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ABSTRACT

The State of Minnesota funds its public schools primarily through a funding formula that provides school districts the same amount of revenue per pupil regardless of the size of their enrollment. An earlier study demonstrated that larger school districts incur less cost per pupil due to increased efficiency derived from economies of scale. This study evaluated whether smaller school districts, as a result of their higher costs per pupil, experienced greater hardship in the areas of infrastructure, resources, and staffing. Surveys returned by 308 school district superintendents indicated that in many key areas of infrastructure and technology, small school districts had significantly lower quality levels compared to larger school districts. Smaller school districts had much more difficulty than larger school districts in attracting and retaining teachers. The disparities between small and large school districts are even larger when one compares the low-referendum small districts with other school districts. To help eliminate these disparities, it is recommended that the state alter its basic funding formula (currently $4,601 per student) to provide 8 percent more funding for a district's first 500 students and an additional 4 percent to the next 500 students. All additional students beyond the first 1,000 in each district would be funded at the $4,601 level. These increased revenues would be available to all school districts. The total cost of the proposal is $77 million, less than 2 percent of state educational revenues. (Contains 20 references, 25 data tables, and a survey questionnaire.) (TD)

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SMALL SCHOOLS UNDER SIEGE

Evidence of Resource Inequality in Minnesota Public Schools

Gregory R. Thorson, Ph.D.
and
Nicholas J. Maxwell
University of Minnesota, Morris

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Small Schools Under Siege: Evidence of Resource Inequality in Minnesota Public Schools

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July 2002

Executive Summary

The State of Minnesota funds its public schools primarily through a funding formula that provides school districts the same amount of revenue per pupil regardless of the size of their enrollment. In an earlier paper (Thorson and Edmondson 2000), we demonstrated that, similar to other areas of the economy, larger school districts incur less cost per pupil due to savings attributed to increased efficiency derived from the economic principle of "economies of scale." The purpose of this study is to evaluate whether smaller school districts, as a result of their higher costs per pupil, experience greater hardship in the areas of infrastructure, resources, and staffing. To test this hypothesis, we surveyed school superintendents throughout Minnesota. Over 88 percent of public school superintendents responded to the survey. Some of our most important findings include:

- In many key areas of infrastructure and technology, small school districts had significantly lower quality levels compared to larger school districts in the state.
- Smaller school districts had much more difficulty than larger school districts in attracting and retaining teachers.
- The disparities between small and large school districts are even larger when one compares the low referendum small districts with other school districts in the state.
- To help eliminate these disparities, we recommend altering the state's basic funding formula (currently $4,601 per student) to provide 8 percent more funding for a district's first 500 students and an additional 4 percent to the next 500 students. All additional students beyond the first 1,000 in each district would be funded at the $4,601 level. These increased revenues would be available to *all* school districts in the state. The total cost of the proposal is $77 million (less than 2 percent of state educational revenues).

Table of Contents

Small Schools Under Siege: Evidence of Resource Inequality in Minnesota Public Schools

Over the last several decades, much of rural Minnesota has experienced serious financial hardship (Minnesota Planning 2000). Many of the problems facing rural Minnesota can be attributed to overall declines in the agriculture and mining industries. Many small rural towns that relied solely on these industries have been virtually eliminated from the landscape, and even those that had some diversification in their local economies are nevertheless threatened due to the spillover effects from the weak economic performance of these industries. As a result, many previously healthy rural communities now have trouble supporting commerce vital to their survival.

In contrast, the regional centers throughout Minnesota, along with urban and suburban areas throughout the state, have experienced significant growth. As small family farmers found they could no longer be profitable and those in the mining industry were laid off in large numbers, they and their children left for areas where the better economic opportunities of the suburbs and regional centers were to be found (Minnesota Planning 1995).

Clearly, side effects of the farm and mining crises have been felt in rural education. As small rural communities have suffered further losses in population, small school districts have found that the cost of educating smaller numbers of children has not decreased as dramatically as the reduction in state funds, which are based on enrollment. In our earlier work (Thorson and Edmondson 2000), we attempted to explain this phenomenon through the well-established economic principle of economies of scale.

In most areas of the economy, it is less expensive per unit to produce a larger number of goods than a smaller number of goods. To produce any good, there is a certain amount of overhead or infrastructure that is needed. Thus the initial cost of producing a single good will be the highest, while subsequent units will become marginally cheaper to produce. Large stores, whether they sell groceries, hardware, or clothing, can usually sell their goods at cheaper cost per unit than small stores. Large manufacturing plants can produce goods at a cheaper cost per unit than smaller plants.

In an earlier work, we found that the same phenomenon occurred in education. Much like in other areas of the economy, larger school districts need less revenue per student to operate than do smaller school districts (Thorson and Edmondson 2000). Our findings are consistent with other work in the field (Fox 1981).

Other scholars have interpreted this data in a different manner. For example, Funk and Bailey (1999) find that small schools have significantly higher graduation rates, so that the cost per graduate between small schools and large schools is nearly identical.

Funk and Bailey's work, however, is also just one example of recent findings that suggest that smaller schools have many desirable characteristics. Several studies have found that student achievement is significantly higher in smaller schools (Lawton 1999; Galletti 1998; Bradley and

Taylor 1998; Walberg and Fowler 1987). More specifically, researchers have found that small schools particularly benefit low-income and minority students (Stiefel et al 2000; Howley 1996, 1994, 1985; Lee and Smith 1996), as well as female students in the areas of math and reading (La Sage 2000). Conversely, other scholars have found that larger schools suffer from higher levels of absenteeism (Klonsky 1995; Raywid 1995) and may suffer from impersonal climates, high levels of bureaucracy, and overall low levels of participation in student activities (Fanning 1995).

Because school districts in Minnesota are funded primarily through formulas that provide fixed amounts of revenue per pupil regardless of total enrollment, the economies of scale phenomena has the potential of working to the detriment of small school districts. Even though it costs smaller districts more per pupil to educate their students, there is no mechanism of adjustment other than the limited funding category of sparsity aid to correct for this factor. Because this need for more money per pupil is not supplied by the state, smaller districts must supplement their state allocation of funds by passing referendums, which are often much larger per pupil than those in urban and suburban districts.

What is the effect of this disparity? Because the state is providing smaller districts with a smaller share of their overall educational costs than it does for larger districts, are smaller districts less able to maintain building systems, offer a diverse curriculum, keep up with modern technological advancements in education, and attract and retain teachers? This study will attempt to answer some of these very important questions.

