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Efficiency and the Characteristics of School Districts: A Study of 178 School Districts in Kentucky

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This study, a response to a 1987 study of the efficiency of small school districts by Herbert Walberg and William Fowler, critiques the notion of efficiency and applies one definition to the performance of school districts in Kentucky. The efficiency of all 178 Kentucky school districts was determined by regarding expenditures per student on three socioeconomic variables (assessed valuation, personal income, and percent of students receiving free or reduced lunch) in order to determine a maximum influence of SES on expenditures. Efficient districts were defined as those that spent less per student than predicted, whereas inefficient districts were those that spent more than predicted.

Average performance on six measures of norm-referenced and minimum competency achievement tests in the inefficient districts exceeded that in the efficient districts by 1/5 of a standard deviation.

The relationship of efficiency and three characteristics was investigated using a chi-square analysis of expected frequencies. A statistically significant ($p < .0005$) relationship was determined to exist between efficiency and [1] smallness and [2] district type. This relationship was not, however, observed with [3] ruralness. Spending in rural county districts was found to be considerably less variable than in other districts. Discussion related the findings to the notion of the "one best system" and to the role of adequate expenditures in supporting higher average student achievement.

After having maligned rural education for a century, educators in the U.S. have for a variety of reasons begun to speculate that our remaining rural schools may model a better way in American education (Gregory & Smith, 1987; Nachtigal, 1982). Rural schools are reputed to have a history of self-reliance, or at least of making do successfully (Nachtigal, 1982). They also tend to be smaller than schools in metropolitan areas. Size and cost efficiency are thus concepts that bear on the appeal of rural education as a model.

As Americans have begun to acknowledge that small can be beautiful, their appreciation for rural schools has grown, and it is not uncommon for observers to confound the issue of small size and rural location (Killian & Byrd, 1988). Yet, smallness and ruralness are not the same, as this study will demonstrate.

The Efficiency and Effectiveness of Small Scale

Walberg and Fowler (1987) purport to demonstrate both the cost efficiency *and* the effectiveness (achievement advantage) of small schools. Their study, "Expenditure and Size Efficiencies of Public School Districts," revives the notion of efficiency as part of the re-emerging debate about school size (*cf.* Smith & DeYoung, 1988).

Walberg and Fowler apply the following definitions of efficiency in their study:

> Efficiency . . . refers to the common dictionary meaning of the term, which denotes *effectiveness without waste* or in consideration of scarce resources.
>
> (p. 8, emphasis added)
>
> Efficient districts bring about *high levels of learning* even though their students may be equally or even less socially and economically advantaged than students in other districts.
>
> (p. 5, emphasis added)

They reached three conclusions: (1) district SES exerts a strong influence on district achievement; (2) when SES is controlled, per-pupil expenditures have an insignificant or inconsistent effect on student achievement; (3) the effect of increasing size has a negative effect on achievement when both SES and expenditures are controlled.

The final conclusion about the effect of small school size would be good news to supporters of small schools, if it were not misleading on several counts. First, as Jonathan Sher (1986) has observed, good schools and school districts come in all sizes. Small schools have particular virtues, but their comparative efficiency and effectiveness may be an artifact of the norms of governance, organization, and funding that characterize particular states or regions. In states in which districts are organized along county lines, for example in the rural South, small school districts function within a different set of norms and may exhibit comparatively different characteristics relative to those norms.

Second, the small school districts that were the objects of Walberg and Fowler's study in New Jersey should not be viewed as *rural* schools, since New Jersey is an entirely metropolitan state (Woods, Ross, & Fisher, 1988). In such an environment, small scale operations may indeed

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produce good results at comparatively less cost than they can elsewhere. The U.S. model of education is a crazy-quilt of different governance and organizational patterns, and the potential negative effect of this diversity on the generalizability of empirical results may be substantial.

