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The Federated District—A Planning Model for Rural Schools

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The federated school district is a cooperative organizational alternative for low enrollment rural districts that face future enrollment decline and/or fiscal exigency. This alternative is most feasible for adjacent districts that serve small to medium size geographic areas. Salient characteristics include local elementary attendance units, small regional high schools, a governing assembly with an executive committee from existing school boards and a multiple district administrative team. The planning model uses hand or microcomputer spreadsheet calculations to simulate the organizational structure implications of cooperation among various combinations of existing elementary-secondary districts. Use of the model incorporates a rational, data-based approach into what is essentially a political process. Acceptance of an adequate federated district organization would provide a larger framework for cooperation in planning and implementation of instruction, student support, plant facility, transportation, administration and other services.

THE FEDERATED DISTRICT— A PLANNING MODEL FOR RURAL SCHOOLS

Demographic, economic and educational changes present unique challenges in planning for rural schools. Low enrollment rural districts which face further enrollment decline and/or financial exigency have three options. 1) They can do nothing—allowing educational programs and district financial condition to deterioriate until state intervention becomes necessary. 2) They can consolidate— being integrated into a new or existing larger school organization. 3) They can cooperate—working together to increase efficiency and educational program opportunity.

The federated district planning model was developed to assist rural communities that wish to explore cooperative alternatives. Developmental activities are summarized in following sections that describe 1) changes and trends to which the model responds, 2) assumptions and characteristics of a federated district, 3) planning procedures and 4) results of a simulated test.

CHANGES AND TRENDS

Research on rural school districts indicates both great diversity and common problems within state educational systems. Each planning effort requires a separate literature review to identify general state and unique local trends that affect rural schools. Many of the studies cited in this section were selected because of particular applicability to districts included in the simulated test of the federated district planning model.

1) *Some rural school districts face continued enrollment decline.* The most recent enrollment projections by the Minnesota Department of Education projected school district enrollments through 1989-90. While projections indicated a 1.3 percent increase statewide, declines of 9.2 percent in the northeast and 1.6 percent in the southwest and west central regions were projected. Seventy-six districts were expected to lose 10 percent or more of their enrollment during the 1984-85 to 1989-90 period.[1] A population projection by the State Demography Unit indicated that between 1990 and 2000, 30 rural Minnesota counties will experience population decline. During this period, numbers of people in the 25 through 39 year child bearing age group will also decline.[2] Aging and loss of population in rural counties foreshadow enrollment decline for some rural districts.

2) *The economic base for local financial support of some rural schools is eroding.* Causes and characteristics of the "farm crisis" have been studied and reported widely. Dion and Raup reported a drop of 26 percent in estimated value of Minnesota farmland from 1984 to 1985. The 1985 estimated value per acre of $686 represented a 48 percent drop from a highpoint of $1,310 per acre in 1981.[3] Stinson and Sigalla used an econometric model to assess the impact of decline in farm income in southwest Minnesota. Using the average of years 1974 through 1977, a $265 million drop in farm income produced a) a further decline of $47 million in local income outside the agricultural sector, b) a loss of 3,650 full and part-time jobs and a loss of $3.1 million in downtown property value.[4] Boody and Rivard identified second and third order social and economic effects of decreased farm income, high indebtedness and declining land value.

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Among the numerous second and third order effects they identified were tax delinquency, local budget crises and decreased tax resources—effects that have direct implications for local school financial support.[5]

3) *School districts play an important economic role in some rural communities.* An exploratory study of the economic role of school districts in six selected rural Minnesota counties found that a) school district gross payrolls ranged from 4.3 to 9.3 percent of state gross income earned in the county, b) school employee take-home pay ranged from 4.7 to 9.9 percent of county retail sales, c) district employees constituted from 1.4 to 5.2 percent of the county workforce, d) state education and property tax relief aids returned from 28.7 to 107.1 percent of income and sales taxes collected in the county and e) federal education aid returned from 1.9 to 10.1 percent of federal income taxes paid. Local realtors estimated that school closings could significantly reduce residential and commercial property valuation in some rural communities.[6] These findings highlighted the need to minimize the loss of secondary economic effects of school operations in restructuring rural districts.

