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ABSTRACT

This paper describes an evaluation strategy designed to assess the efficacy of an education system at the district level. The strategy provides a measure of accountability that takes into account the potential effects of demographic variables. The study focused on Bellevue Public Schools (Washington), a medium-sized district near Seattle with an enrollment of 15,000 students. National, regional, and district data files were merged to form a database for aggregation and analysis. A correlational analysis was performed to identify demographic variables related to student achievement measures. Then, variables shown to be related to student achievement were included in a multiple regression analysis to assess the extent to which these demographic variables affect achievement and to construct a composite index of their impact. Third, the composite index was used to cluster school districts that were demographically similar to provide a basis for comparison. Variables shown to be related to student achievement at the district level included percentages of students from ethnic minorities, in special education, below the poverty level, in bilingual programs, or in compensatory reading programs. When the Bellevue district was compared with other Washington districts it most closely resembled, students in Bellevue consistently showed a higher level of achievement than the state average. This evaluation strategy provides a way of assessing the efficacy of the education system at the district level. It provides a measure of accountability that is more comprehensive and systemic than the evaluation of an isolated or categorical program. (Contains five tables and four references.) (SLD)

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# System Performance at the District Level: Demographics and Student Achievement

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# System Performance at the District Level: Demographics and Student Achievement

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## Introduction

Evaluations have often been conducted at the program level without regard to the fact that programs implemented by a school or school district invariably interact with one another and that students are often participants in several district-, state-, or federally funded programs. It is often difficult, if not impossible, to partial out the interactive effects among programs when one attempts to assess the impact of each program separately.

More recently, the educational research and development community has paid increased attention to the benefits of program and service integration (e.g., Melaville & Blank, 1991, Winfield, et al., 1992), advocating, for example, integrated curriculum and assessment. Likewise, federal education legislation (e.g., Improving America's Schools Act) has placed increased emphasis on the coordination and integration of categorical programs to help students perform to higher standards (U. S. Department of Education & American Educational Research Association, 1995). Service integration is to attend, simultaneously, to the health, education, and social needs of students.

In the context of multiple, interactive programs implemented within a single system (e.g., the school district), evaluation models designed to assess impact at the program level are no longer adequate, or appropriate, for addressing accountability issues at the system level. Increasingly, there is a need to use broader indicators of efficacy to assess system impact at the district level.

The efficacy of a district is influenced by a wide array of variables. Some of the variables are manipulable (e.g., curriculum and instruction, staff development), others are beyond the district's control. Among the uncontrolled variables are the backgrounds and characteristics of students who enroll in the school system. For example, there is abundant evidence (U.S. Department of Education, 1993) that poverty is a potent factor affecting the achievement of not only poor children but others who attend the same school. A system of assessment and accountability that is fair and meaningful should include a mechanism for identifying and partialling out the effects of uncontrolled demographic variables in assessing impact.

This paper describes an evaluation strategy designed to assess the efficacy of an education system at the district level. The strategy provides a measure of accountability which takes into account the potential effects of demographic variables. The study was

focused on Bellevue Public Schools in Washington, a medium-sized district near Seattle with an enrollment of 15,000 students.

## Methods and Data Source

The state of Washington has approximately 300 school districts offering a wide variety of instructional programs to students. The student population is diverse and the districts differ widely with respect to student ethnicity, poverty level, and other demographic characteristics.

To study the effects of demographics on student achievement at the district level, the relevant data were extracted from three existing databases. Specifically, data on ethnicity and special education status were obtained from the Common Core Data (CCD) compiled by the National Center for Education Statistics (NCES). Poverty data were extracted from the 1990 census data. Data on student achievement and participation in special programs were drawn from a statewide database maintained by the Washington Office of the Superintendent of Public Instruction (OSPI) as well as data files and documents maintained by school districts.

Norm-referenced tests provide the most widely used measure of students' achievement in Washington. For several years, the state has used the Comprehensive Test of Basic Skills (CTBS/4) to assess student performance at grades four and eight, and the Curriculum Frameworks Assessment System (CFAS) at grade 11. These tests provide a basis for comparing student achievement with a national (CTBS) or a state (CFAS) norm group, and the test results can reveal the relative strengths and weaknesses of instructional programs. Longitudinal results can also show patterns or trends in student performance across school years.

Student achievement was measured by normal curve equivalent (NCE) scores. Reading NCE scores for grades four and eight were based on CTBS. English NCE scores for grade 11 were based on CFAS. The NCE scale, an equal-interval scale with a range of 1 to 99, coincides with the percentile scale at the 1st percentile, 50th percentile, and 99th percentile.

## Data Analysis

The national, regional, state, and district data files were merged to form a database for aggregation and analysis. Using districts as the unit of analysis, three sets of analyses were conducted on the data. First, a correlational analysis was performed to identify demographic variables related to the student achievement measures. Second, variables shown to be related to student achievement were included in a multiple regression analysis to assess the extent to which these demographic variables are affecting student achievement and to construct a composite index of their impact. Third, the composite

index was used to cluster school districts that are demographically similar to provide a basis for comparing districts with respect to student achievement. Because of missing data, a small number of districts were excluded from the analysis.