A recent study by *Education Week* showed significant disparities in Minnesota's high- and low-poverty schools in many areas of technology, including Internet access and the number of teachers using the Internet in the classroom (Meyer 2001). Students in low-poverty schools had access to over 75 percent more Internet-connected computers per pupil than students in high-poverty schools. Similarly, the survey found that Minnesota students in low-poverty schools were over 70 percent more likely to go to schools where teachers regularly use the Internet in classroom instruction than those in high-poverty schools. Would these findings also hold true for small versus large schools? Would these trends follow into the areas of infrastructure and other resources?

Survey and Methods

To answer these questions, we administered a survey[1] to the school superintendents of Minnesota's 350 public school districts[2]. The complete survey can be found in Appendix A. Three separate waves of surveys were mailed out between March and June 2001. Prior to the second round, an e-mail was sent to each superintendent. A phone call was made to each district office prior to the third wave of surveys.

Overall response rates were very high. A total of 308 out of the 350 school district superintendents responded to the survey, yielding an overall response rate of 88.0 percent. We found very little response bias in the completion rates. For example, in those school districts where the district office is located in the seven county metropolitan area, 81.6 percent of superintendents responded. The corresponding rate in outstate districts was slightly higher at 89.0 percent.

Throughout this paper, we will make comparisons among school districts based on their enrollment size[3]. Our most common breakdown is with the use of quintiles. Table 1 reports the

district enrollments in the various quintiles in Minnesota and their respective response rates to our survey administration. Response rates were uniformly high across all enrollment groups.

Table 1: District Enrollment and Response Rates

Quintile	Enrollment	Respondents	Response Rate
First	0-415 Students[2]	57	81.4%
Second	416-733 Students	65	92.9%
Third	734-1268 Students	63	90.0%
Fourth	1269-2557 Students	65	92.9%
Fifth	> 2557 Students	58	82.9%

Infrastructure

School superintendents were asked to evaluate their district's infrastructure, programming, and staff. In the survey, superintendents were asked to use the following scale when assessing each of their school buildings:

Excellent (1): new or easily restorable to "like new" condition; only minimal routine maintenance required.
Good (2): only routine maintenance or minor repair required.
Adequate (3): some preventative maintenance required.
Fair (4): sometimes fails to meet code or functional requirements; extensive corrective maintenance/repair required.
Poor (5): consistent substandard performance; fails most code and functional requirements; requires constant attention, renovation, or replacement. Major corrective repair or overhaul required.
Replace (6): Non-operational or significantly substandard performance. Replacement required.

Table 2 displays the summary statistics of how superintendents rated their school facilities. The overall trend in Table 2 is very clear. As the enrollment of the school district decreased, so did the conditions of its school buildings. Small districts had the highest mean score at 2.84, a substantial +.23 more than the mean score of 2.61 for all schools in the state, and +.29 higher than the largest districts in the state. The schools in Small districts had particular problems with their acoustics (+.35), ventilation systems (+.30), and plumbing (+.23).

Table 2: Conditions of Schools Overall and Components (Mean Scores).

	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Mean	Diff
Overall Condition	2.84	2.74	2.62	2.63	2.55	2.61	+.23
Acoustics for Noise Control	3.08	3.03	2.97	2.64	2.61	2.73	+.35
Ventilation	3.10	2.98	2.97	2.70	2.73	2.80	+.30
Plumbing	2.96	2.75	3.02	2.69	2.64	2.73	+.23
Indoor Air Quality	3.03	2.88	3.01	2.70	2.80	2.83	+.20
Roofs	2.86	2.98	3.35	2.77	2.70	2.83	+.03
Heating	2.65	2.73	2.79	2.56	2.60	2.63	+.02
Physical Security	2.76	3.07	3.19	2.84	2.67	2.81	-.05

Table 3 shows the percent of buildings in each quintile that superintendents classified as needing replacement. While only 0.8 percent of schools in large districts needed replacement, more than seven times that many schools in small districts (6.3%) needed to be replaced. Substantial differences in replace rates occurred in all of the infrastructure categories, including ventilation, plumbing, heating, and indoor air quality.

Table 3: Percent of Schools with Replace Ratings (by Enrollment Quintile).

Resource	1st Quint	2nd Quint	3rd Quint	4th Quint	5th Quint	All	Diff
Overall	6.3	3.4	4.8	1.8	0.8	2.1	+4.2
Ventilation	8.9	7.5	6.7	4.4	1.3	3.6	+5.3
Plumbing	7.9	5.1	5.3	2.6	2.1	3.3	+4.6
Heating	6.3	4.2	4.7	3.1	0.6	2.3	+4.0
Indoor Air Quality	6.4	5.0	7.3	4.0	0.9	3.0	+3.4
Roofs	6.4	5.0	7.3	4.0	3.3	4.3	+2.1
Physical Security	2.6	1.7	1.3	5.7	0.8	2.0	+.6
Acoustics for Noise Control	2.5	3.3	4.7	3.1	0.8	2.1	+.4

The revenues available to a school district come from a combination of federal, state and local sources. We have argued that the state's per pupil funding formulas work to the disadvantage of small school districts because larger districts can educate students at a lower cost per pupil due to gains in economies of scale. However, a complicating factor is that local school districts are allowed to enhance their revenues through local referendum. Table 4 shows the relationship between enrollment size and the amount of revenue derived from local referendums.

An analysis of Table 4 shows that the average Minnesota school district raises about $406 per student (WADM) in local revenue through referendum. The level is much higher in the smallest districts in the state. In the smallest 20 percent of school districts, the median local referendum is $665, or $259 (63.7%) higher than the state average. Throughout this paper, we will evaluate whether small districts with low referendum amounts have more problems with their infrastructure, resources, and staffing than small districts with large referendum amounts. We break down the

state's smallest school districts into those that had high referendums (above the state median) and low referendums (below the state average).

Table 4: Median Local Referendum Levels and Enrollment Size (per WADM), 2000-2001).

	1st Quintile	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile	Median
Median Revenue from Local Referendums	$665	$390	$385	$371	$503	$406

In Table 5 we compare the mean infrastructure scores of small districts with low and high referendums. Table 5 suggests that the overall condition in small districts with low referendums is much worse than in small districts with high referendums. In Table 3, we found that the smallest schools had mean infrastructure scores that were +.23 more than the state average. When we examine just the low-referendum small districts, the difference from the state average swells to +.35. We also find that small districtswith low referendums have greater problems with acoustics, ventilation, indoor air quality, and plumbing.