4) *District "pairing" and shared superintendents are marginal organizational arrangements for some rural districts.* In 1986-87, 33 Minnesota school districts were involved in pairing arrangements. Anecdotal data indicated that a) pairing was most successful when declining districts pool students to maintain existing quality programs, b) some workable pairing arrangements are threatened financially and educationally by projected enrollment decline and c) pairing one inadequate district with another does not automatically result in an effective and efficient organizational structure. In 1987, 57 Minnesota rural school districts were involved in shared superintendent arrangements. A study of 63 shared superintendents in 21 states indicated a) financial exigency was the most frequently cited reason for sharing a superintendent (52 percent), b) most shared superintendencies involved two low-enrollment rural districts (60 percent), c) most respondents (60 percent) found multiple district administration more stressful and d) a majority (56 percent) thought that a multiple district administrative team could improve efficiency and effectiveness. Under desirable conditions, the shared superintendent can be a workable arrangement, but role ambiguity and role overload occur when there are competing community expectations and multiple problems such as fiscal crises, bargaining impasse and building programs that require much time and specialized skills.[7]

5) *Rural elementary attendance units should be local community schools.* A review of 25 studies addressing elementary school size found recommended minimum enrollment sizes ranging from 175 to 720 students. These studies assumed a school organizational structure that need not contend with low student density and therefore were not generally applicable to rural areas. One study found that school size was not an important factor in achievement when school socio-economic status and ability were controlled.[8] The research on elementary school size indicates that small graded, combination-grade or even ungraded elementary schools may require alternative delivery systems for special services, but that they would not necessarily be educationally ineffective.

6) *Secondary (grades 7-12) attendance units need to be regional high schools in some rural areas.* Enrollment size is a critical factor in high schools that use a traditional grade-level, subject-matter, classroom group delivery system. Some minimum number of students is needed to a) generate sufficient revenue for employment of specialized teachers and b) justify offering elective courses. A review of 75 studies reported recommended minimum senior high school (grades 10-12) enrollments ranging from 100 to 1,600 students. Variability in these findings was due to the nature of districts studied, educational programs offered and socio-economic characteristics of the communities served. The reviewers evaded the minimum size issue by concluding:

> School size is not absolute; it is but one of many factors related to educational quality. Good education can and does occur in schools ranging in sizes from small to large.[9]

A preliminary study of program based foundation aid found that, on the average, as Minnesota secondary enrollments drop below 374 students in grades 7-12, schools experience increasing difficulty in offering comprehensive programs.[10] A study using simulated master schedules indicated that 300 students in grades 7-12 was the minimum enrollment size for a specified comprehensive program with an "ideal" teacher licensure mix and an optimum pattern of student elective course choices.[11]

A recent Minnesota Department of Education study used an average program cost model to estimate the amounts of revenue needed to support the State Board of Education (SBE) minimum program in districts with enrollments of a half section (15 or fewer students), one section (16 to 30 students) and two sections (31 to 60 students) per grade. Among the half section districts the study found, "For all eighty-seven districts, the selected (expected) revenue is less than the model expenditure suggests." In the case of one section per grade districts the study found, "Current (expected) revenues do not appear to be sufficient to cover projected model expenditures for 40 of these 47 districts." Of 65 two-section districts, 43 (66 percent) did not have sufficient (expected) revenue to cover expected expenditures under the model. Reasons for continued financial survival of small districts with inadequate revenue included a) below average salaries, b) fewer staff than suggested by the model, c) additional revenue from locally approved levies, d) interest income, e) reduction of fund balances, f) sharing arrangements with other districts and g) not meeting SBE minimum program requirements.[12] The study did not propose a minimum secondary school size. It can be inferred from the findings that secondary schools with two sections (31 to 60 students) per grade or fewer students can expect both programmatic and financial problems in offering a basic educational program under current Minnesota school finance formulas.

Communications technology (satellite, cable and microwave television) has been proposed as an alternative to school district reorganization. No research was found on the effect of technology on minimum secondary school size. Anecdotal data indicate that a) interactive television has allowed some small schools to offer low incidence elective courses such as advanced mathematics and foreign language, b) quality televised instruction requires special preparation and production support, c) regular and widespread use is needed for cost efficiency and d) subjects areas that require student "hands-on" participation do not lend themselves to televised instruction. While communications technology offers potential for curriculum improvement it does not address the issue of adequate organizational structure.

7) *Some rural school districts are "under-administered."* Carter stated

> "... there are few areas of greater disagreement between a superintendent and board members than the number of personnel required to carrying on central office operations."[13]

Increased management expectations of local school districts during the past 20 years have included collective bargaining, modified accrual budgeting and accounting, education of all children with handicaps, monitoring learner outcomes and computerized data processing and reporting. Large districts responded to increased management expectations by employment of administrative staff such as personnel directors, accountants and other specialists. The local administrative capacity of small rural districts has remained virtually unchanged. In a literature review, Benham, Capehart, Nolley and Seawell identified the seven essential functions of the district central office as administration of a) instruction, b) business, c) staff-personnel, d) pupil-personnel, e) educational research, f) general oversight and g) school-community relations.[14] Literature included in this review was published between 1955 and 1972. The essential functions are probably still valid, but might be conceptualized differently in the light of current themes such as principals as instructional leaders, decentralized (site) management, increased competency and autonomy for teachers and school administration information systems.

