



The relationship between community size of Montana public elementary and high school districts and selected fiscal and economic characteristics
by Eldora Burns Nielson

A thesis submitted in partial fulfillment of the requirements for the degree of Doctor of Education
Montana State University
© Copyright by Eldora Burns Nielson (1991)

Abstract:

This study investigated relationships between public elementary and high school district fiscal and economic characteristics and community size. Examination of available databases from an extremely rural state was anticipated to contribute to a better understanding of the costs, attributes, and correlations between fiscal elements of rural and small schools, and to begin to unwrap some of the myths and "common wisdom" that pervade the literature and the discussions of those schools.

Data from the 537 Montana school districts operating during school year 1988-89 were used to examine instructional expenditures, overhead expenditures, average teacher salary, taxpayer ability to support schools, local taxpayer support of schools, instructional program level (high school and elementary), and the community size of the school district.

Analyses using two-way ANOVA, multiple comparison methods, and multiple regression techniques indicated that several differences and relationships were statistically significant.

Instructional expenditures, overhead expenditures, average teacher salary, and taxpayer effort were significantly higher for the high school districts. Teacher salary level appeared to be independent of the other fiscal characteristics of this study, but showed a significant relationship to community size and instructional level. Overhead costs for school districts were highly correlated with instructional expenditures which excluded salaries and benefits.

Taxpayer ability to support schools appeared to be the only one of five fiscal variables randomly distributed and not significantly related to size of community or instructional level. However, the amount taxpayers provide to local school districts was highly correlated with the taxable valuation of the district.

The two extreme rural community size groups were significantly higher than at least one other community size group in instructional expenditures, overhead expenditures, and taxpayer effort, and significantly lower in average teacher salary. For all four of those variables, the extreme rural high school districts were significantly higher than the elementary districts.

THE RELATIONSHIP BETWEEN COMMUNITY SIZE OF MONTANA
PUBLIC ELEMENTARY AND HIGH SCHOOL DISTRICTS AND
SELECTED FISCAL AND ECONOMIC CHARACTERISTICS

by

Eldora Burns Nielson

A thesis submitted in partial fulfillment
of the requirements for the degree

of

Doctor of Education

MONTANA STATE UNIVERSITY
Bozeman, Montana

October 1991

© COPYRIGHT

by

Eldora Burns Nielson

1991

All Rights Reserved

D378
N5545

APPROVAL

of a thesis submitted by

Eldora Burns Nielson

This thesis has been read by each member of the graduate committee and has been found to be satisfactory regarding content, English usage, format, citations, bibliographic style, and consistency, and is ready for submission to the College of Graduate Studies.

10/21/91
Date

Donald L. Pearson
Chairperson, Graduate Committee

Approved for the Major Department

Oct 29, 1991
Date

Diane Mellis
Head, Major Department

Approved for the College of Graduate Studies

November 5, 1991
Date

Henry L. Parsons
Graduate Dean

STATEMENT OF PERMISSION TO USE

In presenting this thesis in partial fulfillment of the requirements for a doctoral degree at Montana State University, I agree that the Library shall make it available to borrowers under rules of the Library. I further agree that copying of this thesis is allowable only for scholarly purposes, consistent with "fair use" as prescribed in the U.S. Copyright Law. Requests for extensive copying or reproduction of this thesis should be referred to University Microfilms International, 300 North Zeeb Road, Ann Arbor, Michigan 48106, to whom I have granted "the exclusive right to reproduce and distribute copies of the dissertation in and from microfilm and the right to reproduce and distribute by abstract in any format."

Signature Eldora Burns Nielson

Date October 21, 1991

ACKNOWLEDGEMENTS

Sincere appreciation is extended to my committee: Drs. Donald Robson, LeRoy Casagrande, Duane Melling, William Hall, Robert Thibeault, and Arthur Coffin.

I also wish to acknowledge those who, over the last few years of this endeavor, contributed faith, laughter, hospitality, time, support, and endless patience. Special thanks are extended to my children who cheered, my co-workers who endured, my friends who encouraged, and my parents who evoked recollections of less complicated times. And I ask forgiveness from those who were the victims of my curtness, impatience, inattentiveness, and distraction.

My most recent memories of generous support demand that I name some individuals: Don Robson for assistance above and beyond the call of advisorship; Gary Conti for his expertise and wisdom; Nancy Keenan for space and energy; Judy Harrison for skill and serenity; and Coop, Jo, and Marlene for love, shoulders, and a pillow for a weary head.