Table 5: Conditions of Schools in Low- and High-Referendum Districts, First Quintile (Mean Scores)

	Quintile 1 Low Ref	Quintile 1 High Ref	Mean	Diff
Overall Condition	2.96	2.78	2.61	+.35
Acoustics for Noise Control	3.20	3.02	2.73	+.47
Ventilation	3.12	3.09	2.80	+.32
Indoor Air Quality	3.00	3.04	2.83	+.17
Plumbing	2.87	3.00	2.73	+.15
Physical Security	2.92	2.68	2.81	+.11
Roofs	2.84	2.87	2.83	+.01
Heating	2.52	2.70	2.63	-.11

Table 6 lists the percentage of small districtswith high and low referendums in which superintendents identified infrastructure as needing replacement. Strong differences are apparent from an examination of the data. Table 6 shows that just over 12.0 percent of small districtswith low referendums needed replacement compared to the overall average of 2.1 percent. In addition, small districtswith low referendums were much more likely to need new ventilation, indoor air quality systems, and roofs.

Table 6: Percent of Schools Identified as Needing Replacement, High- and Low-Referendum Districtsin the 1st Quintile.

Resource	Quintile 1 Low Ref	Quintile 1 High Ref	All	Diff
Overall	12.0	3.7	2.1	+9.9
Ventilation	12.0	7.4	3.6	+8.4
Indoor Air Quality	8.0	5.7	3.0	+5.0
Roofs	8.0	5.7	4.3	+3.7
Heating	4.0	7.4	2.3	+1.7
Plumbing	4.3	9.4	3.3	+1.0
Physical Security	0.0	3.8	2.0	-2.0
Acoustics for Noise Control	0.0	3.7	2.1	-2.1

We also asked superintendents what percent of their classrooms are air-conditioned. Because Minnesota schools typically begin in early September and end in early June, there are several cooling degree days during the typical academic year. Tables 7 and 8 show the percent of classrooms that have air conditioning by enrollment size of the district.

Table 7: Percent of Classrooms with Air Conditioning by Enrollment

	1st Quintile	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile	Diff
Air Conditioning	9.6	16.2	15.9	30.1	36.0	-26.4

Table 8: Percent of Classrooms with Air Conditioning (Low and High Referendum 1st Quintile)

	Quintile 1 Low Ref	Quintile 1 High Ref	Diff
Air Conditioning	10.9	9.0	+1.9

An analysis of Tables 7 and 8 shows that schools in small districtsare much less likely to have air-conditioned classrooms, although low- and high-referendum districtsare about equally as likely to have this feature.

Resources

Superintendents were also asked to evaluate their district's library resources. Superintendents were asked to classify their district's library resources as

(1) very sufficient
(2) somewhat sufficient
(3) somewhat insufficient
(4) very insufficient

The range for each of these variables is from 1 (indicating all responses as "very sufficient") to 4 (indicating all responses as "very insufficient"). Higher numbers thus indicate greater levels of dissatisfaction with the district's resources.

In Table 9, we display the mean score for each question for each quintile in school enrollment. For example, in the state's smallest districts (up to 415 students), the mean score for the quality of computer technology is 2.02. The overall mean for all districts is 1.93, indicating that smaller school districts had a higher level of mean dissatisfaction with resources by +.09. The areas where schools in smaller districts had the least sufficient resources were in the areas of phone messaging systems (+.44), cable television (+.33), library online cataloguing (+.29), and science labs (+.25). Smaller districts seemed to have more sufficient resources than larger districts in the areas of interactive television (-.32) and supply budgets for teachers (-.28). Overall, smaller districts fare worse than larger districts in all areas of library resources, as well as in nine of the 14 areas of core technology used in the survey.

Table 9: *Assessment of District Resources by Enrollment Quintile, All Districts.*

Description of Resource	1st Quint	2nd Quint	3rd Quint	4th Quint	5th Quint	Overall	Diff*
Library Resources							
Computer Technology for Lib. Use	2.02	1.88	1.90	1.78	2.07	1.93	+.09
Library Journals Collection	2.39	2.23	2.29	2.18	2.16	2.25	+.06
Library Book Collection	2.46	2.40	2.50	2.43	2.31	2.42	+.04
Online Library Resources	2.02	1.98	2.02	1.83	2.05	1.98	+.04
Teaching Resources							
Science Labs	2.36	2.11	2.10	2.23	1.77	2.11	+.25
Professional Development Money	2.00	1.71	1.98	1.89	2.21	1.95	+.05
Textbooks	2.35	2.42	2.45	2.35	2.33	2.38	-.03
Supply Budgets for Teachers	2.32	2.55	2.82	2.58	2.72	2.60	-.28
Technology							
Phone Messaging System	2.58	2.02	2.39	2.06	1.70	2.14	+.44
Cable Television	2.27	1.98	1.94	1.84	1.72	1.94	+.33
Library On-Line Cataloguing	2.36	2.26	2.00	1.90	1.84	2.07	+.29
Television Sets	2.08	1.81	1.93	1.84	1.77	1.88	+.20
DVD Players	3.34	3.27	3.32	3.11	2.77	3.16	+.18
Computer Projectors	2.92	2.65	2.87	2.77	2.56	2.75	+.17
Teacher Training in Technology	2.63	2.43	2.56	2.40	2.50	2.50	+.13
VCRs	1.86	1.71	1.77	1.66	1.68	1.74	+.12
Photocopying	1.82	1.65	1.80	1.73	1.67	1.73	+.09
Access to Internet	1.51	1.54	1.60	1.44	1.58	1.53	-.02
Computers Networks for Inst Use	1.80	1.79	1.87	1.85	1.84	1.83	-.03
Computers for Instructional Use	1.96	1.98	2.10	2.10	2.19	2.07	-.11
Overall Tech Integration into Curr.	2.43	2.58	2.71	2.52	2.57	2.57	-.14
Interactive TV	2.06	2.07	2.28	2.57	2.91	2.38	-.32

* *The Diff Category represents the difference between the 1st quintile and the overall average.*

Means scores can be a useful measure of central tendency, but many policy makers are also interested in what percentage of superintendents listed their resources as very insufficient. Table 10 displays the percentage of superintendents within each quintile that listed each of the respective resources at very insufficient levels. The results displayed in Table 10 are similar to our earlier findings. In general, the smallest districts were more likely than larger schools to report very insufficient resources. For example, smaller districts reported higher rates of very insufficient library resources in each of the categories questioned than larger districts. Over 15 percent of the state's smallest districts reported having a very insufficient journal collection. That figure is more than twice as high as any other quintile of enrollment. Other large disparities exist in the areas of online library cataloguing (+9.7), computer projectors (+7.7) and the library book collection (+7.1). In addition, nearly 15 percent of small school districts indicated that their science labs were very insufficient.