Third, Walberg & Fowler's conceptualization of efficiency is based on minimized expectations for low-SES students. Breaking that cycle of expectation, not accommodating it, ought to form the basis of public policy about schooling. The negative effect of socio-economic differences on school learning is well-documented, but not necessarily inevitable. Observers of the Japanese educational system point out that Japan has the best-educated "bottom-half" in the world (Fallows, 1987).

Efficiency and Effectiveness

The meaning Walberg and Fowler have ascribed to the term "efficiency" is *not* the common one. In common usage, "efficiency" means to perform a task cheaply. The task need only be performed to a minimally acceptable level; a high level of performance is *not* a requirement of efficiency, commonly defined (Webster's Third International Dictionary, 1983; OED, 1981; see also Callahan, 1962).

In particular, the notion of efficiency depends on controls to reduce waste, especially wasted money (Callahan, 1962). Our view of waste in education, however, is a function of intellectual values (*e.g.*, is learning valuable in itself?) and social priorities (*e.g.*, when is it useful to educate children of the poor?) Indeed, if money is tight, and if the returns to schooling for lower-class students are not high (Wright, 1979), then a *high* level of performance may be construed as wasteful. By defining efficiency as the cost of producing an expected level of learning, Walberg and Fowler (1987) confound efficiency and effectiveness in their definitions.

Psychometricians, by contrast, know that there is a contest between efficiency and effectiveness. Too great an insistence on efficiency inevitably undermines effectiveness. In some things the argument that "less is more" makes sense; in some things it does not.

In studying efficiency, it makes better sense to control district per-pupil *expenditures*—instead of student achievement (*cf.* Walberg & Fowler, 1987)—for socioeconomic variables. Rural educators have complained for many decades that it is financially difficult for them to do what is expected, given meager resources. The irony is that rural districts often devote a larger portion of limited local revenues to education than other districts (Bureau of the Census, 1983; Sher, 1977). In such places, where even high taxpayer "effort" does not provide adequate support, efficiency is a hollow word. There is hardly any alternative.

Any attempt to define the efficiency of education must be scrutinized to make sure it does not give short shrift to human needs. Education—by which I mean real learning and understanding, not merely the operation of schools, or educational policymaking—is an event that has proven extraordinarily difficult to package as a product, though mass schooling has made a valiant attempt. The virtues of small scale may not generally reside in low cost, but in other qualities.

The relationship of efficiency (as expenditures controlled for socioeconomic variables) ought to be investigated with respect to such basic characteristics as type of organization, smallness, and ruralness of school districts. This issue is very important to those concerned with rural education, because rural environments vary from one another so greatly (Nachtigal, 1982), yet seldom are such characteristics of districts investigated.

This study makes an initial attempt to consider and understand the cost efficiency of rural districts and small districts with a methodology and context that differ from that studied by Walberg and Fowler (1987). It does not contest the results of that study, but rather offers a very different view of the related issues.

Controlling Expenditures for Socioeconomic Variables

One way to operationalize a definition of efficiency is to regress per-pupil expenditures on the most influential available socioeconomic variables of existing districts. When districts' expenditures are viewed in this way, some districts may nonetheless perform their services more frugally than would be predicted. In fact, reduced federal expenditures for education and recent budget problems in the states may have increased the need of some districts to implement austerity measures so as to become "efficient" according to the terms of the definition adopted here.

In light of the preceding discussion, then, the following questions are addressed by this study:

- Is SES a sufficiently powerful influence on spending to predict per-pupil expenditures in order to determine which districts spend less than would be expected on the basis of their socioeconomic characteristics?
- If so, what is student achievement like in these districts in comparison to districts that spend more money than would be expected on the basis of their socioeconomic characteristics?
- Are efficient districts likely to be small, rural, or of a particular organizational type than other districts?

Data: School Districts in Kentucky.

Kentucky data were selected for three reasons. First, of the four states served by the Appalachia Educational Laboratory (AEL), Kentucky has the largest number of districts (N = 178), due in part to the comparatively small size of its countries and in part to the existence of many independent districts. Readers should note, however, that the range of enrollment in these districts exceeds that of the New Jersey districts reported by Walberg and Fowler (1987, p. 8).