Bless you.

TABLE OF CONTENTS

	Page
APPROVAL	ii
STATEMENT OF PERMISSION TO USE	iii
ACKNOWLEDGEMENTS	iv
TABLE OF CONTENTS	v
LIST OF TABLES	viii
LIST OF FIGURES	xi
ABSTRACT	xii
CHAPTER:	
1. INTRODUCTION	1
Historical Perspective	1
Rural Education Research Needs	7
Statement of the Problem	11
Significance of the Study	11
General Questions to Be Answered	16
Research Questions	16
Limitations of the Study	18
Definition of Terms	18
2. REVIEW OF THE LITERATURE	26
Definition of Rural	26
Optimum School Size	29
School District Isolation	32
Teacher Salaries	35
School District Financial Characteristics	37

TABLE OF CONTENTS--Continued

	Page
3. DESIGN OF THE STUDY	42
Data	42
Procedures	51
Hypotheses	54
Statistical Techniques	56
Summary	59
4. ANALYSIS OF DATA	60
Two-Way Analysis of Variance	62
Per Student Instructional Expenditures	63
Per Student Overhead Expenditures	66
School District Average Teacher Salary	70
Per Student Taxpayer Capacity	73
Per Student Taxpayer Effort	75
Summary of Two-Way Analysis of Variance	77
Multiple Regression Analysis	77
Instructional Expenditures Excluding Salaries	78
Overhead Expenditures	81
Average Teacher Salary	83
Taxpayer Capacity	86
Taxpayer Effort	88
Summary of Multiple Regression Analysis	90
5. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	92
Summary	92
Conclusions	99
Recommendations for Practice	106
Recommendations for Study	107

TABLE OF CONTENTS--Continued

	Page
BIBLIOGRAPHY	111
APPENDICES:	
A. MONTANA PUBLIC SCHOOL CATEGORIES, SCHOOL YEAR 1988-89	121
B. PROCEDURES FOR ISOLATION CLASSI- FICATION	133

LIST OF TABLES

Table	Page
1. Community size location categories for Montana public school districts	45
2. Montana foundation program funding categories for elementary and high school district ANB	46
3. Variables tested for Hypotheses 1 through 5	57
4. Variables tested for Hypotheses 6 through 10 using regression equation: $y' = b_1x_1 + \dots + b_6x_6 + a$	59
5. Distribution of sample means and represented student population for community size and instructional level, school year 1988-89	61
6. Means for per student instruction expenditures by community size and instructional level	63
7. Results of two-way ANOVA on per student instruction expenditures by community size and instructional level	64
8. Test of simple main effects to determine the interaction for each pair, comparing elementary to high school instructional expenditures by community size categories	65
9. Means for per student overhead expenditures by community size and instructional level	67
10. Results of two-way ANOVA on per student overhead expenditures by community size and instructional level	67

LIST OF TABLES--Continued

Table	Page
11. Test of simple main effects to determine the interaction for each pair, comparing elementary to high school overhead expenditures by community size categories	69
12. Means for school district average teacher salary by community size and instructional level	70
13. Results of two-way ANOVA on school district average teacher salary by community size and instructional level	71
14. Test of simple main effects to determine the interaction for each pair, comparing elementary to high school average teacher salary by community size categories	72
15. Means for per student taxpayer capacity by community size and instructional level	74
16. Results of two-way ANOVA on student taxpayer capacity by community size and instructional level	74
17. Means for per student taxpayer effort by community size and instructional level	75
18. Results of two-way ANOVA on student taxpayer effort by community size and instructional level	76
19. Summary results of two-way ANOVA (N=537) on dependent variables, by community size and instructional level	77
20. Results of multiple regression analysis: Variables in and out of the regression equation for instructional expenditures excluding salaries	80

LIST OF TABLES--Continued

Table		Page
21.	Summary of stepwise regression procedures for instructional expenditures excluding salaries	80
22.	Results of multiple regression analysis: Variables in and out of the regression equation for overhead expenditures	82
23.	Summary of stepwise regression procedures for overhead expenditures	83
24.	Results of multiple regression analysis: Variables in and out of the regression equation for average teacher salary	85
25.	Summary of stepwise regression procedures for average teacher salary	85
26.	Results of multiple regression analysis: Variables in and out of the regression equation for taxpayer capacity	87
27.	Summary of stepwise regression procedures for taxpayer capacity	87
28.	Results of multiple regression analysis: Variables in and out of the regression equation for taxpayer effort	89
29.	Summary of stepwise regression procedures for taxpayer effort	90
30.	Summary of multiple regression results for regression equation Hypotheses 6 through 10	91
31.	Montana public school categories, school year 1988-89	122