Table 10: *Percent of School Districts by Enrollment Quintile Listing Resources as Very Insufficient*

Resource	1st Quint	2nd Quint	3rd Quint	4th Quint	5th Quint	All	Diff*
Library Resources							
Library Journals Collection	15.8	6.2	1.6	4.6	3.4	6.2	+9.6
Library Book Collection	17.5	6.2	9.5	10.8	8.6	10.4	+7.1
Online Library Resources	5.3	3.1	1.6	1.5	.7	2.6	+2.7
Computer Technology for Library Use	5.3	4.6	1.6	1.5	5.2	3.6	+1.7
Teaching Resources							
Science Labs	14.5	9.4	11.3	10.8	0.0	9.2	+5.3
Professional Development Money	7.0	4.6	6.3	4.6	12.1	6.8	+0.2
Textbooks	3.5	7.8	9.7	12.3	8.6	8.5	-5.0
Supply Budgets for Teachers	3.5	15.6	21.0	10.8	19.0	14.1	-10.6
Technology							
Library On-Line Cataloguing	18.0	16.4	4.9	0.0	3.5	8.3	+9.7
Computer Projectors	27.5	12.7	29.5	19.7	10.5	19.8	+7.7
Cable Television	13.7	8.2	8.1	6.5	3.5	7.8	+5.9
Phone Messaging System	22.0	17.5	24.2	14.5	8.8	17.3	+4.7
DVD Players	44.0	41.9	54.2	36.1	26.8	40.6	+3.4
VCRs	3.9	1.6	0.0	0.0	0.0	1.0	+2.9
Teacher Training in Technology	16.1	9.2	15.9	12.3	19.0	14.3	+1.8
Television Sets	3.9	0.0	3.3	3.2	1.8	2.4	+1.5
Access to Internet	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Photocopying	0.0	0.0	1.6	0.0	0.0	0.3	-0.3
Overall Tech Integration into Curr.	10.7	7.7	17.5	9.2	10.3	11.1	-0.4
Computers Networks for Inst Use	0.0	1.6	1.6	3.2	0.0	1.4	-1.4
Computers for Instructional Use	0.0	1.6	3.3	1.6	3.5	2.1	-2.1
Interactive TV	19.6	15.0	16.7	34.4	32.1	23.6	-4.0

* *The Diff Category represents the difference between the 1st quintile and the overall average.*

Table 11 compares the mean scores using the same self-reported sufficiency scales reported by district superintendents in Tables 9 and 10. The results are quite stunning. Schools in small districts with low or no referendum revenues had significantly lower mean scores in many resource areas. For example, in the library resources area, the average difference between all districts and the first quintile districts averaged +.06. When one compares the low referendum first quintile to the overall average, the gap swells to +.26. Similar increases occur in many of the technology areas as well.

Table 11: Assessment of District Resources by Referendum Level, 1st Quintile.

Description of Resource	1st Quintile Districts with Low Referendums	1st Quintile Districts with High Referendums	Mean for All Districts	Difference
Library Resources				
Library Book Collection	2.82	2.30	2.42	+.40
Online Library Resources	2.24	1.93	1.98	+.26
Computer Technology for Lib. Use	2.06	2.00	1.93	+.23
Library Journals Collection	2.41	2.38	2.25	+.16
Teaching Resources				
Professional Development Money	2.06	1.98	1.95	+.11
Science Labs	2.19	2.44	2.11	+.08
Supply Budgets for Teachers	2.47	2.25	2.60	-.13
Textbooks	2.24	2.40	2.38	-.14
Technology				
Phone Messaging System	2.62	2.57	2.14	+.48
Photocopying	2.00	1.76	1.73	+.27
Television Sets	2.07	2.08	1.88	+.19
Teacher Training in Technology	2.65	2.62	2.50	+.15
Library On-Line Cataloguing	2.21	2.42	2.07	+.14
Cable Television	2.07	2.35	1.94	+.13
VCRs	1.79	1.89	1.74	+.05
Computer Projectors	2.79	2.97	2.75	+.04
DVD Players	3.21	3.39	3.16	-.05
Access to Internet	1.43	1.54	1.53	-.10
Overall Integration into Curriculum	2.47	2.41	2.57	-.10
Computers for Instructional Use	1.69	2.06	2.07	-.38
Computers Networks for Inst Use	1.43	1.95	1.83	-.40
Interactive TV	1.79	2.16	2.38	-.59

We see a similar trend when we compare the percentage of school superintendents in 1st quintile low-referendum districts assessing their resources as very insufficient with all other districts. Over 29 percent of superintendents in small districts with low or no referendums labeled their library book collection as very insufficient compared to just 10.4 percent of the overall state average. In the

library book collection, library journal collection, and online resource areas, more than twice as many low-referendum 1st quintile districts suffered from very insufficient resources compared to the state average. Similarly, over 18 percent of science labs were rated as very insufficient by superintendents in small low-referendum districts compared with under 10 percent for all other districts.

Table 12: *Percent of School Districts Listing Resource as Very Insufficient by Referendum Level, First Quintile.*

Description of Resource	1st Quintile Districts with Low Referendums	1st Quintile Districts with High Referendums	Mean for All Districts	Difference
Library Resources				
Library Book Collection	29.4	12.5	10.4	+19.0
Library Journals Collection	17.6	15.0	6.2	+11.2
Online Library Resources	11.8	2.5	2.6	+9.2
Computer Technology for Lib. Use	5.9	5.0	3.6	+2.3
Teaching Resources				
Science Labs	18.8	12.8	9.2	+9.6
Textbooks	11.8	0.0	8.5	+3.2
Professional Development Money	5.9	7.5	6.8	-0.9
Supply Budgets for Teachers	11.8	0.0	14.1	-2.3
Technology				
Overall Integration into Curriculum	17.6	7.7	11.1	+6.5
Cable Television	14.3	13.5	7.8	+6.5
Library On-Line Cataloguing	14.3	19.4	8.3	+6.0
Phone Messaging System	23.1	21.6	17.3	+5.8
Teacher Training in Technology	17.6	15.4	14.3	+3.3
Access to Internet	0.0	0.0	0.0	0.0
Photocopying	0.0	0.0	0.3	-0.3
VCRs	0.0	5.4	1.0	-1.0
Computers Networks for Inst Use	0.0	0.0	1.4	-1.4
Computers for Instructional Use	0.0	0.0	2.1	-2.1
Television Sets	0.0	5.4	2.4	-2.4
Computer Projectors	14.3	32.4	19.8	-5.5
DVD Players	28.6	50.0	40.6	-12.0
Interactive TV	7.1	24.3	23.6	-16.5

We also examined the age of computers available to students in each school district. Tables 13 and 14 show that there is very little difference in the age of computers for small and large schools.