## Results

The correlational analysis showed that several demographic variables were related to student achievement at the district level, including:

- Percent of ethnic minority students
- Percent of special education students
- Percent of students below poverty level
- Percent of students in bilingual programs
- Percent of students in compensatory reading programs

The relationships with percent of ethnic minority students and percent of students below poverty level were particularly strong, with the correlation coefficients hovering around .50, as shown in Table 1.

## Table 1

### Correlations Between Reading/English NCE Scores and Demographic Variables

| Demographic Variable | Grade Level | Correlation Coefficient |
|---|---|---|
| % of ethnic minority students | 4 | -.54** |
| | 8 | -.52** |
| | 11 | -.43** |
| % of special education students | 4 | -.11 |
| | 8 | -.16 |
| | 11 | -.17* |
| % of students below poverty level | 4 | -.50** |
| | 8 | -.47** |
| | 11 | -.43** |
| % of students in bilingual programs | 4 | -.35** |
| | 8 | -.25** |
| | 11 | -.04 |
| % of students in compensatory reading programs | 4 | -.32** |
| | 8 | -.19* |
| | 11 | N.A. |

* $p < .05$
** $p < .01$

Note. 1. Percent of students below poverty level was based on 1990 census data.
2. Percent of ethnic minority students and percent of special education students were extracted from the 1992-93 Common Core Data (CCD) compiled by the National Center for Education Statistics (NCES).
3. Percent of students in bilingual programs and percent of students in compensatory reading programs came from a database maintained by the Washington Office of the Superintendent of Public Instruction (OSPI).
4. The poverty thresholds are revised annually to allow for changes in the cost of living as reflected in the Consumer Price Index. The average poverty threshold for a family of four persons was $12,674 in 1989. Poverty thresholds were applied on a national basis and were not adjusted for regional, state, or local variations in the cost living.
5. Reading/English NCE scores are for the 1990-91 school year.

Using the demographic variables as independent variables, the multiple regression analysis yielded multiple correlations of .62, .59, and .52 for grades 4, 8, 11, respectively. All correlations are significant beyond the .001 level. Table 2 provides a summary of the results.

**Table 2**

**Multiple Correlations Between Dependent and Independent Variables**

| Grade Level | N | Independent Variables | Dependent Variables | Multiple R | R Square | p |
|---|---|---|---|---|---|---|
| 4 | 284 | (1) % of ethnic minority students<br>(2) % of special education students<br>(3) % of students below poverty level<br>(4) % of students in bilingual programs<br>(5) % of students in compensatory reading programs | CTBS reading NCE score | .62 | .38 | <.001 |
| 8 | 261 | (1) % of ethnic minority students<br>(2) % of special education students<br>(3) % of students below poverty level<br>(4) % of students in bilingual programs<br>(5) % of students in compensatory reading programs | CTBS reading NCE score | .59 | .35 | <.001 |
| 11 | 238 | (1) % of ethnic minority students<br>(2) % of special education students<br>(3) % of students below poverty level<br>(4) % of students in bilingual programs | CFAS English NCE Score | .52 | .27 | <.001 |

Results of the regression analysis were used to create a composite demographic index for each of the districts included in the analysis. The regression equation for each grade level included in the study provides an estimate of achievement that is solely determined by the demographic variables. In this study, this predicted achievement level served as the composite demographic index. It was used to rank and cluster districts with respect to the demographic variables.

Then, using the composite index, a cluster of districts which most closely resembled the Bellevue School District with respect to the demographic variables were identified as comparison districts. For each grade level, two clusters were identified. The first cluster included four districts. The second cluster consisted of ten districts.

**Student Achievement**

Students in Bellevue consistently showed a higher level of achievement than the state average. During a four-year period from 1990 to 1994, the district scored higher on the CTBS and the CFAS. In most cases, the district's average score was seven or more points higher than the state average. This is one-third or more of a standard deviation of the NCE scores. Such differences are generally considered to be educationally significant.

With its high level of achievement, the district ranked very favorably in comparison with other districts in the state. During the four-year period, Bellevue scored in the top quartile of the state for all three grade levels included in the study. The overall achievement data are summarized in Table 3.

