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Analytical Tools To Ease The Burden Of School Closure Decisions

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By Thomas W. Allen

SCHOOL districts in the 1980s will continue to be hard hit by the financial pressures caused by declining enrollments, rising costs, reduced state support due to taxing limitations. The requirement to achieve balanced budgets has forced many districts to reexamine the number of needed school sites. As a consequence, many districts have been compelled to close schools and lease or sell district property.

The school closure decision is one of the most difficult a school board must make. Both economic and noneconomic factors must be considered and extensive community participation must be achieved. The first step in approaching the difficult school closure decision is gathering and analyzing the relevant factual data regarding the issue.

In recent years, the process of gathering and analyzing this factual data has been simplified by the introduction of microcomputers. Microcomputers have placed extensive computing power in the hands of district administrators. Several districts have successfully used the microcomputer to accumulate statistical information, perform enrollment projects and conduct financial analysis. This article describes how financial modeling on a microcomputer can be a significant help to school boards addressing the school closure problem.

The focus of the article is in 2 areas. First, it describes the financial model's purpose and how one can be built to assist district boards in understanding the financial consequences of school closure alternatives. It then illustrates a financial analysis process and describes how the process can assist in school closure decision making.

The Need For A Financial Model

Among the many complex and difficult issues associated with school closure are the financial consequences of different alternatives. When district boards first confront the financial issues surrounding potential school closures, they usually ask a series of questions that must be answered before any decisons can be made. These questions are:

1) If we close one or more schools, what savings will be achieved from avoiding the fixed costs at the closed school site(s)?

2) What one-time revenues would be generated if we were to sell the closed school site(s)?

3) What sort of revenue stream would be available if we were able to lease or rent the closed school site(s)?

4) If we relocate students from one site to other sites, how will this change the cost patterns at each school?

5) If we close one or more schools, how will the cost savings affect our budgeted financial condition over the next 5 to 10 years?

6) If we were to consider other cost-savings options, such as altering the student/teacher ratio, how would these actions compare to school closure in terms of cost savings?

Board members who are fully aware of their fiduciary responsibilities to their communities recognize that any decisions must be made on the basis of the best information that can be developed.

Advantages of a Financial Model

To answer these questions, it is helpful to create a financial model of the school district. A financial model does 2 things for a school board. First, it presents a financial picture of the current situation in terms of major revenue and cost items and their relationship. It also shows, over time, the financial consequences of maintaining the *status quo* or "doing nothing" with respect to school closures.

Second, and most important, it allows the school board to view the financial consequences of a wide variety of school closure options. Each of the potential school closure alternatives may then be compared to the baseline, or *status quo*.

Structuring the Financial Model. To develop a financial model, district staff first must conduct an examination of revenue and cost factors and their relationship to one another. This is most readily accomplished by reviewing monthly and annual financial statements from the past several years. From these financial statements, the district staff must differentiate between costs that are considered *fixed* and those that *vary* according to a certain level of district activity. Distinguishing between fixed and variable costs allows the district staff to analyze several actions based on different assumptions.

When identifying fixed and variable costs, a school district must consider 2 major factors. The first is the relationship of fixed and variable costs to individual school sites. Costs may be identified as fixed if they are incurred to maintain a specific school site. Similarly, costs may be identified as variable if they increase or decrease according to district-

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wide activity levels and are *not* related to specific school sites.

The second factor to consider is the time frame in which a cost is identified as fixed or variable. Over a short period of time many costs may be considered fixed because of prevailing union agreements, school district policy or external economic factors. However, as the time period lengthens more costs become variable because the school district has greater discretion in changing the costs and redirecting district priorities. Thus, when developing a financial model, a school district should consider a relatively short time frame, perhaps 5 years, so that realistic comparisons can be made.