Table 13: Mean Age of Computers (All School Districts)

	1st Quintile	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile
0-12 Months	13.0	18.7	13.1	12.8	18.2
13-24 Months	25.0	18.6	19.8	21.9	20.3
25-36 Months	29.0	24.4	25.2	25.7	22.6
37-48 Months	11.9	16.4	19.5	16.5	16.9
More Than 48 Months	21.0	21.9	22.4	23.1	22.1
Mean	30.3	30.5	32.2	31.8	30.5

Table 14: Mean Age of Computers (1st Quintile Low and High Referendum)

	1st Quintile Low	2nd Quintile High
0-12 Months	14.6	12.4
13-24 Months	24.8	25.1
25-36 Months	28.0	29.5
37-48 Months	15.9	10.3
More Than 48 Months	16.8	22.8
Mean	29.5	30.7

However, significant differences did show up when comparing the Internet access available to children at smaller and larger districts. The smallest districts had less access to the Internet in their schools, with the largest difference at the K-6 level. The gap further widens when comparing the low and high referendum districts in the 1st quintile of enrollment. Small districts that had low referendums had significantly lower levels of access to the Internet.

Table 15: Percent of Classrooms with Internet Access

	1st Quintile	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile	Overall	Diff
K-6	86.8	95.9	93.1	91.6	95.2	92.6	-5.8
7-12	90.2	97.9	95.7	94.9	97.4	95.4	-5.2

Table 16: Percent of Classrooms with Internet Access

	1st Quintile Low	1st Quintile High	Overall	Diff
K-6	81.0	89.2	92.6	-11.6
7-12	81.8	93.8	95.4	-13.6

Curriculum

In addition to measuring both resources and infrastructure, we also asked superintendents which classes were offered in their districts. Table 17 shows that, as expected, small districts do offer a narrower range of courses than do large districts. However, Table 18 shows that in many areas, there is not much difference between the types of courses offered at small low- and high-referendum districts.

Table 17: Percent of School Districts Offering Courses in...

Course	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Total	Diff
French	12.2	25.9	21.1	43.1	90.9	39.0	-27.2
German	28.6	26.8	59.3	65.5	87.5	54.3	-25.7
Jazz Ensemble	48.0	68.9	72.4	79.7	94.8	73.5	-25.5
Calculus	46.9	57.6	66.7	88.3	98.2	72.2	-25.3
Pottery	54.0	72.6	78.7	88.3	94.5	78.1	-24.1
Microbiology	4.3	21.8	25.5	30.8	46.0	26.0	-21.7
Physical Chemistry	53.1	78.0	77.6	75.0	81.1	73.5	-20.4
Statistics	27.7	27.3	42.1	54.4	67.9	44.2	-16.5
Orchestra	8.3	17.2	8.8	27.3	60.0	24.5	-16.2
Pre-Calculus	74.5	82.0	93.3	96.8	98.3	89.4	-15.1
Sociology	54.0	63.3	67.8	70.7	80.0	67.4	-13.4
Algorithms	8.3	18.9	16.7	28.0	34.8	21.1	-12.8
HTML Programming	20.8	27.3	25.9	38.2	49.0	32.1	-12.7
Visual C/C++	2.1	17.0	8.8	19.2	28.3	14.8	-12.7
Vocal Elective	70.0	67.2	88.1	91.8	94.6	82.6	-12.6
British Literature	26.5	30.9	28.1	50.0	56.6	38.5	-12.0
Economics	71.2	80.0	75.0	88.7	98.3	82.9	-11.7
Geology	10.6	18.2	18.2	35.2	28.0	22.2	-11.6
Drawing	78.4	91.8	85.2	93.5	100.0	90.0	-11.6
Art History	30.6	33.3	34.5	44.1	59.6	40.4	-9.8
Environmental Science	73.5	85.2	78.0	87.1	90.7	83.2	-9.7
Painting	80.8	87.1	85.0	96.8	96.4	89.3	-8.5
Astronomy	17.4	16.1	18.2	40.0	36.7	25.7	-8.3
Drama/Theater	57.7	53.3	56.9	70.0	91.2	65.9	-8.2
Macroeconomics	4.0	1.8	5.2	12.5	37.3	11.8	-7.8
Spanish	88.5	98.5	95.2	95.3	100.0	95.7	-7.2
Microeconomics	8.2	7.1	8.6	14.3	31.4	13.7	-5.5
World History	85.1	91.7	93.2	86.9	92.7	90.1	-5.0
Ancient History	32.6	36.4	38.6	38.9	40.0	37.4	-4.8
Java	0.0	3.7	7.0	5.8	4.3	4.3	-4.3
Computer Animation	10.4	12.1	16.1	9.1	26.0	14.6	-4.2
Japanese	0.0	0.0	0.0	3.7	12.2	3.1	-3.1
Shakespeare	44.7	41.1	33.3	41.8	49.0	41.7	-3.0
Anthropology	2.1	5.3	5.3	10.9	13.7	7.5	-2.4
Philosophy	10.4	3.7	10.7	13.0	26.0	12.6	-2.2
Latin	2.0	0.0	0.0	5.6	6.1	2.7	-0.7
Russian	4.1	3.7	0.0	5.6	8.2	4.2	-0.1
Basic Computing	88.5	87.1	73.3	88.7	94.7	86.3	2.2
Organic Chemistry	53.2	36.8	48.2	54.5	58.0	49.8	3.4
Geography	92.5	88.7	86.9	87.3	89.7	88.9	3.6

Table 18: Percent of School Districts Offering Courses in...