LIST OF FIGURES

Figure		Page
1.	Mean school district per student instruction expenditures by community size and instructional level	64
2.	Mean school district per student overhead expenditures by community size and instructional level	68
3.	Mean school district average teacher salary by community size and instructional level	71

ABSTRACT

This study investigated relationships between public elementary and high school district fiscal and economic characteristics and community size. Examination of available databases from an extremely rural state was anticipated to contribute to a better understanding of the costs, attributes, and correlations between fiscal elements of rural and small schools, and to begin to unwrap some of the myths and "common wisdom" that pervade the literature and the discussions of those schools.

Data from the 537 Montana school districts operating during school year 1988-89 were used to examine instructional expenditures, overhead expenditures, average teacher salary, taxpayer ability to support schools, local taxpayer support of schools, instructional program level (high school and elementary), and the community size of the school district.

Analyses using two-way ANOVA, multiple comparison methods, and multiple regression techniques indicated that several differences and relationships were statistically significant.

Instructional expenditures, overhead expenditures, average teacher salary, and taxpayer effort were significantly higher for the high school districts. Teacher salary level appeared to be independent of the other fiscal characteristics of this study, but showed a significant relationship to community size and instructional level. Overhead costs for school districts were highly correlated with instructional expenditures which excluded salaries and benefits.

Taxpayer ability to support schools appeared to be the only one of five fiscal variables randomly distributed and not significantly related to size of community or instructional level. However, the amount taxpayers provide to local school districts was highly correlated with the taxable valuation of the district.

The two extreme rural community size groups were significantly higher than at least one other community size group in instructional expenditures, overhead expenditures, and taxpayer effort, and significantly lower in average teacher salary. For all four of those variables, the extreme rural high school districts were significantly higher than the elementary districts.

CHAPTER 1

INTRODUCTION

Historical Perspective

A convergence of industrialism and urbanization in America in the middle decades of the 19th century transformed a nation of village schools into an America of urban-industrial model schools. Cities were besieged with social and economic problems as the urban population grew from less than 700,000 to over 6,000,000 in a 40-year period from 1820 to 1860 (Tyack, 1974). The village school structure could not absorb the masses of children, and thousands were unable to attend school. Chaotic conditions demanded changes in urban educational organization, which would serve other need for change as well. The pre-industrial rural values, culture, and attitudes could be molded to serve a modern society. The immigrants who streamed into the cities could be Americanized.

Centralization of schools was seen as desirable and irreversible. As America embraced a social policy of urbanization, schooling became compulsory and a function of the state. Rural schools were considered obsolete; the future was in the cities.

The industrial model which was transforming the cities was applied to solve the urban school problems. The model proselytized quantity, order, efficiency, division of labor, punctuality, authority, precision, continuity, and standardization. By the end of the century the model was extended beyond the cities; the Commission of Twelve on Rural Schools proposed applying the urban industrial model to remedy perceived rural school problems. Rural and village schools had flexible calendars, non-standard curriculum, ungraded groups, often substandard facilities, and minimal funding (Tyack, 1974).

In an attempt to hasten the "uniformity of excellence" envisioned by John D. Philbrick, sweeping school consolidation took place in America in the late 19th and early 20th centuries. Following World War I, school consolidation and centralization efforts declined somewhat because immigration had slowed to a trickle after passage of the Immigration Act of 1924, and ruralness had gathered growing respect with the recognition of farming as a legitimate business (Tyack, 1974).

Then in the mid-1940s, following World War II, rural education issues were resurrected and the consolidation drive was renewed. Policymakers and professionals became crusaders in their drive to reduce the number of small school districts. In 1950, the United States had 83,718 school districts, in 1960 only 40,500 remained, in 1970 there were 17,995 (Sher, 1977), and by 1980 the total was reduced to 15,766 (Burrup & Brimley,

1982). David Tyack (1974), education historian, noted, "In their diagnosis and prescription, the rural school reformers blended economic realism with nostalgia, and efficient professionalism with evangelical righteousness" (p. 199). The rural communities passionately resisted the consolidations of their schools, fearing a loss of community as they knew it. The rural cycle and economy were based on nature, not time; on broad responsibilities, not specialization; and on the family and locality, not the state.