Identifying Fixed Costs. When identifying fixed costs and determining their magnitude, district staff should assign them to specific school sites for analysis. Fixed costs include maintenance, insurance, utilities and custodial expenses since these costs must be paid if a site remains open, regardless of enrollment levels. Depending upon the allocation of administration resources, the cost of an administrator's time may be considered fixed or variable. The magnitude of the site-specific fixed costs can be obtained by reviewing schoolsite financial statements or any other district-wide cost allocation based on school sites. For example, a manager's estimate of the time spent by maintenance and custodial employee at a particular site may be used to allocate costs to each site.

Identifying Variable Costs. Once fixed costs have been identified, the second step in developing a financial model is isolating the variable costs and determining their relationship to one another. Schoolsite variable costs are those costs that rise or fall depending on the activity level of the district. They are *not* related to a specific site. Typically, districts use the average daily attendance (ADA) as the most valid measure of school district activity. Accordingly, an important step in the modeling process is determining the relationship of variable costs to enrollment.

The most significant variable cost is teacher salaries. The number of teachers required in a district is a direct result of the number of students and the distrct's student/teacher ratio. By using a district's salary schedules, it is possible to determine the average cost per teacher and thus the instructional cost per ADA. Similar analysis can determine the cost per ADA of other major variable costs such as instructional materials, teacher's aides, supplies and equipment. Variable costs at any one school site are primarily a result of the number of students at that site.

Figure 1 identifies fixed and variable costs for a typical school district. While some costs may have amounts allocated to both categories, the figure's purpose is to highlight major assumptions in school district cost allocation. When this cost analysis is complete, the district has an idea of the costs required to operate each school site at current enrollment levels.

Figure 1: Fixed and Variable Costs for a Typical School District

Fixed Costs	Variable Costs
• Custodial salaries	• Teacher salaries
• Maintenance salaries	• Administrator salaries
• Utilities	• Special teacher salaries
• Clerical salaries	• Central clerical and maintenance salaries
• Administrator salaries	• Central utilities
	• Instructional supplies
	• Central administration expenses

Projecting Costs. The next step is projecting costs into the future. Developing such a projection involves making assumptions about inflation levels, enrollment levels and student/teacher ratios. To make the model as realistic as possible, several different rates should be used to account for the different inflationary expectations among salaries, utilities and other nonsalary costs such as instructional supplies. Once this is completed, the district has a financial model of the current situation available and a picture of the financial consequences of maintaining the *status quo* and "doing nothing" with respect to school closure.

Asking the "What If" Questions. In conducting an alternatives analysis, the district can receive major benefits from automating its financial model. Automation allows the district to examine the financial consequences of a series of alternative school closure scenarios quickly and consistently. By rapidly performing a variety of interrelated calculations, the model may be used as a tool to answer "what if" questions.

To answer "what if" questions, the district must define the scenarios it wishes to examine and make assumptions regarding the actions it would take. For example, if a district wants to analyze the financial consequences of closing School A, it must decide where School A's students would go. School district variable costs tend to follow the students and it is important to make assumptions regarding student reassignment in the event of a school closure.

A microcomputer may greatly assist in forecasting enrollment levels at each site over a 5 to 10 year period for each school. Figure 2 shows student relocation by class for 11 possible closure scenarios in a typical school distrct. Of the 11 closure scenarios shown, 6 represent the closure of one site while 5 represent the closure of 2 sites.

Using this pattern, the student enrollment at each school site can be calculated for each scenario. Figure 3 is an example of the calculation results. The figure indicates the number of students attending the remaining schools after closing one school (Barrow) as seen by scenario 1. The baseline enrollment at each school without a school closure is shown as well as the total district enrollment. The data for the subsequent scenarios reflects student relocation while maintaining the same total district enrollment. As schools are closed, the district's overall ADA capacity declines. The model calculates the percentage utilization of the new ADA capacity

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after a school closure.

Producing the Financial Model. Given the baseline scenario, fixed and variable costs, inflationary factors and current and projected enrollment by school site in the event of a school closure, the financial model can be built. The output of this model will present the district board with the financial results of each school closure alternative.

The model may be structured to show total district-wide expenses under each school closure scenario during the forecast period. The model can be run using different figures for inflation, enrollment and other key variables.

