources.

Inconsistencies in previous measurements used may be accounted for by widely different specifications and assumptions. Previous measurements did not measure separate effects for high- and low-SES students, and most measurements contained typical student populations with large proportions of more-advantaged students. Smaller effects might be expected in such samples, and effects would be "inconsistent" across studies if student characteristics changed. Effects could also differ across grade levels and lead to "inconsistent" results across studies that focus on measuring different grade levels.

Implications for Policy: Improving American Education

As noted, one interpretation of the empirical evidence implies that additional resources for public education are not the answer to improving schools if there remains an absence of fundamental reforms in incentives and organizational culture. Underlying this view is the idea that it is necessary to create either alternatives outside the current system or increased choice within the system to foster greater competition for public schools.

RAND's results show that resources can make significant differences for minority and lower-SES students. Between-state differences in resources are the main reason for inequitable resource levels for these students, and can only be addressed with federal programs. Results also suggest, however, that significant gains are occurring in math scores across many states—gains that cannot be traced to changing resources.

Much research is required to attribute these gains to specific reforms, but a plausible explanation suggests that ongoing systemic structural reform within public education might be responsible, certainly challenging the traditional view of public education as "unreformable."

Significant reform may be achieved in public education if the output of its separate and diverse units can be measured and compared, leading to the identification and diffusion of successful initiatives. Caution is warranted, however, until student gains in elementary schools result in longer-term gains in secondary schools, leading to completion of more years of education and greater success in the labor market.

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There are reasons to believe that improvements in achievement will continue:

- The full effect of structural reform initiatives is not reflected in current achievement
- The identification of successful initiatives may result in diffusion across states
- Better allocation of future resources can also raise achievement

Implications for Research

Experimentation and Improving Nonexperimental Analysis

Expanded experimentation in education is critical to understanding educational processes and helping to determine the application of appropriate assumptions and specifications to nonexperimental data. Experimentation should be directed toward *measuring the effects* of major resource variables and *the critical assumptions* used in nonexperimental analysis. In addition, both experimental and nonexperimental research must seek an understanding of how resources impact both student development and what occurs in the classroom. It is unlikely that research consensus will emerge until we can answer some critical questions:

- What causes differences in experimental and nonexperimental measurements and the differences among nonexperimental measurements?
- What theories explain how changing resource levels affect parent, teacher and student behavior in the classroom and families?
- How do these changes affect long-term student development in ways that result in higher long-term achievement?

Two hypotheses that arose from the RAND analysis also need much more study.

Hypothesis #1: The Dynamic Effect of Schooling Variables

The first is the dynamic nature of achievement effects across grades suggested in the Tennessee experiment. Schooling variables in one grade appear to influence achievement at *all* later grades, so conditions during all previous years of schooling need to be specified. Pretest scores may not adequately control for previous schooling characteristics. *The Tennessee experiment results suggest that two students can have similar pretest scores and similar schooling conditions during a grade and still emerge with different posttest grades that have been influenced by different earlier schooling conditions.*

For example, despite having similar schooling conditions in grades 4 through 8, relative changes in achievement occurred in grades 4 through 8 for those students who had one to two, versus three to four, years in small K-3 class sizes. Whether or not a smaller class size in 2nd grade had an effect cannot be known until later grades, and even then the answer will depend on what class sizes were experienced in both previous and higher grades.

Conceptually, the effect of class-size reductions resembles a human "capital" input that can change outputs over all future periods. Thus, models that specify the effects of capital investments may be more appropriate. These results are consistent with the concepts of risk and resiliency in children from the standpoint of child development: Different levels of risk and resiliency in children appear to interact with schooling conditions to produce gains or losses.

Hypothesis #2: Resource Substitutions Affect Achievement and Measurement

A second key hypothesis underlying the RAND analysis is that resource substitutions can affect student achievement. High family resources can substitute for and supplement school resources in indirect and unmeasured ways that affect accurate measurement of policy variables. Families who are able may apply more of their own resources when school resources are lower, and less when schools are devoting more resources. Students with lower levels of family resources may be affected more by changing school resources, and show the most sensitivity to levels of school resources. Taken at face value this would imply that more school resources can substitute for lower family resources; these substitutions need to be the focus of more research.

Assumptions and Caveats for Interpreting the Study Results

Achievement is only one of many desirable outcomes expected from schools.

Test scores will continue to receive a disproportionate share of attention until other comparable measures of outcomes are available. It is possible to overemphasize achievement at the expense of other outcomes; it is also possible to have good schools that satisfy parents even though they are not among the highest achieving. While achievement is certainly a very important outcome expected of schools (and we should continue to try to understand the policies that contribute cost-effectively to increasing achievement), we must also begin collecting a broader range of measures of school outcomes to achieve balance.