Course	Quintile 1 Low	Quintile 1 High	Overall Mean	Diff
Jazz Ensemble	33.3	54.3	73.5	-40.2
Calculus	46.2	47.2	72.2	-26.0
Microbiology	0.0	6.3	26.0	-26.0
Pottery	56.3	52.9	78.1	-21.8
Algorithms	0.0	11.8	21.1	-21.1
Statistics	23.1	29.4	44.2	-21.1
Economics	62.5	75.0	82.9	-20.4
Physical Chemistry	53.3	52.9	73.5	-20.3
French	20.0	8.8	39.0	-19.0
Orchestra	7.1	8.8	24.5	-17.4
Environmental Science	66.7	76.5	83.2	-16.5
Pre-Calculus	73.3	75.0	89.4	-16.1
Geology	7.1	12.1	22.2	-15.1
Visual C/C++	0.0	2.9	14.8	-14.8
Astronomy	14.3	18.8	25.7	-11.4
HTML Programming	21.4	20.6	32.1	-10.7
Spanish	87.5	88.9	95.7	-8.2
German	46.7	20.6	54.3	-7.6
Vocal Elective	75.0	67.6	82.6	-7.6
Drawing	82.4	76.5	90.0	-7.6
Painting	82.4	80.0	89.3	-6.9
Ancient History	30.8	33.3	37.4	-6.6
Sociology	62.5	50.0	67.4	-4.9
Java	0.0	0.0	4.3	-4.3
Japanese	0.0	0.0	3.1	-3.1
Art History	37.5	27.3	40.4	-2.9
British Literature	35.7	22.9	38.5	-2.8
Latin	0.0	2.9	2.7	-2.7
Anthropology	7.1	0.0	7.5	-0.4
Computer Animation	14.3	8.8	14.6	-0.3
Macroeconomics	12.5	0.0	11.8	0.7
Philosophy	14.3	8.8	12.6	1.7
World History	92.9	81.8	90.1	1.8
Geography	94.1	91.7	88.9	5.2
Microeconomics	20.0	2.9	13.7	6.3
Shakespeare	50.0	42.4	41.7	8.3
Russian	13.3	0.0	4.2	9.1
Basic Computing	100.0	82.9	86.3	13.7
Organic Chemistry	68.8	45.2	49.8	19.0
Drama/Theater	86.8	52.8	65.9	20.9

Other Extra- or Co-Curricular Activities

School superintendents were also asked if their districts participated in a variety of extra- and co-curricular activities. Table 19 shows that small districts were less likely to participate in the state One-Act Play competition and much less likely to offer advanced placement courses, but only slightly less likely to offer vocal and instrumental lessons.

Table 19: Percent off School Districts that offer...

Program	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5	Total	Diff
State One Act Play	51.9	64.6	82.3	87.7	88.9	75.3	-23.4
Vocal Lessons	75.0	73.4	85.5	87.7	75.0	79.5	-4.5
Advanced Placement Courses	29.6	45.3	56.5	69.2	98.2	59.9	-3.0
Instrumental Lessons	96.4	100.0	98.4	96.9	96.5	97.7	-1.3

Table 20 demonstrates that small districts with low referendums are significantly less likely to offer advanced placement courses, participate in the state One-Act Play competition, or offer vocal or instrumental music lessons.

Table 20: Percent of School Districts Offering Courses in...

Course	Quintile 1 Low	Quintile 1 High	Total	Diff
Advanced Placement Courses	12.5	36.8	59.9	-47.4
State One Act Play	50.0	52.6	75.3	-25.3
Vocal Lessons	56.3	82.5	79.5	-23.2
Instrumental Lessons	87.5	100.0	97.7	-10.2

Staffing

Superintendents were asked to rate the difficulty that they faced both in hiring new teachers and retaining existing staff. Tables 21 and 22 show that superintendents in small districts found it much more difficult to recruit and retain teachers. Over 25 percent of small school districts (compared to 0 percent in the largest school districts) reported having a much more difficult time than the state average in attracting teachers.

Table 21: Percent of Superintendents Indicating that Attracting New Teachers is ... than the State Average (All Districts).

	1st Quintile	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile
Much Less Difficult	2.0	9.5	0.0	11.5	24.6
Slightly Less Difficult	11.8	11.1	19.4	26.2	47.4
About Average	25.5	23.8	37.1	44.3	24.6
Slightly More Difficult	35.3	30.2	35.5	16.4	3.5
Much More Difficult	25.5	25.4	8.1	1.6	0.0
Mean	3.71	3.51	3.32	2.70	2.07

Table 22: Percent of Superintendents Indicating that Retaining Teachers is ... than the State Average (All Districts).

	1st Quintile	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile
Much Less Difficult	5.9	9.5	4.8	16.1	26.3
Slightly Less Difficult	31.4	19.0	24.2	32.3	43.9
About Average	33.3	33.3	35.5	29.0	21.1
Slightly More Difficult	17.6	23.8	32.3	17.7	8.8
Much More Difficult	11.8	14.3	3.2	4.8	0.0
Mean	2.98	3.14	3.05	2.63	2.12

The situation is even more difficult for superintendents in small school districts with low referendums. In those districts, 40 percent of the superintendents indicated having a much more difficult time hiring new teachers than the rest of the state. Only 19.4 percent of similarly sized districts with high referendums reported the same problem.

Table 23: Percent of Superintendents Indicating that Attracting New Teachers is ... than the State Average (1st Quintile Only).

	Quintile 1 Low	Quintile 1 High
Much Less Difficult	0.0	2.8
Slightly Less Difficult	13.3	11.1
About Average	13.3	30.6
Slightly More Difficult	33.3	36.1
Much More Difficult	40.0	19.4
Mean	4.00	3.58

Table 24: Percent of Superintendents Indicating that Retaining Teachers is ... than the State Average (1st Quintile Only)

	Quintile 1 Low	Quintile 1 High
Much Less Difficult	6.7	5.6
Slightly Less Difficult	20.0	36.1
About Average	33.3	33.3
Slightly More Difficult	13.3	19.4
Much More Difficult	26.7	5.6
Mean	3.33	2.83

Effects of Changes Made in the 2001 Legislative Session

A few significant changes in education funding were made during the 2001 legislative session. Two of the most important changes were 1) a $415 per-pupil transfer from the referendum, supplemental, and transitional categories into the basic formula allowance, and 2) the adoption of a new two-tiered equalization formula for all districts.

The $415 per-pupil transfer shifts revenues in each district from the referendum, supplemental, and transitional categories into the basic formula. Districts with combined referendum, supplemental, and transitional revenues less than $415 per pupil will net gains in revenue for fiscal year 2003. For example, if a district only had combined referendum, supplemental, and transitional revenues of $200 per pupil, the state would nevertheless roll $415 per pupil into the district's basic formula. This hypothetical district would thus gain $215 in new revenue as a result of the transfer.