Figure 4 shows a representative format for displaying district-wide expenses in detail under scenario 1,—"Close Barrow". The model also may be used to show the incidence of these costs by site. The closed site, of course, would only incur "mothball" costs until sold, leased or otherwise disposed of. A representative cost statement by site is shown in Figure 5.

Depending on district circumstances, the board may want to analyze the most likely school closure scenarios or may want to evaluate each alternative. In any case, the automated financial model will display the enrollment and cost data for each site under each scenario for selected period. By reviewing the model's results, the board will have many of its financial questions answered.

Of course, the school board must recognize that the results of the financial model are only as good as its underlying assumptions. The value of the model's output will be diminished according to the extent that assumptions regarding inflation, student/teacher ratio and enrollment projections are unclear.

However, even if the board questions the underlying assumptions, it will find the model extremely useful in identifying the relative financial consequences of various school closure options. An increasing or decreasing inflation rate, for example, would change the overall results, but

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Figure 2: Assumed Relocation of Classes in the Event of School Closure(s)

Scenario	School(s) Closed	No. of Classes	Relocation of Classes to	
1	Barrow	6	Dougal	1
			Central	2
			Cypress	3
2	Central	10	Dougal	6
			Barrow	4
3	Cypress	8	Barrow	7
			Wolf	1
4	Wolf	9	Cypress	1
			Barrow	8
5	Dougal	7	Barrow	5
			Central	2
6	Nesball	15	Central	3
			Barrow	12
7	Barrow	6	Cypress	4
			Dougal	2
			Nesball	2
			Dougal	8
8	Barrow	6	Dougal	6
	Cypress	8	Wolf	8
9	Wolf	9	Cypress	4
			Dougal	5
	Barrow	6	Dougal	4
			Central	2
10	Barrow	6	Cypress	4
			Central	2
	Dougal	7	Central	1
			Wolf	6
11	Nesball	15	Dougal	10
			Central	3
			Cypress	2
	Barrow	6	Cypress	2
			Wolf	4

Figure 3: Enrollments by Site in Baseline Scenario and Scenario 1

Baseline Scenario **ADA Capacity: 3,105**

School:	Nesball	Dougal	Wolf	Cypress	Central	Barrow	Total	% of ADA Capacity Utilized
No. of Classes:	15	7	9	8	10	6	55	
Fiscal Year:								
82-83	391	158	244	209	264	145	1,411	45.44
83-84	381	146	226	199	253	132	1,337	43.06
84-85	378	141	219	195	232	129	1,294	41.67
85-86	384	140	210	198	235	141	1,308	42.13
86-87	389	138	212	202	233	138	1,312	42.25

Scenario 1: Close Barrow **ADA Capacity: 2,511**

School:	Nesball	Dougal	Wolf	Cypress	Central	Barrow	Total	% of ADA Capacity Utilized
No. of Classes:	15	8	9	11	12	0	55	
Fiscal Year:								
82-83	391	182	244	282	312	0	1,411	56.19
83-84	381	168	226	265	297	0	1,337	53.25
84-85	378	163	219	260	275	0	1,294	51.53
85-86	384	164	210	269	282	0	1,308	52.09
86-87	389	161	212	271	279	0	1,312	52.25

would most likely not change the relative rankings of each scenario.

Noneconomic Factors To Consider

The school closure model can be helpful to district boards interested in developing answers to financial questions. The model can provide information on the financial consequences of closing one or more schools. The financial result of each alternative, however, is only one factor to consider. The nonfinancial factors are equally important.

Physical Structure. The age and design of the schools is an important consideration. Older schools usually require more maintenance and are relatively more costly to operate. In addition, newer schools may be much better suited to providing education to students.

Geographic Location and Zoning Restrictions. Location is an important consideration in potential school-closure decisions. School districts must be sensitive to the educational needs of all community sectors, and must consider the transportation consequences of a closure. The neighborhood-based school's importance also must be examined. Local zoning laws should be studied to determine potential constraints on the sale of surplus school property.