8) *Adequate administrative staffing is essential for effective school organizational structures.* Without distinguishing between elementary and secondary schools, a recent staffing adequacy study reported a mean of 359.4 students per building level administrator with a range of 206 to 501 between the 10th and 90th percentiles among 204 very small (300 to 2,499 students) school districts. The same study reported a mean of 20.4 teachers per building administrator with a range from 13.5 to 29.0 between the 19th and 90th percentiles.[15] A doctoral study of 30 randomly selected Virginia public school systems with 6,000 or fewer students reported a mean of 2.631 district central office staff per thousand students. Capehart's extensive review of literature on central office staffing for small districts found 1.5 central office administrators per thousand students to be the minimum acceptable staffing ratio.[16] The most recent study of district central office staffing ratios found a mean student to district central office staffing ratios of 556.5 to 1 with a range of 233 to 948 to 1 at the 10th and 90th percentiles in a sample of 212 very small (300 to 2,499 students) districts. The data also indicated that districts with higher per student expenditures tended to employ more administrative staff.[17]

ASSUMPTIONS AND CHARACTERISTICS

Three basic assumptions undergirded development of the federated district planning model. These assumptions were:

1) Planning for cooperative organizational alternatives should be based on projected enrollments and include allowances for decline beyond the forecast period to sustain cost-efficiency and organizational stability over time. Small-scale cooperative arrangements that meet immediate needs may be short-term "band-aid" solutions that reduce stability and confidence in the school system.

2) Effective medium to long range educational planning must attempt to respond to trends and changes in the environment external to school organizations. Of particular importance are demographic trends that suggest numbers and needs of future students and economic trends that point toward future local capacity to support schools. The pilot test used base-year general fund expenditure per weighted pupil unit as an estimate of capacity to support schools. The relationship between district revenue and expenditure is more important than absolute estimates of dollar amounts in the model.

3) An adequate organizational structure is essential for representing the educational interests of rural communities and providing a vehicle for continued planning and implementation of instruction, student support services, plant facilities, transportation and administrative services. Formal organizational structure provides a framework within which individuals and groups can work together.

The goals and characteristics envisioned for the federated district included the following:

1) Small graded, combination-grade or ungraded elementary attendance units would be operated in each town; keeping children close to home, eliminating undesirably long bus rides and minimizing the loss of secondary economic effects of school operations. An elementary director/principal would supervise several attendance units.

2) The federated district would operate one or more area secondary (grades 7-12) schools of sufficient enrollment size to provide comprehensive programs and to justify employment of a full-time principal.

3) An assembly made up of elected school boards from all federated district members would be the governing body or "big school board" for the federated district. An executive committee of the assembly with representation from each member district would be established to perform routine monthly school board tasks on behalf of the assembly. The assembly and executive committee organi-

zation would provide a unified governance structure with broad participation in local control.

4) A general superintendent would a) report to the executive committee and the assembly and b) direct the activities of an administrative team with specialized skills for i) general executive oversight (planning, implementation of policy and intergovernmental relations), ii) resource management (finance, personnel and fixed assets) and iii) accountability (information systems, monitoring and reporting).

5) Regional educational service units would continue to provide instructional support, staff development, low incidence special education and similar services. Federated districts could make more effective use of regional services.

PLANNING MODEL PROCEDURES

The following steps were used in the simulated test of the federated district planning model. Adaptations may be required for use in other states. The procedures may be performed by hand calculation or with the aid of a microcomputer spreadsheet.

1. Specify the following initial federated district organizational parameters.
   a. Number of students per elementary principal.
   b. Minimum size of secondary school to be administered by one full time principal.
   c. FTE administrative staff for district central office functions.

1) General superintendent.
2) Deputy superintendent.
3) Business manager.
4) Personnel director.
5) Curriculum director.
6) Other.