Meanwhile, districts with combined referendum, supplemental, and transitional categories in excess of $415 will have revenues transferred from these categories into the general formula. Although the referendum amounts for these districts will likely be decreased, they will experience no net increase in overall funding,

Who are the winners and losers as a result of this change? Table 25 shows the mean amount of referendum, supplemental, and transitional categories by school district size.

Table 25: Mean 1999 Supplemental, Transitional, and Referendum Revenues by School District Size

State total Average	Supplemental	Transitional	Referendum	Total Supp, Trans, and Referendum	Percent of Districts Anticipating Increased Revenue
1st Quintile	$15	$19	$552	$585	38.0%
2nd Quintile	$11	$28	$382	$421	64.7%
3rd Quintile	$9	$27	$279	$316	65.7%
4th quintile	$12	$26	$285	$322	77.9%
5th quintile	$7	$25	$544	$579	41.1%

The most recent data available for these budget categories is for the 1999 fiscal year. Based on this data, only 38 percent of the smallest districts (1st Quintile) will experience increased revenues as a result of the $415 transfer. Alternatively, nearly 78 percent of 4th quintile schools will receive additional net revenues. While smaller schools will have disproportionately larger referendums as a result of the transfer, they nevertheless will not experience the overall increases in revenues similar to the 4th quintile schools. Such trends are more likely to increase the gap in infrastructure quality rather than reduce them.

The second significant change made during the 2001 legislative session was the adoption of new two-tiered equalization formulas. With the new program, the first $126 of referendum revenue per student will be equalized using the current equalizing factor ($476,000 of market value per student). A new second tier has been added that will equalize referendum revenue per student up to $837, but at a lower equalizing factor ($270,000 of market value per student). This second equalizing cap is waived for districts that receive sparsity aid.

To determine the winners and losers of these changes in equalization will require much more study. At first glance, there appear to be some significant advantages to poor school districts that can still pass large referendums. These school districts will have a higher amount of equalized referendum available to them as the result of these changes. In addition, schools that qualify for sparsity aid (usually small schools located in remote areas) can have all of their referendum equalized.

Yet these two possible impacts are qualified by at least two other factors. First, the equalizing factor is substantially reduced and thus additional analysis is needed to determine what percentage of school districts have the very low Net Adjusted Tax Capacity to benefit from this low equalization rate. Second, there is a considerable question as to the ability of these poor districts to pass the large school referendums that are required to benefit from equalization. As a result, the actual impact of these changes in equalization will require further study.

A Policy Proposal to Reduce Disparity

In our earlier paper (Thorson and Edmondson 2000), we provided strong evidence that there was a measurable relationship between district size and the cost of educating students. Because state funding formulas largely ignore these differences, large disparities in the quality of infrastructure between small and large districts are now evident in a variety of different measures. What should be done to correct this problem?

Although there are many alternatives available to policymakers, we recommend that the state alter its basic funding formula to provide more funding per pupil, for example, for each district's initial 500 and 1,000 students. The state is currently scheduled to provide districts with $4,601 per student through the basic formula. Policymakers should consider increasing that amount 8 percent for each district's first 500 students ($4,969) and 4 percent for the next 500 students ($4,785 for students 501-1,000). All additional students beyond the first 1,000 in each district would be funded at the $4,601 level.

All school districts would thus benefit from this approach. More importantly, the state funding formula would reflect the higher costs of educating children in smaller districts. The results

will likely help reduce the disparities in infrastructure between the state's smallest and largest districts. Of course, the number of students and the percentages to be supplemented could be adjusted. The 8/4 proposal described above would cost approximately $77 million for Fiscal Year 2003 (less than 2 percent of total education revenue).

Conclusion

Like many other states, Minnesota funds its public schools primarily through a funding formula that provides school districts the same amount of revenue per pupil regardless of the size of their enrollment. In an earlier paper (Thorson and Edmondson 2000), we demonstrated that, similar to other areas of the economy, larger school districts incur lower costs per pupil due to savings attributed to increased efficiency derived from the economic principle of "economies of scale." The purpose of this study is to evaluate whether smaller districts, as a result of their higher costs per pupil that are not generally reimbursed by the state, experience greater hardship in the areas of infrastructure, resources, and staffing.

Based on the assessments of school superintendents statewide, we compared the infrastructure, resources, and curriculum of small and large districts in Minnesota. In most areas, the consequences of this funding gap were easy to recognize. Small districts typically had much poorer infrastructure and lower levels of resources compared to larger districts in the state. In addition, smaller districts had much more difficulty attracting and retaining their best teachers. In short, smaller districts in Minnesota are at a significant competitive disadvantage.

The disparities between small and large districts are even larger when one compares the low-referendum small districts with other school districts in the state. Because the basic funding formula does not provide adequate resources, many small districts have opted to make up this shortfall through significant local referendums. Those that cannot pass referendums for either political or economic reasons have clearly suffered even more than other small districts. This result is particularly troublesome in light of extensive findings that the quality of school facilities has a significant effect on student learning (for a complete review, see Lackney 1997).

What should be done about this problem? In our earlier paper, we suggested that the state offer additional revenues to smaller school districts in the state. Current sparsity revenue is inadequate to deal with the inequalities that exist in today's school districts. In our opinion, the state should provide resources to small districts so that they can compete with larger districts in the areas of infrastructure, resources, and teacher staffing.

Appendix A:
Survey Administered to Minnesota School Superintendents, 2001

School Infrastructure, Technology, and Staffing Survey

District # _____

Directions: For each of the questions below, please circle the answer that most closely matches the conditions of the schools in your district. Please return your survey in the enclosed self-addressed stamped envelope.

Please use the following definitions as you answer questions 1-5 and 12:

Very Sufficient:	**Meets or exceeds all** modern educational standards in the area.
Somewhat Sufficient:	**Meets or exceeds most** modern educational standards in the area.
Somewhat Insufficient:	**Fails to meet some** modern educational standards in the area.
Very Insufficient:	**Fails to meet most** modern educational standards in the area.