Future Growth Requirements. The school district must assess the likelihood of future increasing enrollments and the resulting need for additional classroom space. In addition, the district must consider its obligation to the community to hold land for future generations.

Community Communications. In order to consider these and other noneconomic factors of community importance, the distrct should make every effort to involve the community in the decision making process. Community meetings should be held at each site to hear the concerns of the people living in the school's neighborhood. The district's decision making process and timetable must be explained to the community so residents have a clear understanding of when closer decisions will be made.

Of course, once a closure decision is made, the results must be fully explained to the community. In such instances, the computer model results can be very helpful in explaining economic factors entering into the decision process.

School Closure Analytical Process

The preceding section outlined some of the most important factors entering into the school closure decision-making process and showed how a computerized financial model of the district may be of great assistance. Figure 6 illustrates the analytical process districts may follow when considering school closures. The major steps involved in this process are:

1) *Specify the Decision-Making Time Frame.* The essential first step for any district is determining the necessary time frame for decision making. The time frame will vary depending on the timing and severity of projected future budget deficits. A district projecting continuously declining enrollment should be prepared to undertake this analytical process annually. Assuming emergency action is not required, the district should plan on spending 6 to 9 months conducting the analysis.

2) *Establish a Citizen's Advisory Committee.* An effective way to ensure community participation is establishing a Citizen's Advisory Committee to participate in the decision making process. The Committee should consist of representatives from local government, teachers, administrators, business leaders, homeowners and other interested people.

3) *Conduct a Baseline Financial Analysis.* Districts should establish a baseline financial scenario for the next 5 to 10 years. This scenario should define the projected costs by site over the appropriate time

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Figure 4. Detailed District-Wide Expenses Under Scenario 1

Scenario 1: Close Barrow

Fiscal Year:	1982-83	1983-84	1984-85	1985-86	1986-87
Key Assumptions:					
ADA Projections	1,991	1,877	1,784	1,711	1,683
Enrollment Decline %	5.19	5.73	4.95	4.09	1.64
Student: Regular Teacher Ratio	24.3	24.3	24.3	24.3	24.3
No. of Regular Teachers	82	77	73	70	69
Student: Special Teacher Ratio	178.6	178.6	178.6	178.6	178.6
No. of Special Teachers	11	11	10	10	9
Student: Administrator Ratio	362	362	362	362	362
No. of Administrators	5	5	5	5	5
Salary Costs:					
Teachers' Salaries	$x,xxx	$x,xxx	$x,xxx	$x,xxx	$x,xxx
Administrators' Salaries	xxx	xxx	xxx	xxx	xxx
Special Teachers' Salaries	xxx	xxx	xxx	xxx	xxx
Total Salary Costs	xxx	xxx	xxx	xxx	xxx
Employee Benefits	xxx	xxx	xxx	xxx	xxx
Total Salaries and Benefits	x,xxx	x,xxx	x,xxx	x,xxx	x,xxx
Other Variable Costs:					
Books and Supplies	xxx	xxx	xxx	xxx	xxx
Grounds and Buildings	xxx	xxx	xxx	xxx	xxx
Transportation	xxx	xxx	xxx	xxx	xxx
Food Services	xxx	xxx	xxx	xxx	xxx
Total Other Variable Costs	x,xxx	x,xxx	x,xxx	x,xxx	x,xxx
Fixed Costs:					
Utilities (Fixed Portion)	xxx	xxx	xxx	xxx	xxx
Grounds and Buildings (Fixed Portion)	xxx	xxx	xxx	xxx	xxx
Other Fixed Costs	xxx	xxx	xxx	xxx	xxx
Total Fixed Costs	x,xxx	x,xxx	x,xxx	x,xxx	x,xxx
Total District-Wide Costs	$x,xxx	$x,xxx	$x,xx	$x,xxx	$x,xxx
Costs Per ADA	$x,xxx	$x,xxx	$x,xxx	$x,xxx	$x,xxx

period, as well as the projected deficit or shortfall. The baseline scenario illustrates the economic consequences of the *status quo*, or "doing nothing."