Second, in the 1985-86 school year Kentucky administered minimum competency tests and standardized tests to all grade levels. The Kentucky Essential Skills Test (KEST) is a criterion-referenced test of basic grade-level skills in reading, writing, math, spelling, and library and research skills. District scores are reported as percentages of students passing minimum "mastery" scores established by the State Board of Education. The Comprehensive Test of Basic Skills, Form U, (CTBS/U) is a norm-referenced group achievement test of grade-level knowledge used in Kentucky to provide scores in reading comprehension, writing, math, spelling, and library skills. It also yields a total test battery score. Scores are reported in NCE units.

Third, data gathered by AEL on student density were available for analysis. Student density is a normally-distributed, reliable measure of rurality, one of the characteristics of potential interest in this study (Meehan, 1988).

Data sources. Data came from three sources, the Kentucky Department of Education (variables 1, 5, and 7-14 in Table 1); the Northwest Regional Educational Laboratory (variables 2, 3, and 4 in Table 1); and from AEL's Rural, Small Schools Program (variables 15, 16, and 17 in Table 1). All but three variables represent data collected during the 1985-1986 school year.

Dichotomous Variables

Four characteristics—district type, smallness, ruralness, and efficiency—are constructed as dichotomous variables. District type is inherently dichotomous, while the other three are dichotomies derived from interval data. Both ruralness and smallness, however, are of interest primarily in this study as distinct categories. Smallness and ruralness are believed to reflect particular situations that might be obscured in an analysis based on a continuum of size or population density.

District type. Kentucky school districts are of two types, county districts (N = 120) and independent districts (N = 58). County districts thus outnumber independent districts by a ratio of 2:1, and they tend to be larger as well.

The 178 districts in this study are, with five exceptions, K-12 school districts. In these five cases, eighth grade achievement scores were used in the analyses instead of ninth grade scores. The 178 districts vary in size from 167 (the smallest independent district) to 93,589 (the largest county district). Enrollment is sharply and positively skewed (skewness = 10.04); mean enrollment was 3609, whereas the median enrollment was 2321. The mean enrollment of these districts is slightly larger than the mean enrollment of the New Jersey districts studied by Walberg and Fowler.

Smallness. Since the data used in this study came from Kentucky, the definition of smallness is one that makes sense for the Appalachian region. The study used the definition adopted by the Rural, Small Schools Program of the Appalachia Educational Laboratory (AEL). Because schools in the region served by AEL are either county or independent districts, and because independent districts are smaller on average than county districts, a single criterion of smallness for both—such as that used by the National Rural School and Small Schools Consortium—would necessarily confound the characteristics of smallness and district type. The definition adopted by AEL classifies a county district with fewer than 3000 students as small and an independent district with fewer than 1500 students as small. Of the independent districts, 40 were classified as small; of the county districts 61 were classified as small. None of the independent districts was classified as rural, whereas 88 of the county districts were classified as rural.

In addition to enrollment, data were collected on 16 other variables. Univariate statistics for these 17 variables are presented in Table 1, together with data on the residuals from the prediction equation described below. Simple (zero-order correlations) among these variables are presented in Table 2.

Ruralness. Ruralness was measured in the current study as student density (number of students per square mile). A district was defined as rural if its student density was less than the median value (14). In Kentucky the K-12 enrollment is 17.7% of the general population (Hodgkinson, 1988); hence a student density of 14 students per square mile suggests a general population density of about 79 persons per square mile. For comparison, the National Rural and Small Schools Consortium includes the criterion of general population density less than 150 persons per square mile in its definition of ruralness.

