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ABSTRACT

The contributions of educational indicators to the eighth grade passing rates on the Minimum Performance Test (MPT) for Arkansas' 329 school districts for the 1987-88 school year were investigated. The variables/educational indicators reported in this study included: school district size in terms of average daily attendance, number of teachers with master's degrees, various fiscal characteristics, outside aid amounts, number of personnel, minimum foundation program aid, expense per student, eighth-grade MPT passing rates as percentages, and average personnel salaries. The correlation analysis addressed the question of whether any of the variables steadily increased or decreased as school district size increased. Analysis using multiple regression and Pearson correlation techniques indicated that none of the factors accounted for more than slight contributions to the variance in the percentage of students passing the MPT by district. These findings are consistent with numerous researchers, particularly those who investigated the relationship between school district size and achievement. It appears that calls for school district consolidation to effect enhanced academic achievement, solely on the basis of district size, are unfounded. (Author/RLC)

Educational Indicators

and

Eighth Grade MPT Passing Rates

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Abstract

The contributions of educational indicators, including school district size, number of master degree teachers, minimum foundation program aid, expense per student, and personnel salaries, to the eighth grade passing rates on the Minimum Performance Test (MPT) for Arkansas' 329 school districts for the 1987-88 school year were investigated. Analysis using multiple regression and Pearson correlation techniques indicated that none of the factors accounted for more than slight contributions to the variance in the percentage of students passing the MPT by district.

Educational Indicators and Eighth Grade MPT Passing Rates

In order to be promoted to the ninth grade in Arkansas, a student must take the Minimum Performance Test (MPT) and earn a total combined scale score of no less than 4204 on the five areas of the test which measure knowledge of reading, mathematics, language arts, science, and social studies, according to the Department of Education (1988). In addition, school districts are required to achieve an eighty-five percent passing rate on the MPT in all subject areas in grades three, six, and eight or face possible forced consolidation with another district. These benchmarks make the MPT a critical measure of the academic success of a district. Therefore, factors which may impact upon MPT performance are worthy of investigation. In particular, the purpose of this study was to investigate the relationship between the educational indicators compiled in the Annual Statistical Report of the Public Schools of Arkansas (Arkansas Department of Education, 1989) and the MPT passing rates in the 329 school districts of Arkansas.

Methodology

Commonly used methods for analyzing relationships among the types of data investigated in this study have been multiple correlation techniques (Borg & Gall, 1989; Cates, 1985; Martellaro, 1984; Ramirez, 1987; Stevens, 1987; Vaughn, 1984; Walberg & Fowler, 1987; Yong, 1987), of which multiple regression techniques and simple linear correlation analysis (Pearson) were employed in this study. The correlation analysis explored only the linear relationships among the variables. In other words, it addressed only the question of whether any of the variables steadily increased or decreased as school district size increased. It did not address the possibility of one or more reversals in direction as size increased (Keppel, 1973, p.113-14). Since the entire population was included in the study, testing statistical significance was meaningless and is not presented in the discussion (Borg & Gall, 1989, p.353-54).

The variables reported in this study included school district size in terms of average daily attendance, number of master's degree teachers, various fiscal characteristics, outside aid amounts, numbers of personnel, average personnel salaries, and eighth grade MPT passing rates as percentages. The

MPT passing rates were compared with each of the other variables in the analysis. District MPT passing rates ranged from 64 percent in one district to 100 percent in 135 districts (See Table 1.)

Insert Table 1 about here

Results

Table 2 lists indicators related to MPT passing rates giving the strength of the relationship in terms of the correlation coefficient. Table 2 also lists the contributions of the various factors toward the variance in the MPT passing rates. As can be observed in Table 1, there is little variance to be explained in the passing rates.

Insert Table 2 about here

The definitions of the terms used in Table 2 are drawn from the Annual Statistical Report of the Public Schools of Arkansas (1989), published by the Arkansas Department of Education. They will be defined as they are encountered in the discussion of the findings.

"Area in square miles" is the number of square miles within the school district boundaries. Its correlation with MPT passing rates was -0.15. Correlation coefficients within the range of -0.20 to 0.20 are considered very slight and of little use in predictive studies (Borg & Gall, 1989, Cates, 1985). Therefore, a correlation this small has little practical significance. The variance, being definitionally related to the correlation coefficient, is necessarily even smaller, contributing by itself only two percent of the dispersion in the percentages of eighth-graders passing the MPT. A factor making a contribution this small cannot be considered a significant one.