4) *Determine Cost Relationships.* This task involves determining the relationships between variable costs and enrollment, as well as making assumptions about the fixed costs associated with each school site.

5) *Define Feasible School Closure Alternatives.* This step involves determining which school closure alternatives to analyze. The analytical process is easier if the alternatives are held to a minimum. For example, it may be a "given" that certain schools will not be closed under any circumstances because of their location or special facilities; and in these cases, these alternatives should not be considered at the outset. In addition, the district must decide whether to study single-site closures only or whether to consider multiple closures.

6) *Specify an Assumed Reassignment of Students.* An essential part of any school closure analysis is developing assumptions regarding student reassignment in the event of a closure. This analysis determines which schools would accept reassigned students.

7) *Forecast Enrollment by Site Over Time.* All of the preceding tasks may be performed easily without automated assistance. For multiple alternatives, the tasks are better performed using an automated schoolclosure model. For each closure scenario, the projected enrollment at each school site must be forecast over the time period of the study. This involves applying the enrollment decline rate against the reassigned school enrollments after closing one or more sites.

8) *Automate the Baseline Financial Projects.* To efficiently compare the closure scenarios to the "do nothing" alternative, it is necessary to automate the baseline financial scenario. This involves redefining the cost relationships in the school closure model. The model should be run to ensure that all calculations are performed accurately and the resulting output agrees with the previously developed forecast.

9) *Run Alternative Scenarios Through the Model.* This task uses the computer model to calculate the economic consequences of each school closure. The model should be run for each separate scenario.

Figure 5: Detailed District-Wide Expenses Under Scenario 1

Scenario 1: Close Barrow

Fiscal Year:	1982-83	1983-84	1984-85	1985-86	1986-87
Site: Barrow					
ADA	0	0	0	0	0
Total Variable Costs	0	0	0	0	0
Total Fixed Costs	0	0	0	0	0
Deferred Maintenance	0	0	0	0	0
Mothball Costs	30,500	32,940	35,575	38,421	41,495
Net Lease Revenue	0	0	0	0	0
Net Sales Revenue	0	0	0	0	0
Total Costs: Barrow	$30,500	32,940	35,575	38,421	41,495
Site: Central					
ADA	312	297	274	281	279
Total Variable Costs	536,430	543,981	534,889	584,870	618,488
Total Fixed Costs	61,577	65,632	69,983	74,656	79,679
Deferred Maintenance	12,900	0	0	0	0
Mothball Costs	0	0	0	0	0
Net Lease Revenue	0	0	0	0	0
Net Sales Revenue	0	0	0	0	0
Total Costs: Central	$610,907	609,613	604,872	659,526	698,167

(Continued for each additional site)

10) *Contrast Selected Scenarios to the Baseline.* Each closure should result in a significant cost savings to the district and an improvement over the baseline scenario. A comparison of each scenario to the baseline will reveal the projected savings.

11) *Identify All Significant Noneconomic Factors.* An important task of the school board is identifying the noneconomic factors that must be considered in the school closure analysis. This task can only be performed by the governing board since it requires judgment about the relative importance of each factor in the community.

12) *Conduct Analysis of Noneconomic Factors.* Each of the noneconomic factors must be studied to fully understand the issues involved. Each factor should be examined in light of each alternative and relative rankings should be developed. Relative rankings may use a numerical scale or a qualitative scale. The Citizen's Advisory Committee may be helpful in analyzing many of the noneconomic factors.

13) *Solicit Community Involvement.* Active community involvement beyond the Citizen's Advisory Committee is essential and should be sought throughout the analysis. At the beginning, it is important to have community members accept the underlying assumptions of the model. Community involvement is also important after the analytical work is done. At this stage, the analysis results should be fully explained to interested community members and their comments and reactions should be solicited.