Efficiency. The residuals of the regression equation—which represent unexplained variance—were used to classify districts as "efficient" or "inefficient" in the following way. *Efficient* districts are considered to be those in which the residuals are less than 0; *inefficient* districts are those in which the residuals are greater than 0. Residuals are the difference between observed and predicted expenditures, and thus negative values reflect an over-prediction, or, in the terms of this study, "efficiency." This definition needs to be borne in mind when interpreting the zero-order correlations of the residuals (*i.e.*, of "efficiency" thus defined) with other variables.

Statistical Significance. Since the data set includes all the districts in one state—Kentucky—the data are construed as population data, and significance levels are not reported. This decision is typical of studies based on complete district-level sets for particular states (*e.g.*, Bickel & Papagiannis, 1987; Guskey & Kifer, 1988; Walberg & Fowler, 1987). This investigation is meant to characterize relationships that exist among the variables in Kentucky only.

Significance levels are, however, applied to the development of the prediction equation (in which unexplained variance bears on the issue of prediction; see Table 3) and in the analysis of dichotomous data (in which expected frequency is relevant; see Table 5).

Analysis: Part One

Exploratory multiple regression investigated the contribution of seven available SES variables in explaining the variance of current expense per student. The variables

TABLE 1
Univariate Statistics for 18 Variables

Variables	Minimum	Maximum	Mean	Median	St. Dev. (unbiased)	Skewness
1. Student Enrollment (1985-86)	167	93589	3609	2321	7509	10.044
2. Non-urban (% 1980 population, non-SMSA)	0	100	61	77	41	−0.514
3. Personal Income/Student (1980)	12590	89408	29312	26868	11956	2.411
4. Poverty (% 1980 families < fed. poverty level)	0	53	20	19	10	0.349
5. Free Lunch (% 1985/86 students)	3	82	36	34	16	0.536
6. Current Expense/Student (85/86, federal programs included)	1037	4522	2033	1984	318	3.130
7. Assessed Valuation/ Student (1985/86)	33945	268345	100074	95534	39847	0.979
8. CTBS U Total Bat. (1985/86, Grade 2)	46	82	62	62	6.12	0.159
9. CTBS U Total Bat. (NCE, 1985/86, Grade 9)	39	68	52	52	5.01	0.271
10. KEST 9th (% pass, reading, 1985/86)	59	100	81	81	7.65	−0.227
11. KEST 9th (% pass, math, 1985/86)	56	100	82	82	9.00	−0.486
12. KEST 3rd (% pass, reading, 1985/86)	62	100	84	85	7.46	−0.339
13. KEST 3rd (% pass, math, 1985/86)	74	100	91	92	5.11	−0.777
14. Type of District (1=ind.; 2=county)	1	2	1.66	2	.47	−0.689
15. Small by AEL (n<1500 [inc.]; n<3000 [co.])	1	2	1.57	2	.50	−0.272
16. Small by NRSSC (n<2000 all districts)	1	2	1.40	1	.49	0.413
17. Student Density (No. students per sq. mi.)	3.35	10711	178	14	826	11.80
18. Residuals (from regression equation)	−1038	1309	0	−14	233	0.924

(see Tables 1 and 2) entered in the analysis were:

> enrollment, percent of nonurban population, personal income per student, poverty rate, free lunch rate, assessed valuation, and student density.

Of these seven, three variables were found to contribute a statistically significant ($p < .01$) portion of unique variance to the equation: (1) assessed valuation per student [35%]; (2) personal income per student [+6%]; (3) and free lunch rate [+5%]. The total proportion of explained variance, then, was 46%, and the coefficient of multiple correlation was .68. Each of the three predictor variables, as might be expected, is moderately to strongly correlated with the dependent variable (see Table 2). The resulting equation (with three independent variables) is the equation used to categorize all 178 Kentucky districts as "efficient" or "inefficient." Table 3 summarizes these results.

The difference between the expected value and the observed value was calculated for each district. The values of the residuals thus calculated ranged between +$1,309 (the highest expenditure *above* expectancy) and −$1,308 (the lowest expenditure *below* expectancy). Using the definition described above, 83 districts were classified as "inefficient" and 95 districts were classified as "efficient."