Little empirical research exists to support either the evangelists of consolidation or the resisters. "Common wisdom" assumed the benefits of larger schools; "rural values" presumed the superiority of a traditional system. A report issued by the National Institute of Education (1985, p. 14) stated that "there has not been a sufficient database to argue rationally the pros and cons" of consolidation. Rincónes (1988) indicated there was no compiled information to establish that consolidation solved any of the problems for which it was advocated, whether for fiscal, economic, or curriculum reasons. Research into comparisons of the actual costs, savings, and educational benefits associated with either a rural or an urban model is almost nonexistent.

Despite the fact that research does not document the benefits nor acknowledge the liabilities of school consolidation, Jonathan Sher suggested that consolidation was the most successfully implemented education policy of the last 50 years:

Indeed, one of the great ironies of American rural education is that problems resulting from policies of neglect seem to be exceeded only by the damage wrought by policies of active reform. (Sher, 1977, p. 272)

In the 1980s, the consolidation debate continued, but with less vigor. William Chance (1986) observed that consolidation proposals in the 1980s in Illinois and Washington generated a storm but were received by the legislatures "with enthusiasm given a dead mouse in a soup bowl" (p. 156). Proposals for consolidation or unification of districts in the 1987 Montana legislative session attracted hundreds of opponents from rural schools, in the 1989 session a single forced-unification proposal met a quiet demise, and in the 1991 session a proposal to combine elementary and high school districts with the same boundaries through voluntary "attachment" of districts elicited consensus and passed easily through both chambers (Montana House Education and Cultural Affairs Committee, 1987, 1989, 1991).

New challenges faced rural schools in the 1980s. Brown and Deavers (1988) pointed out that economic stress was felt throughout rural America. Extractive resource industry production declined; rural unemployment increased. Rural businesses closed; property values declined. The recession in America in the early 1980s was accompanied by drought; rural banks failed, many farmers left their land. This rural exodus was different from earlier ones (Richter, 1986). The major displacement occurred among the young and well-educated, not the poorly-educated tenant farmers as in earlier years. Rural Americans saw their children leaving and tax bases

shrinking. Rural schools were impacted with declining enrollment, higher costs per student, and shrinking tax bases with which to raise additional school funding. State governments also felt the fiscal stress, and taxpayer revolts resulted in tax freezes in several states. Funds were unavailable at the state level to assist school districts in distress, further impacting the inability of school districts to reinforce school budgets with local funding.

At the same time schools were struggling with fiscal burdens, they were also being pressured to improve educational programs. The quality of American education was strongly criticized in major reports: *The Paideia Proposal* — Adler, 1982; *High School: A Report on Secondary Education in America* — Boyer, 1983; *A Nation at Risk* — The National Commission on Excellence in Education, 1983; and *A Place Called School* — Goodlad, 1984. However, many rural districts did not have the financial resources to revamp programs. Data from a 17-state sample were used by the Northwest Regional Laboratory in Portland to project that 28% of small, rural school districts were poor in terms of family wealth, per pupil expenditure, and student achievement indicators (National Rural, Small Schools Task Force, 1988).

Rural education received some positive attention in the 1980s, however. The United States Department of Education adopted a policy to provide rural schools with an equitable share of the information, services, assistance, and funds available through the Department of Education (Bell, 1983). In 1983,

the National Center for Education Statistics (NCES) began to compile data separately for schools of less than 300 students. Prior to that time no attention was given to data from small schools. Federal funds also were made available for regional educational laboratories to explore issues in rural education and search out promising practices in rural schools (Barker, 1985). The National Rural, Small Schools Task Force (1988) reported that technical assistance could be useful in helping rural schools solve their own problems.

America became an urban nation, but rural America did not cease to exist. At one time cities subsidized the larger rural population needs with government services, processing of raw materials, cultural activities, etc. Now rural America subsidizes economic and aesthetic needs of the greater urban population with food, mining, fishing, forestry, skiing, scenery, mountains, lakes, and parks. Rural has not become obsolete. Transporting rural America's children to larger schools does not diminish the physical distances nor increase the sparse rural populations.

What are the effects of schooling on students in sparsely settled rural areas? Are there economic differences between rural and urban school districts? If differences exist, what contributes to those differences? What size school appears to be too small? What size appears to be too large? Are urban schools more effective than rural schools?