"Average daily attendance, K-12" and "average daily transported, K-12" refer to those students in grades kindergarten through twelfth, residing in the district attending school in that district or attending in

another under a tuition agreement. Closely related are "Average daily membership, 1-12" and "average daily membership, K" although membership tends to be a somewhat smaller figure than attendance. The correlation coefficients ranged from -0.21 to -0.15, at best only slight relationships. The variances were 0.02 to 0.05, again only of slight interest. "Percent change in ADA 1982-83 through 1987-88" refers to the average daily attendance during that five year period. Although the correlation was positive, 0.13, it was still small. The variance contribution was also small, 0.02.

"Assessed valuation of real and personal property" includes utilities and carriers in the school district. The correlation of -0.15 and the variance contribution of 0.02 were both small. Similarly, the "number of master's degree teachers" had a low correlation, -0.14, and a low contribution to the variance in the percentage of students passing the MPT, 0.02.

"Total millage", or the tax rate approved in the 1988 school elections, had a correlation of 0.07 and a variance contribution of 0.01. The proportion of the total voted for maintenance and operations had a correlation of -0.02 and a contribution of less than 0.01 to the variance. The proportion of the total for debt service was 0.13 and 0.02, respectively.

Total indebtedness of the district as of the end of the 1987-88 fiscal year, including commercial bonds and revolving loans outstanding, and the amount of additional debt the district could incur without exceeding the legal debt limit, had correlations of -0.04 and -0.15, respectively. Their contributions were less than 0.01 and 0.02, respectively.

Local tax receipts, including rent, interest, donations, revenue in lieu of taxes, revenue from the county, and other miscellaneous local receipts, had correlations of -0.14 and -0.16, and variance contributions of 0.02 and 0.03, respectively. Revenue received from other school districts for tuition for non-resident pupils and other reasons had a correlation of -0.04 and a contribution of less than one percent.

School districts receive various forms of financial assistance from the state and federal governments. Minimum Foundation Program aid is received from the state for general school operation including professional salaries. Other state aid includes the state apportionment of $2.96 per child less county school

office expenses, aid in support of the transportation system, aid for handicapped children, aid for vocational education, and miscellaneous aid including orphan's aid, isolated school aid, program improvement, contingency aid, and other aid not previously described in the other categories. Miscellaneous federal aid includes forest reserve, flood control, mineral leases, Public Law 874, revenue in lieu of taxes from federal housing, wildlife refuge, and grazing rights. Other federal aid includes ECIA Chapters 1 and 2, Title VI, vocational, and other restricted grants-in-aid received from the Federal Government directly or indirectly through a state agency. The correlation coefficients ranged from -0.19 to -0.02, all low numbers. The contributions made to the variance in the percentage passing rates were less than one, to four, percent.

"Current expense per ADA" is the expense minus the amount received from other school districts, divided by the resident ADA. The federal funds are those described in the previous paragraph. Again, the correlations were low, 0.03 and -0.03, respectively, as were the contributions to the variance, both less than one percent.

"Current expenditures" include all expenditures for the current fiscal year minus capital outlay, debt service, and amount received from other school districts. The capital outlay items include the totals spent from the operating fund and the building fund. "Non-bonded debt service payments" include revolving loans and postdated warrants. "Bonded debt service payments" include principal, interest, and fiscal fees for the bonded debt. The correlations ranged from -0.18 to 0.02 while the variance contributions ranged from less than one percent to three percent.

Numbers of personnel; including non-certificated personnel other than persons paid with restricted federal funds; certificated and non-certificated federal personnel who are paid with restricted federal funds; certificated personnel other than superintendents, principals, supervisors, and assistant superintendents; and the number of certificated personnel, including superintendents, principals, supervisors, and assistant superintendents; provided the strongest correlations and variance contributions. The ranges were -0.26 to -0.17 and 0.03 to 0.07, respectively. Although stronger, the numbers are still too small for any practical significance. Average teacher and certificated personnel salaries, as well as the total amounts paid these

groups, had small correlations and variance contributions, although the averages were stronger than the totals. The ranges were -0.17 to 0.02 and less than one percent to three percent.

The total variance accounted for by all the factors was 0.23, twenty-three percent, leaving over three-fourths of the variance in the eighth-grade MPT passing rates unaccounted for by the indicators investigated here.

Conclusions and Implications

In all cases, the relationships were very slight. These findings are consistent with numerous researchers, particularly those who investigated the relationship between school district size and achievement: Martellaro, who studied the relationship of school enrollment size to academic achievement in New Mexico, concluded that "from the data in this study there is no reason to believe that school enrollment size is related to academic achievement" (1984, p.106). Vaughn, who studied the relationship of school enrollment size and student achievement in reading, language and mathematics in New Mexico schools, indicated that after controlling for the effects of other variables, that school enrollment size "was not significantly related to student achievement in reading", "was determined not to be a predictor of language achievement", and "only accounted for 3% of the variance in mathematics achievement in 1980 and it accounted for 1% of the variance in 1981" (1984, p.139-140). Yong, who investigated the impact of wealth and size on selected accountability indicators of Illinois school districts, stated that after removing the effects of district wealth, that district size accounted for "a negligible amount (2 percent or less)" of the variation in ACT scores (1987, p.119). Stevens, who studied the relationship between school size and academic achievement of tenth grade students in Oklahoma, concluded that when ethnicity, educational level, expenditure per pupil, teacher/pupil ratio, and income level were included in regression analyses, "school district size was not a statistically significant factor in academic achievement" (1987, p.85-86). In attempting to determine the extent to which achievement of fourth- and eighth-grade students could be predicted from educational costs and school district size, Amos and Moody found that district size accounted for three percent or less of the variance in reading, mathematics, and language arts (1981, p.5-9).