Analysis: Part Two

In order to compare the efficient districts (which spent less per student might be expected on the basis of SES) with inefficient districts (which spent more than

TABLE 2
Kentucky Study of Achievement and District Characteristics
Zero-order Correlations Among Eighteen Variables

Variable List

1. student enrollment (85-6)
2. non-urban (% 1980 population non—SMSA)
3. personal income per student (1980)
4. poverty (% 1980 families < fed. poverty level)
5. free lunch (% 1985/6 students)
6. current expense/student (85/6, federal programs included)
7. assessed valuation per student (1985/6)
8. CTBS U total bat. (NCE, 85/6, grade 2)
9. CTBS U total bat. (NCE, 85/6, grade 9)
10. KEST 9th (% pass, reading, 85/6)
11. KEST 9th (% pass, math, 85/6)
12. KEST 3rd (% pass, reading, 85/6)
13. KEST 3rd (% pass, math, 85/6)
14. type of district (1=ind.; 2=county)
15. Small by AEL (n<1500 [ind]; n<3000 [co]); 1=not small, 2=small
16. Small by NRSSC (n<2000 all districts); 1=not small, 2=small
17. natural log of students per sq. mile (rurality)
18. (residuals—from regression equation; see table 4)

Simple correlation matrix

	1.en	**2.nonurb**	**3.inc**	**4.pov**	**5.lunch**	**6.exp**	**7.val**	**17.den**
2. nonurb	−.08							
3. inc	+.18	−.61						
4. pov	−.17	+.28	−.62					
5. lunch	−.04	+.32	−.59	+.83				
6. exp	+.17	−.39	+.55	−.30	−.25			
7. val	+.27	−.30	+.60	−.59	−.60	+.59		
8. ct2	−.06	−.24	+.31	−.27	−.35	+.15	+.19	+.23
9. ct9	−.03	−.36	+.53	−.54	−.62	+.29	+.45	+.18
10. kr9	−.01	−.28	+.41	−.48	−.52	+.21	+.33	−.04
11. km9	−.04	−.17	+.28	−.51	−.52	+.19	+.33	−.03
12. kr3	−.03	−.20	+.35	−.41	−.50	+.28	+.41	−.10
13. km3	−.01	−.16	+.30	−.41	−.49	+.28	+.35	−.11
14. typ	+.20	+.71	−.39	+.10	+.13	−.36	−.03	−.11
15. sma	−.32	+.08	−.09	+.12	+.05	+.13	−.13	+.07
16. smn	−.27	−.15	+.07	+.06	+.04	+.25	−.09	+.35
17. den	−.01	−.09	+.02	+.09	+.03	+.00	+.04	1.00
18. res	−.05	−.11	.00	+.01	.00	+.73	.00	+.00

might be expected), the mean achievement of "efficient" and "inefficient" districts was compared across six variables. Table 4 presents the results of this comparison. Again, these are population data for the state of Kentucky.

Table 4 shows that in all comparisons "inefficient" districts (which spent more on education than would be predicted from their socioeconomic status) reported mean district achievement higher than the mean district achievement of efficient districts (which spent less than would be predicted).

To interpret this pattern, the notion of effect size was applied to these results. According to Glass and Hopkins (1984, p. 236), effect size can help convey the magnitude of observed differences when the magnitude of difference is problematic—as it is when variability is reduced for school district averages. Effect size (population data) is given by the following formula:

In this application, the first term in the denominator represents the efficient districts, while the latter represents the inefficient districts. In this case the population variance

TABLE 3

Multiple Regression of Per-Pupil Expenditures on Three SES Variables)
(Predition Equation)
Variable List

DV	current expense/student (85/6, federal programs included)
IV1	personal income per student (1980)
IV2	free lunch (% 1985/6 students)
IV3	assessed valuation per student (1985/6)