No test is a perfect indicator of what students have learned.

Achievement scores reflect particular test items that can emphasize more basic skills than critical-thinking skills. Further, scores can reflect the timing of when students learn skills: Students in different states do not learn certain skills in the same sequence or at the same grade level because of differences in curricula. Finally, different state standards and assessment systems may not be aligned with NAEP test items; states having systems that reflect NAEP might be expected to score higher.

Measured effects should be seen primarily as long-term effects of differences in policies.

States will not see the full effects measured in this analysis in the first few years. State differences have existed over long periods of time, allowing students, teachers, parents and curricula to make longer-term adjustments.

A variety of factors are reflected in the estimated differences in scores for students from similar families.

Several factors related to characteristics of the state education system have been identified, and account for part of the differences. Less than one-half of the differences are accounted for, however, with the remaining variance arising from:

- unmeasured family characteristics
- unmeasured characteristics of the educational system
- characteristics of other social support systems for families and children
- particular factors (such as foundations) creating social capital in states

Effects and rankings all have ranges of uncertainty.

Use of these results for policy guidance must take into account the ranges of uncertainty associated with the effects and rankings. The effectiveness of certain policies may hide the presence of context-sensitive factors that make the policy more or less effective. Further, the particular predicted effects may vary within state or local contexts.

These results identify effective policies and states where students from *similar backgrounds* are performing at *different levels*.

This is a first step toward identifying policies and practices that contribute to higher achievement, and toward understanding constraints upon broader implementation.

The tendency to blame or credit policymakers for achievement results must be tempered by three factors.

1. Achievement results from 1990-96 can reflect policies and practices from the early 1980s through 1996. Eighth-graders tested in 1990 entered school in 1992; their scores reflect the quality of education throughout their schooling. Fourth-graders tested in 1996 have scores that reflect more-recent policies.
2. Many reforms initiated since the mid-1980s require significant organizational adjustment; their effect on schools, teachers and students occurs gradually and is not necessarily reflected in current scores.
3. The research and development community in education has been unable to provide consensus results or pilot-tested policies and procedures to guide policymakers and educators in adopting more effective practices. Without good research and development, policymakers lack the key process required to improve the system of education; progress in education reform will thus be slow, uncertain and inefficient.

Final Note: The Importance of Linking Educational Reform to Social Services for At-risk Students

Policy decisions need to include a broader mix of school, family and community programs to improve educational outcomes. The narrow focus of educational research is a function of using easily measurable and available objectives. "Achievement" or "high school completion" or "total years of education" are the common measures used to evaluate the effectiveness of schooling expenditures. These narrower objectives do not provide direction for the ultimate objective: connecting both family and school expenditures to their effect on longer-term contributions (taxes raised) and disbursements (welfare, criminal justice, Medicaid, etc.). Better educational outcomes presumably contribute to higher wages and more taxes, and to reduced social welfare, health and criminal justice expenditures.

Utilizing this broader perspective is important for two reasons.

1. It is the goal of both family and schooling expenditures to produce adults (either current parents or current children as adults) with stable employment, reducing the utilization of social service and criminal justice programs. Research is continuing to move in this direction to compare the long-term savings from investments in family or school programs (Karoly et al, 1998; Krueger, 1999).
2. The "optimal" level of investment in all children's programs cannot be determined without this methodology. An intermediate measure such as "achievement" may be used to compare the *relative* cost-effectiveness of programs, but it cannot determine how much should be invested across all programs (Grissmer et al, 1997, 1998). Total investment level can only be determined by estimating a rate of return; this can be accomplished by comparing the discounted costs of the programs to the discounted net savings in future public expenditures and revenues. A rate of return that is higher than that achieved in private sector investment would argue for increased expenditures.

Using longer-term measures would show significant rates of returns for investments directed toward lower-SES children. Higher levels of funding for such programs would be mandated by societal self-interest.

This paper is based on the following:

Grissmer, D. (2000). *Improving the efficiency of public expenditures directed toward children.* In Improving Educational Achievement: A Volume Exploring the Role of Investments in Schools and Other Supports and Services for Families and Communities, Center for Educational Policy, Washington, DC.

Grissmer, D., Flanagan, A., Kawata, J., & Williamson, S. (2000). *Improving student achievement: What state NAEP test scores tell us.* Santa Monica, CA: RAND. ISBN 0-8330-2561-9

Grissmer, D. (1999). Class size effects: Assessing the evidence, its policy implications, and future research agenda. *Educational Evaluation and Policy Analysis*, 21, 231-248.