   d. Level of enrollment decline beyond five-year projection not requiring organizational restructuring.
   e. Acceptable proportion of general fund revenue to be appropriated for all administration programs.
   f. Acceptable proportions of administration program appropriations for building and district central office administration.
2. Collect or calculate data for the planning model.
   a. Identify all districts that are potential members of a contiguous federated district.
   b. Estimate a base year unit cost for each building and district central office administration program identified in Steps 1a, b and c.
   c. Collect the following data for each potential federated district member:
      1) Base year enrollment in grades K, 1-6, 7-12.
      2) Five-year enrollment projections for grades K, 1-6, 7-12 (or enrollment history and census data for making the projections).
      3) Base year general fund expenditure.
   d. Calculate weighted pupil units if used for state revenue distribution.
   e. Calculate a planning projected enrollment for each potential federated district member by multiplying the decline factor in Step 1d times the year-five projected enrollments obtained in Step 2c2.
   f. Calculate planning weighted pupil units by multiplying planning projected enrollments obtained in Step 2e times student weighting factors (if used in distribution of revenue).
3. Combine potential federated districts and/or adjust parameters until organizational structure parameters in Step 1 are met.
   a. Estimate building, central office and total administration program required appropriation using a plausible trial number of potential federated district members, planning enrollment from Step 2e, ratios and FTE data from Steps 1a, b and c and estimated cost data from Step 2b.
   b. Estimate federated district general fund revenue using base year pupil unit expenditures from Step 2c3 and planning enrollment from Step 2e.
   c. Estimate general fund appropriations for all administration programs (Step 1e times Step 3b) and appropriations for building and district level administration programs (Step 1f times Step 3b).
   d. Compare estimated required federated district building, central office and total administration program appropriations (Step 3a) with available federated district allocations (Step 3c). An excess of required administration program appropriations over available allocations indicates that the organizational structure does not satisfy budgetary requirements of the parameters established in Step 1.
   e. Recycle the model with other combinations of potential federated district members and/or adjusted organizational parameters until one or more adequate and acceptable organizational structures is identified.

RESULTS OF A SIMULATED TEST

A simulated test of the federated district planning model was conducted using 20 school districts serving all or part of ten rural counties in southwestern Minnesota. The planning model was programmed into an Appleworks™ spreadsheet to facilitate changing organizational parameters and combining potential federated district members. The convenience of the spreadsheet prompted collection of additional base year descriptive data (area, 1980 U.S. Census, FTE professional staff, unappropriated fund balance, adjusted assessed valuation and bonded debt) to be incorporated into computer generated profiles of alternative federated district configurations.

The spreadsheet program made it easy to recycle the model many times using different organizational parameters and potential member districts. One limitation of the simulated test was the lack of involvement by representatives from potential member districts who would have added realistic political, vested interest and local preference dimensions. The organizational parameters used in the final run included the following:

a. Elementary student to principal ratio—500:1.
b. Minimum secondary enrollment (grades 7-12) to principal ratio—450:1.
c. One FTE central office administrators each—superintendent, business manager and director of personnel.
d. Allowance for enrollment decline beyond five-year projection—10 percent.
e. Proportion of general fund expenditure for administration—10 percent.
f. Proportion of administrative expenditure for buildings—75 percent.
g. Proportion of administrative expenditure for central office—25 percent.

The smallest federated district profile that satisfied all model parameters included eight existing districts with K-12 enrollments ranging from 142 to 568 students. Projected enrollments for these member districts would decline from 4,119 to 3,996 in the next five years. Combining base year data for these eight districts indicated that they would have had a general fund expenditure of about $11,719,000, an adjusted assessed valuation of $175,142,000, an existing bonded debt of $3,974,000 and an unreserved fund balance of $1,284,000. Were these eight districts to accept the federated district model, they would maintain an elementary attendance unit in each town, but operate no more than five regional secondary schools instead of the present eight.

Further study of federated district feasibility and policy implications are needed. The federated district planning model is, at best, a first step. An adequate organizational structure is a means toward the end of providing a framework or vehicle for aggregating and deploying financial, personnel and fixed asset resources to deliver educational services. Within the context of a federated district organization plan, subsequent supporting plans for instructional support, student support, co-curricular, food service, transportation, plant operation, debt service and other programs are necessary components of a comprehensive planning effort.

State education agency approval of local federated district plans should be required in fulfilling the state constitutional mandate for a uniform system of public schools and advancing the state's collective interest in quality education. The approval process would provide for a) enforcement of minimum standards or acceptable ranges adopted by the Legislature or the State Board of Education, b) insure that "islands" of educational deprivation would not occur between federated districts and c) provide third party review of plan feasibility.

ENDNOTES

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8. Educational Research Service, Inc., *Summary of Research on Size of Schools and School Districts.* Arlington, VA: ERS Inc., 1974, pp. 12-14.

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14. Fred G. Benham, John C. Capehart, George E. Nolley and W.H. Seawell, *Staffing the Central Office—Status and Implications.* Charlottesville: Virginia Association of School Executives, 1978, pp. 31-41.

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16. John C. Capehart, *The Organizations, Functions, and Adequacies of Central-Office Staffs of Small-Size School Systems* (Doctoral dissertation, University of Virginia, 1977).

17. Educational Research Service, Inc., *Ibid.,* p. 41.