Stepwise Regression Summary Table

Step No.	Variable	Multiple R	RSQ	Increase in RSQ	Number of Independent Variables Included
1	IV3	0.58	0.35	0.35	1
2	IV1	0.64	0.41	0.06	2
3	IV 2	0.68	0.46	0.05	3

Regression Statistics

Coefficient of multiple determination	= 0.4619
Coefficient of multiple correlation	= 0.6797
Standard error of multiple estimate	= 234.9830
F-Ratio	= 49.7958
Degrees of freedom	= 3 & 174
Probability of chance	= 0.0000

Regression coefficients

Constant = 1061.1964

Var.	Coeff.	Beta	F-ratio	Prob.	Std. Error
IV1	0.0111	0.4172	31.436	0.000	0.0020
IV2	6.2875	0.3155	18.057	0.000	1.4796
IV3	0.0042	0.5264	48.603	0.000	0.0006

TABLE 4
Achievement of Efficient versus Inefficient Districts

			EFFICIENT		INEFFICIENT		DIFFERENCE
test	grade	subject	$\bar{X}1$	s.d.	$\bar{X}2$	s.d.	$\bar{X}1 - \bar{X}2$
CTBS*	2	total bat.	61.7	5.40	62.7	6.85	−1.0
CTBS*	9	total bat.	51.5	4.98	52.0	5.07	−0.5
KEST+	3	reading	82.8	7.01	84.5	7.89	−1.7
KEST+	3	mathematics	90.4	4.93	91.9	5.22	−1.5
KEST+	9	reading	80.6	7.30	81.3	8.06	−0.7
KEST+	9	mathematics	80.4	7.81	82.9	10.07	−2.5

Key
*CTBS = Comprehensive Test of Basic Skills, form U; units are district averages of individual scores reported in units of Normal Curve Equivalents (mean = 50; s.d. = 21)
+KEST = Kentucky Test of Essential Skills, 1985-86; units are percent of students passing at given grade level, by district
total bat. = CTBS U total battery score
$\bar{X}1$ = mean of "efficient" districts
$\bar{X}2$ = mean of "inefficient" districts
difference: negative difference indicates lower scores for "efficient" districts, higher scores for "inefficient" districts
N = 95 "efficient" districts and 83 "inefficient" districts

Effect size formula from Glass and Hopkins

$$\Delta = \frac{\mu_E - \mu_C}{\sigma}$$

Δ = effect size
μ_E = mean of efficient districts
μ_C = mean of inefficient districts
σ = population standard deviation

(the pooled variance for all 178 districts) is known. Thus, we have the following effect sizes (data from Tables 1 and 3):

CTBS (total battery, grade 2)	−1.0/6.12 = −.16
CTBS (total battery, grade 9)	−0.5/5.01 = −.10
KEST (reading, grade 3)	−1.7/7.46 = −.23
KEST (mathematics, grade 3)	−1.5/5.11 = −.29
KEST (reading, grade 9)	−0.7/7.65 = −.09
KEST (mathematics, grade 9)	−2.5/9.00 = −.28

This yields an average effect size of .19, about ⅕ of a standard deviation in this data set. This finding supports the hypothesis that spending *above* predicted levels ("inefficiency") affects achievement positively in this population. Conversely, spending below predicted levels ("efficiency") may affect achievement negatively. Readers are cautioned that between-district variance is less than within-district variance, as the CTBS variances (approximately ⅓ of the NCE standard deviation of 21) indicate. The meaning of this difference with respect to individual students is not clear; however, district scores *are* typically used to compare the academic performance of districts with one another. If one accepts the assumptions that warrant use of group achievement tests to make such comparisons, then it is possible to speculate that more ample financial support for schools may affect student achievement in the aggregate.

In order to discover salient differences between "efficient" and "inefficient" districts, this study next investigated the relationship of efficiency with (1) type of district (county or independent), (2) smallness (as defined above), and (3) ruralness (student density <14). A chi-square analysis was performed to determine if the relationships exceeded chance frequencies. A chi-square analysis accommodates the notion that Table 5 gives the results.