14) *Make a Decision.* Once the analysis is complete and community input received and considered, the school board must make a decision regarding closure. Neither the automated model nor the community input will specify the "correct" course of action, but both can be very important in the overall decision making process.

15) *Develop an Implementation Plan.* Any school closure must be accompanied by a plan of action specifying the timetables and responsibilities for accomplishing the required steps. The timetable must be communicated to the community, so that those affected may plan

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accordingly. Those responsible for specific action steps must be aware of their responsibilities.

16) *Monitor the Financial Situation.* Another important task for the district is to continuously monitor the financial situation of the district, paying attention to the economic consequences of a school closure. Continuous monitoring is important to avoid future projected budget deficits. It also is important to determine the validity of the assumptions made in the school closure model so they may be refined prior to using the model for subsequent analysis. Finally, it is important that the district monitor savings to be sure that budgeted savings are achieved. Student/teacher ratios and other key variables must be monitored to ensure compliance with the district's plan.

17) *Repeat the Analytical Process.* The school closure analytical process is probably not a "one time" event for districts facing continued enrollment decline. The analysis should be conducted annually as a way of ensuring that the district is dealing with the financial realities of the environment in which it operates.

Conclusion

Considering potential school closures is one of the most difficult and least pleasant tasks that school boards must undertake. Under the best circumstances, the process is demanding and politically difficult.

This article has described the methodology that school districts may follow to conduct a logical and rational school closure analysis. It has shown a computerized school closure financial model can assist the process. Used together, the process and the school closure financial model can provide the best possible information to district decision makers. This information can ease, but not eliminate, the burden of the final decision regarding school closure.

Legal Aspects
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unanswered in many states. Broadly worded, vague guidelines existing in many states continue to be challenged. Additional challenges may focus on the authority of the state agencies abridging the school district's contractual powers as corporate entities. Where state legislatures prescribed some standard governing the scope and determination of administrative actions, school districts may argue that this is an unregulated discretionary action.

Public school administrators will continue to argue the wisdom of such legislation. An examination of state prevailing wage cases reflects a great reluctance by the courts to endorse the wisdom of state law. Litigating such legislation based on public policy arguments has not found a receptive hearing. Clearly, policy formulation and enactment lie within the purview of the various state legislatures.

Notes

1. This article has been adapted from S. M Goldblatt and R. C. Wood, "Financing Educational Facility Construction: Prevailing Wage Litigation," *School Law Update–1982*, ed. T. Jones and D. Semler (Topeka: NOLPE), 1983 269-293, and R. C. Wood and S. M. Goldblatt, "Prevailing Wage Litigation and the Construction of Public School Facilities in Indiana," Forthcoming.

2. M. D. Alexander and R. C. Wood, "The Financing of Educational Facilities," *Planning and Changing*, Winter 1983.

3. See e g., *Rogers v. Speros Construction Company*, 580 P 2d. 750; *industrial Community v C. & D. Pipeline*, 607 P. 2d. 383; *Baughn v. Gould & Riley*, 24 S W. 2d 436; *Kerth v. Hopkins County Board of Education*, 346 S.W. 2d 737.

4. See e.g., *Hilton v. Board of Education*, 1 N.E. 2d 166; *Male v. Renda Construction Company*, 301 A. 2d 153; *Union School District of Keene v Community of Labor*, 176 A 2d 332.

5. See e.g., *West Ottawa v. Babcock*, 309 N.W. 2d 220; *Crowley v Thornbrough*, 294 S.W. 2d 62; *Community of Labor v Danco*, 294 S.W. 2d 336; *Adams v Albuquerque*, 307 P. 2d 792

6. See e.g., *Connally v. General Construction Company*, 269 U S. 385

7. See e g, *Street v. Varney Electrical Supply Company*, 66 N E. 895; and *Shelbyville Central Schools v. Shelbyville Construction*, Decatur Circuit Court No C-82-108, (Indiana)

8. See e.g., *Board of Education of Campbellsville v Faulkner*, 443 S W 2d 853

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