Teeter, Bradley, and Shull studied factors related to student achievement in the 371 Arkansas school districts existing in 1981-82 and concluded that "school district size accounted for a small amount of the variation in student achievement scores" (1983, p.32). Science Research Associates (SRA) tests were used then rather than the currently used MAT6, but both are commonly-used measures of academic achievement. The change, which occurred during the 1985-86 school year, allowed comparisons of Arkansas students to the MAT6 national norm group (Office of Curriculum and Assessment, Arkansas Department of Education, 1989). They further explained that since none of the variables included in their study accounted for much of the variance in achievement test scores, that spending additional amounts of money in those areas would yield little in the way of immediate score improvements (p.9). Kennedy, Gentry, and Coyle (1989) agreed after conducting a similar study in which MAT6 scores were used as the measure of achievement. They concluded that since there were only slight relatio ships between district size and costs, MAT6 scores, or dropout rates, that pursuing these avenues in search of improvements in test scores would be minimally helpful.

The point remains, then, that there are differences in the passing rates on the MPT as there were and are on the SRA, MAT6, and other measures of achievement, but the indicators studied do not seem to play a particularly significant role in accounting for these differences. Given the strength of this message, it appears that calls for school district consolidation to effect enhanced academic achievement, solely on the basis of district size, are unfounded. The energy utilized in this effort could be more gainfully employed investigating more substantive contributors to academic excellence.

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Table 1

School District MPT Passing Rate Distribution by Percentages (1987-88)

Percentages	Number of Districts
96-100	239
91-95	63
86-90	19
81-85	10
76-80	3
71-75	1
66-70	2
61-65	1
	328 (Scores not reported by one district)

Table 2

Educational Indicators, their Relationships to, and Contributions to the Variance of, MPT Passing Rates

Indicators	Correlation Coefficient	Variance Contribution
Area in square miles	-0.15	0.02
Average daily attendance, K-12	-0.18	0.03
Average daily transported, K-12	-0.15	0.02
Percent change in ADA 1982-83 through 1987-88	0.13	0.02
Average daily membership, 1-12	-0.18	0.03
Average daily membership, K	-0.21	0.05
Assessed valuation of real and personal property	-0.15	0.02
Number of master's degree teachers	-0.14	0.02
Proportion of mills for maintenance and operation	-0.02	0.00
Proportion of mills for debt service	0.13	0.02
Total millage	0.07	0.01
Total indebtedness including bonds and loans	-0.04	0.00
Additional indebtedness borrowing power	-0.15	0.02
Local tax receipts	-0.14	0.02
Other local receipts	-0.16	0.03
Revenue received from other school districts	-0.04	0.00
Minimum Foundation Program aid	-0.19	0.04
State apportionment	-0.19	0.04
Transportation aid	-0.15	0.02
Special education aid	-0.15	0.02
Vocational education aid	-0.10	0.01

Table 2 (Continued)

Educational Indicators, their Relationships to, and Contributions to the Variance of, MPT Passing Rates

Indicators	Correlation Coefficient	Variance Contribution
Miscellaneous state aid	-0.02	0.00
Miscellaneous federal aid	-0.02	0.00
Non-revenue receipts	-0.12	0.01
Other federal aid	-0.03	0.00
Current expense per ADA	0.03	0.00
Current expense per ADA, including federal funds	-0.03	0.00
Current expenditures	-0.18	0.03
Capital outlay from operating funds	-0.11	0.01
Capital outlay from building funds	-0.10	0.01
Non-bonded debt service payments	0.02	0.00
Bonded debt service payments	-0.11	0.01
Number of non-certificated personnel	-0.17	0.03
Number of federal personnel	-0.26	0.07
Number of teachers, 1-12	-0.18	0.03
Number of teachers, K	-0.20	0.04
Teacher salaries, 1-12	-0.17	0.03
Teacher salaries, K	-0.13	0.02
Average salary of teachers	0.02	0.00
Number of certificated personnel	-0.18	0.03
Certificated personnel salaries	-0.16	0.03
Average salary of certificated personnel	-0.04	0.00