Type of district and efficiency are significantly (p. <.0005) related in this study, according to Table 5. In particular, it seems that independent districts tend to be *less* efficient than county districts. Recall, however, that this means that independent districts spend *more* on education than would be expected on the basis of their SES characteristics (that is, on the basis of assessed valuation, personal income, and percent of students receiving free or reduced lunches).

Smallness and efficiency are also significantly (p <.0005) related in this study, according to Table 5. In particular, smaller districts appear to be *less* "efficient" than large districts. Again, in the context of this study, this finding means that smaller districts spend more than would be expected, given their SES characteristics. Recall also that type of district and smallness are not confounded in this study, as both county districts and independent districts are classified as small according to the criteria given above.

Finally, ruralness and efficiency are *not* significantly related (p = .36) in this study, according to Table 5. Nonetheless, Table 5 shows that "efficient" rural districts outnumber "inefficient" rural districts slightly (50 versus 38), whereas no observed differences occur among nonrural districts. The small observed difference does not, however, reflect large differences in expenditure among rural districts (all of which are county districts).

Discussion of Results

The results of this study suggest that emphasis on "efficiency" is not only misplaced, but that the misplaced emphasis on efficiency (as defined in this study) may have a detrimental effect on students' learning.

Walberg and Fowler's caveat that "the conclusion that learning is unlinked to expenditures requires cautious and considered interpretation" (Walberg & Fowler, 1987, p. 13) is borne out by the results of this study, which found that expenditures *were* related to learning once SES was controlled. Districts that were more frugal than would be predicted on the basis of their SES characteristics have district achievement scores lower than districts in which per-pupil expenditures exceed expectations.

"Efficiency" is a term most typically applied to profit-making organizations. In that context, accomplishing a standardized task as cheaply as possible is advisable if profits are to be maximized. In a profit-making enterprise, expenses above those necessary to accomplish that end—producing a maximum profit for a minimum price—are deemed wasteful.

Efficiency in Schooling? In education there is no (tangible) product, and there is no profit that can be privately and immediately appropriated. It is hard to see how *any* criterion of efficiency applies to schooling, including that employed by the present study. In fact, a sure way for schools to waste money—teaching foolish or even harmful lessons—is difficult to quantify.

The knowledge of most worth is a legitimate object of ethical and aesthetic debate that cannot easily be settled by reference to its financial value. Unfortunately for us,

TABLE 5
Chi-Square Analyses on Efficient and Inefficient Districts

TYPE OF DISTRICT
(1=independent; 2=county) – (Y Axis)
– – – – BY – – – –
EFFICIENCY (from residuals) – (X Axis)

	Number Row % Column % Total %	Efficient 2	Not Efficient 1	Row Totals
county	2	75 62.5 78.9 42.1	45 37.5 54.2 25.3	120 67.4
ind.	1	20 34.5 21.1 11.2	38 65.5 45.8 21.3	58 32.6
	Column Totals	95 53.4	83 46.6	178 100.0

Chi square = 12.333
Degrees of freedom = 1
Probability of chance = 0.000
Phi = .263

Chi-Square Analyses on Efficient and Inefficient Districts

SMALL (AEL definition) – (Y Axis)
– – – – BY – – – –
EFFICIENCY (from residuals) – (X Axis)

	Number Row % Column % Total %	Efficient 2	Not Efficient 1	Row Totals
Small (ind < 1500; county < 3000)	2	42 41.6 44.2 23.6	59 58.4 71.1 33.1	101 56.7
not small	1	53 68.8 55.8 29.8	24 31.2 28.9 13.5	77 43.3
	Column Totals	95 53.4	83 46.6	178 100.0

Chi square = 13.034
Degrees of freedom = 1
Probability of chance = 0.000
Phi = .271

TABLE 5
Chi-Square Analyses on Efficient and Inefficient Districts

RURAL – (Y Axis)
– – – – BY – – – –
EFFICIENCY (from residuals) – (X Axis)