**Table 3**

**NCE Scores and District Ranks in Reading/English**

| School Year | 90-91 | 91-92 | 92-93 | 93-94 |
|---|---|---|---|---|
| **Grade 4** | | | | |
| State Average | 50.5 | 49.2 | 48.4 | 48.2 |
| Bellevue Average | 57 | 57 | 55 | 57 |
| **Bellevue Rank** | **38** | **25** | **39** | **26** |
| Number of Districts Included | 284 | 284 | 284 | 284 |
| **Grade 8** | | | | |
| State Average | 52.9 | 52.8 | 52.2 | 52.3 |
| Bellevue Average | 60 | 59 | 60 | 60 |
| **Bellevue Rank** | **29** | **29** | **23** | **20** |
| Number of Districts Included | 261 | 261 | 261 | 261 |
| **Grade 11** | | | | |
| State Average | 48.2 | 48.2 | 47.3 | 47.8 |
| Bellevue Average | 57 | 57 | 56 | 55 |
| **Bellevue Rank** | **11** | **15** | **12** | **14** |
| Number of Districts Included | 238 | 238 | 238 | 238 |

**District Comparison**

When Bellevue was compared with districts which most closely resemble the district with respect to the demographic variables used in the study, its achievement level was, again, shown to be higher than that of the comparison districts.

The evaluation methodology first identified demographic variables which are related to student achievement as measured by the CTBS and the CFAS. These variables included:

- Percent of ethnic minority students
- Percent of special education students
- Percent of students below poverty level
- Percent of students in bilingual programs
- Percent of students in compensatory reading programs

There were some significant differences between Bellevue and the state as a whole with respect to these demographic variables. For example, the data showed that the district had a much higher percentage of ethnic minority students (26%) in comparison with the state average (17%). On the other hand, the data showed that 7 percent of the district's students lived below the poverty level when the state average was more than 18 percent. Overall, the district had a higher percentage of students participating in bilingual programs and a much lower percentage of students in compensatory reading programs in comparison with the state average. The demographic data are summarized in Table 4.

**Table 4**

**Summary Statistics on Demographic Variables**

| Variable | Grade Level | Bellevue | State |
|---|---|---|---|
| % of ethnic minority students | All grades | 26.0 | 17.0 |
| % of special education students | All grades | 9.0 | 10.1 |
| % of students below poverty level | All grades | 7.0 | 18.3 |
| % of students in bilingual programs | Grade 4<br>Grade 8<br>Grade 11 | 1.2<br>1.2<br>2.3 | 1.3<br>.6<br>.4 |
| % of students in compensatory reading programs | Grade 4<br>Grade 8 | .4<br>0 | 10.1<br>3.3 |

Note. 1. Percent of students below poverty level was based on 1990 census data.
2. Percent of ethnic minority students and percent of special education students were extracted from the 1992-93 Common Core Data (CCD) compiled by the National Center for Education Statistics (NCES).
3. Percent of students in bilingual programs and percent of students in compensatory reading programs came from a database maintained by the Washington Office of the Superintendent of Public Instruction (OSPI).
4. The statewide statistics were based on 284 districts for grade 4; 261 districts for grade 8; and 238 districts for grade 11.

The methodology then put districts that are similar with respect to these variables in clusters. Bellevue was then compared with the similar districts. The results of these comparisons are summarized in Table 5.

The data showed that when Bellevue was compared with four demographically similar districts, its achievement level was consistently above those of the comparison districts for all four school years included in the study. When the district was compared with a larger cluster of ten demographically similar districts, the differences were, again, very favorable to the district.

**Table 5**

**Reading/English NCE Scores of Bellevue and Comparison Districts**

| Grade Level | School Year | Bellevue | 1st Cluster of Comparison Districts | 2nd Cluster of Comparison Districts |
|---|---|---|---|---|
| 4 | 90-91 | 57 | 50.5 | 51.7 |
| | 91-92 | 57 | 47.5 | 49.2 |
| | 92-93 | 55 | 48.5 | 49.1 |
| | 93-94 | 57 | 47.25 | 48.1 |
| 8 | 90-91 | 60 | 59.25 | 56.7 |
| | 91-92 | 59 | 55 | 52 |
| | 92-93 | 60 | 56.5 | 53 |
| | 93-94 | 60 | 58.75 | 55.3 |
| 11 | 90-91 | 57 | 47.75 | 49.4 |
| | 91-92 | 57 | 50 | 50.4 |
| | 92-93 | 56 | 49.5 | 49.6 |
| | 93-94 | 55 | 50 | 50.3 |

Note. 1. Reading NCE scores for grades 4 and 8 were based on CTBS.
2. English NCE scores for grade 11 were based on CFAS.
3. The first cluster consisted of four districts which most closely resemble Bellevue with respect to the demographic variables used in the study.
4. The second cluster consisted of ten districts which most closely resemble Bellevue with respect to the demographic variables used in the study.

## Concluding Remarks

The evaluation strategy described in this paper provides a way of assessing the efficacy of the education system at the district level. It provides a measure of accountability that is more comprehensive and systemic than the evaluation of an isolated or categorical program. In taking into account the potential effects of student demographics, it presents policymakers with an accountability tool that is fair and perhaps more acceptable to school and district administrators.

The evaluation strategy is particularly pertinent under the new Title I legislation which strongly encourages schoolwide programs, program integration, and district level accountability. To be fair and equitable, it is important that the process for determining adequate yearly progress toward meeting improvement goals takes into account all critical variables that affect student performance—including those that are beyond the control of teachers and school administrators.

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