Rural Education Research Needs

Answers to questions about rural education are difficult to locate. The research is replete with requests for increased studies in rural education. The literature is sprinkled with negative descriptors of rural education research: startlingly inadequate, limited, non-additive (Barker, 1985); not sufficient, little useable data (National Institute of Education, 1985); poor quality (McIntire, 1989); rhetoric, minuscule supply of competent studies (Sher & Schaller, 1986).

Barker and Stephens (1985, p. 4) presented the nine rural education areas identified by the National Rural Education Association (NREA) for increased research:

- (1) rural school effectiveness,
- (2) staff development and professional support,
- (3) curriculum and instruction,
- (4) taxonomy of rural education,
- (5) federal, state, and rural policies,
- (6) rural school finances,
- (7) school district governance and organization,
- (8) assessment of rural school assumptions, and
- (9) role of the school in rural development.

Barker and Stephens concluded that all nine areas were inadequate to provide policymakers with data analysis for decisions.

The McREL Rural Education Project (National Institute of Education, 1985) sought to address the fourth and ninth items on the NREA's agenda

by attempting to identify unique characteristics of small, rural schools and to develop the capacity of the community. The project report observed that economies of scale have not been documented, and little usable data are available to assist in knowing about rural schools. The report concluded that the database was not sufficient to argue rationally the values of various practices.

Another rural education group, a national intra-agency Committee on Rural Education, listed their priorities for research in the rural setting: (1) relationship of major issues to geographic isolation, inadequate resources, and sparse population; (2) more effective transportation, richer curriculum, and improved support services; and (3) the use of technology (Barker, 1985).

Individual rural education researchers also listed research areas they felt were inadequate. McIntire (1989) suggested five topics which need additional research: (1) equity in rural education; (2) effective school research looking for models for rural education; (3) information that can be obtained from large available databases; (4) the use of context as a variable, rather than just content orientation; and (5) the need for more comparative studies. Marshall (1986) called attention to the need for research to distinguish between ruralness and smallness, and the effects of distance and isolation on programs and achievement.

In 1989, Carlson felt future rural education research should focus on understanding the demographics, character, size, organization, culture, and the commitment to quality and equity of schools in an effort to identify potential explanations for the differences between schools. Twelve years earlier, rural education researchers had listed similar needs for rural education analysis (Sher, 1977). They asked for investigation of the relationship between reorganization and the costs of schools, the effectiveness of the educational process, equality of opportunity, and the well-being of the community.

Although McIntire (1989) noted an increase in the quantity of high quality rural education research, he also noted the increase in rural education research of poor quality. Barker (1985) discussed the limited value of rural education research because of insufficient definition of "rural," lack of diversity, disproportionate attention to large schools, and the absence prior to 1983 of a national database which included small schools.

Several articles suggested the need for research on optimum size of schools, rural-urban differences in student achievement, and higher education success. Studies have been performed in these areas, but the results are conflicting, confusing, and limited. The research on Montana rural education also appears to be limited. Several contributions to the literature discuss rural education, but few are research based.

In summary, research in rural education in the United States and Montana is incomplete, at best. Rural education committees, organizations, and research groups are outspoken about the lack of attention to rural education research needs, e.g., the National Rural Center in 1981, the McREL Rural Education Project and the Committee on Rural Education in 1985, and the National Rural Education Association in 1986. Individual researchers and the chairman of a national committee on rural education have called for research-based explanations for the differences between urban and rural schools, and comparative studies using developed databases (Barker & Stephens, 1985; Carlson, 1989; McIntire, 1989; Pucciano, 1987). Other studies noted the lack of research to distinguish between the effects of smallness, ruralness, distance, and isolation (Barker, 1985; Marshall, 1986; Pucciano, 1987). Sher (1977) and Barker (1985) joined others in citing the need for research that explores the finances and costs associated with school size.

The call resounds for educational research to expand the understanding of rural education. This paper will contribute to the body of rural and small school research by examining a large statewide database in search of differences or similarities in the financial and economic patterns of rural and small schools.

Statement of the Problem

The problem of this study was to determine relationships between the community size and instructional level of public school districts and selected school district fiscal and economic characteristics.