1. In your opinion, how sufficient are each of the following library resources in your district?

1a. Library Book Collection	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)
1b. Library Journals/Magazine Collection	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)
1c. Online Library Resources	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)
1d. Computer Technology for Library Use	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)

2. How sufficient are each of the following teaching resources in your school district?

2a. Supply Budgets for Teachers	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)
2b. Professional Development Money for Teachers	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)

3. How sufficient are the textbooks, both in regard to their age and completeness, that are used in the classrooms in your district?

3. Textbooks	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)

4. How sufficient is the amount of training provided to teachers in your district in the use of instructional technology?

4. Teacher Training in Technology	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)

5. How sufficient is the overall integration of technology into your district's curriculum?

5. Integration of Technology	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)

6. In your school district, approximately what percent of your computers are...

	0-12 Months Old (a)	**13-24 Months Old (b)**	**25-36 Months Old (c)**	**37-48 Months Old (d)**	**More than 48 Months Old (e)**	**Total (f)**
6. Pct. of Computers						**100%**

7. Approximately what percent of the classrooms in your district have Internet access?

a) K-6th grade _____ b) 7-12th grade _____

8. Many of the courses listed below are only offered in a few school districts statewide. Please circle whether or not your district offers dedicated courses in the following areas:

Social Sciences

a. Anthropology	Yes	No
b. Sociology	Yes	No
c. Geography	Yes	No
d. Economics	Yes	No
e. Microeconomics	Yes	No
f. Macroeconomics	Yes	No

Natural Sciences

u. Astronomy	Yes	No
v. Microbiology	Yes	No
w. Environmental Science	Yes	No
x. Organic Chemistry	Yes	No
y. Physical Chemistry	Yes	No
z. Geology	Yes	No

Computing and Math

g. Basic Computing	Yes	No
h. HTML Programming	Yes	No
i. Visual C/C++	Yes	No
j. Java	Yes	No
k. Algorithms	Yes	No
l. Pre-Calculus	Yes	No
m. Calculus	Yes	No
n. Statistics	Yes	No

Music and Art

aa. Orchestra	Yes	No
bb. Jazz Ensemble	Yes	No
cc. Vocal Elective	Yes	No
dd. Computer Animation	Yes	No
ee. Art History	Yes	No
ff. Drawing	Yes	No
gg. Painting	Yes	No
hh. Pottery	Yes	No
ii. Drama/Theater	Yes	No

Languages

o. Spanish	Yes	No
p. French	Yes	No
q. German	Yes	No
r. Latin	Yes	No
s. Japanese	Yes	No
t. Russian	Yes	No

Humanities

jj. Philosophy	Yes	No
kk. British Literature	Yes	No
ll. Shakespeare	Yes	No
mm. World History	Yes	No
nn. Ancient History	Yes	No

9. Does your district compete in the State One-Act Play Competition? Yes No

10. Does your district offer Advanced Placement (AP) Courses? Yes No

11. Does your district offer...

a. Individual or Small Group Instrumental Lessons Yes No

b. Individual or Small Group Vocal Lessons Yes No

12. In your opinion, how sufficient are the science labs in your district's classrooms?

12. Quality of Science Labs	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)

13. How many permanent school buildings are there in your district? Please note that for the purposes of this survey we are excluding temporary, non-attached, portable classrooms.

Number of Permanent Buildings _____

14-15. Questions 14-15 ask you to evaluate the physical infrastructure in each of your district's schools using the following definitions:

Excellent: new or easily restorable to "like new" condition; only minimal routine maintenance required.

Good: only routine maintenance or minor repair required.

Adequate: some preventative maintenance required.

Fair: sometimes fails to meet code or functional requirements; extensive corrective maintenance/repair required.

Poor: consistent substandard performance; fails most code and functional requirements; requires constant attention, renovation, or replacement. Major corrective repair or overhaul required.

Replace: Non-operational or significantly substandard performance. Replacement required.

14. Using these definitions above, please rate the overall condition of each of the permanent school buildings within your district and report the raw number that fall into each of the following categories:

Number of Schools that I rate (see definitions above) as:

	Excellent (1)	**Good (2)**	**Adequate (3)**	**Fair (4)**	**Poor (5)**	**Replace (6)**	**Total* (7)**
Overall Condition of School							

*Note: The number in the total column should equal the total number of permanent school buildings identified in Question #13.

15. Please rate each of the following systems in each of your district's permanent school building using the scale described above and report the number of schools that fall into each of the following categories:

Number of schools that I rate (see definitions above) as:

Environmental Condition	Excellent (1)	Good (2)	Adequate (3)	Fair (4)	Poor (5)	Replace (6)	Total* (7)
15ab. Heating							
15b. Ventilation							
15c. Indoor Air Quality							
15d. Acoustics for Noise Control							
15e. Physical Security							
15f. Roofs							
15g. Plumbing							

*Note: The number in the total column should equal the total number of permanent school buildings identified in Question #13.

16. Approximately what percent of the classrooms in your district are air conditioned?

Percent of Classrooms Air Conditioned _____

17. In your opinion, how sufficient are the schools in your district at meeting the functional requirements of modern educational technology in each of the following areas?

17a. Computers for Instructional Use	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)
17b. Computer Networks for Instructional Use	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)
17c. Access to Internet	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)
17d. Phone Messaging System	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)

17e. Computer Projectors	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)
17f. Television Sets	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)
17g. Interactive TV (ITV)	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)
17h. Library On-line Cataloguing	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)
17i. Photocopying	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)
17j. DVD Players	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)
17k. VCRs	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)
17l. Cable Television	Very Sufficient (1)	Somewhat Sufficient (2)	Somewhat Insufficient (3)	Very Insufficient (4)

18. Overall, how would you assess your district's difficulty ATTRACTING the state's strongest teaching candidates?

Much less difficulty than the state average (1)	Slightly less difficulty than the state average (2)	About the state average (3)	Slightly more difficulty than the state average (4)	Much more difficulty than the state average (5)

19. Overall, how would you assess your district's difficulty RETAINING your district's best teachers?

Much less difficulty than the state average (1)	Slightly less difficulty than the state average (2)	About the state average (3)	Slightly more difficulty than the state average (4)	Much more difficulty than the state average (5)

Thank you for completing this survey! Please return the survey in the enclosed postage paid envelope.

Notes

[1] Most scales used in this study are hybrids of several different surveys administered by the U.S. Department of Education.

[2] Charter schools, cooperative districts, alternative schools, schools in correctional facilities, and private schools were omitted from this analysis.

[3] We used the total number of K-12 students enrolled in the district to determine the quintile placement for each school.

[4] Defined as schools where over 50 percent of the teachers used the Internet for instruction.

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