	Number Row % Column % Total %	Efficient 2	Not Efficient 1	Row Totals
rural (x<2.64)	2	50 56.8 52.6 28.1	38 43.2 45.8 21.3	88 49.4
not rural (x>2.63)	1	45 50.0 47.4 25.3	45 50.0 54.2 25.3	90 50.6
	Column Totals	95 53.4	83 46.6	178 100.0

Chi square = .831
Degree of freedom = 1
Probability of chance = 0.362
Phi = .068

the knowledge of most worth in mass education is almost always based on the need to create the "human capital" believed to underwrite the national and international success of our American capitalism. It is a particularly short-sighted invocation, which contains a mechanism sufficient to place its goal out of reach.

That mechanism is the notion of efficiency. Investments in the development of human capital are not likely to be efficient in conventional terms. Schooling well the "bottom half"—children who must confront grave obstacles to learning—is not likely to be cheap in the United States (Amos & Moody, 1981).

In fact, education ought to have a larger aim than producing human capital efficiently. Wigginton (1985) provides a fine summary of the sort of things an education ought to do; those things are familiar to us all, but too seldom repeated in recent years.

Cultural Diversity and the One Best System. One of the strengths (perhaps, in fact, an exasperating strength) of American education is, as George Counts (1930) noted long ago, its diversity. This diversity not only needs to be respected (as an historical fact and a reflection of authenticity), but as an advantage to be exploited or developed on behalf of students. Rural education—which may have been a particular target of "one best system" reforms, at least in Kentucky—has offered several examples of how such diversity might be developed, not only for the benefit of students, but for the benefit of the entire community of which students are a part (*e.g.*, Bell & Sigsworth, 1987; Nachtigal, 1982; Sher, 1977, 1988; Wigginton, 1985).

Unfortunately, among the schools in this study, the century-old emphasis on efficiency (a critical strategy of the "one best system") seems to have *reduced diversity among the rural county districts* in this study. In the early years of the century, efficiency was used to help make schools more similar to one another and easier to control centrally (Callahan, 1962; DeYoung, 1987; Nachtigal, 1982; Tyack, 1974). Evidence of the success of that earlier era of reform is reflected in the data on current expense used by this study. Although there are 120 county districts and only 58 independent districts in Kentucky (a 2:1 ratio), variation in spending is much *less* among the *more numerous* county districts than among the less numerous independent districts. This effect is the *opposite* of what one would expect to encounter, influences being equal. In fact, the standard deviation of per pupil expenses is about *twice* as large among the 58 independent districts as it is among the 120 county districts ($417.00 versus $217.00).

Among the 88 rural counties of Kentucky, the standard deviation of expenses was only $195.00. Apparently, Kentucky's rural counties exercise less financial latitude than Kentucky's other districts. One might, therefore, ask if rural districts in Kentucky have enough scope to improve education. Might we expect better achievement among students served in those 21 large, rural, efficient, county districts if they became smaller and less "efficient"?

Unresolved Questions

The results of this study show that certain small and independent districts spend *more* than can normally be expected of them to educate their students. As they spend more to educate their students, these "inefficient" districts also achieve somewhat better results—at least as measured by Kentucky's standardized achievement tests and criterion-referenced minimum competency tests at the second, third, and ninth grade levels.

Nonetheless, on the basis of statistically-controlled SES background, these "inefficient" districts as a group resemble the group of "efficient" districts that spend *less* than would be expected. Thus, an object of further study might be to investigate what it is about these districts that determines the observed differences in predicted spending levels and in observed achievement. Is the strength of the relationship between SES and achievement different in efficient and inefficient districts? What do differences in spending have to do with size? Do small, independent, or inefficient districts articulate a stronger rhetorical commitment to education? Are the differences between efficient and inefficient districts related to cultural or ethnic phenomenon? Or are they simply an artifact of administrative procedures at the state level?

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