Significance of the Study

Rural schools still play a significant role in American education, although the United States has become an urban society. The National Center for Education Statistics (NCES) found that in 1989 over 38% of American public school students attended schools in localities classified as small town or rural: 22% in small towns, and 16% in rural locations (NCES, 1989). Despite the fact that nearly two-fifths of the nation's students are educated in small or rural schools, research on those schools is unavailable, incomplete, or inconclusive in nearly all cases, as pointed out earlier in this chapter. This study contributes to the rural and small school knowledge base through analysis of school district data in a distinctly rural state.

Montana is a living laboratory in which to build a small and rural school information base. In 1989, the NCES analysis of state data indicated the general population density of Montana was 5.54 and the public school student population density was 1.05 per square mile; only Alaska and Wyoming had fewer students per square mile than Montana (0.18 and 1.01,

respectively). Montana is extremely rural; in the 1987-88 school year, 76% of its public school students were enrolled in schools in small towns and rural settings, twice the national rate of 38%. Thirty-seven percent of Montana's students were in schools in small towns, and 39% were in rural locations (NCES, 1989). NCES identified the community-size location of the schools as well as the location of the students; approximately 90% of the Montana public schools were in locations classified as small town and rural, much higher than the national figure of 51%.

In addition to contributing to an understanding of Montana school districts, the value of this research will be enhanced if the findings can be compared with other states. The use of community size groupings, as defined and utilized by NCES, facilitates the application of this study to other states.

Fiscal and economic characteristics were observed separately for elementary and secondary levels in this study, because elementary and high school districts budget and report as separate entities in Montana.

Although Montana school districts are overwhelmingly small and rural, the number of districts and the diversity of district characteristics contribute to the usefulness of this study. Montana has more districts than most states where districts combine elementary and secondary levels into K-12 districts. In 1980, Montana ranked tenth among the states in the number of school districts with a total of 563 (Burrup & Brimley, 1982), and by 1989 still had

545 districts. Casual observation of the fiscal 1989 school district data (Montana OPI, 1989) easily identified district features that exhibit wide diversity. The elementary district enrollment ranged from 1 to 10,677, and the high school district enrollment ranged from 14 to 4,749 students. The taxable valuation of the school districts ranged from a low of \$103 per student to a high of more than \$5.8 million per student.

The impact of impending change in public schools cannot be assessed without a base from which to compare or anticipate results. This study examined Montana public school data from the 1988-89 school year, prior to the implementation of significant changes in Montana schools, thus taking advantage of a window of opportunity for future research. Some of the post-fiscal 1989 changes include:

- (1) A new public school foundation program implemented in school year 1990-91, which increased state school foundation program schedules for elementary school districts in funding categories 1 through 7 by 17.3%; for elementary category 8 by 27.9%, and all high school categories by 26.2% (Montana OPI, 1989).
- (2) Guaranteed tax base supplements which were available beginning in 1990-91 to school districts with below-average taxable valuation.
- (3) Implementation of new accounting standards and reporting requirements which were implemented in 1990-91.

- (4) The opportunity for elementary and high school districts with the same boundaries to combine into a K-12 district, which will take effect for school year 1991-92.
- (5) Reporting requirements for student achievement scores, grades 3, 8, and 11, which became effective for all public schools in Montana in July of 1991.
- (6) Followup studies on dropouts, transfers, and graduates which are required by the accreditation standards for all schools in 1992-93.
- (7) Revised accreditation standards for schools which include new qualitative curriculum area goals for student achievement to be phased in through the year 2000.
- (8) Revised required courses for high school graduation, which will be in effect in the spring of 1993.
- (9) An education telecommunications network, which will be developed and implemented from 1991 through 1993.

Research on the effects of the changes listed above may add significantly to the rural education information base. This study establishes a platform from which the impact of the changes may be observed.

The demand is increasing for research and data on school district fiscal characteristics. Lawsuits filed across the nation are challenging funding systems as unequitable, citing wide disparities in local wealth and

expenditures. In 1989, lawsuits were active or court orders were pending in 10 states, Montana being one of them (Mitang, 1989).

The 1989 Montana Legislature restructured the school funding system in response to a state supreme court ruling declaring unconstitutional the method of funding public school education. Following the 1991 Montana Legislative Session, which provided no additional funding to public schools and no legislation to address the remaining inequities; the plaintiffs in the 1985 lawsuit announced their intention to file a new lawsuit. Both the plaintiffs and defendants in the Montana underfunded lawsuit utilized the same database that provided data for this study. Therefore, the results of this study may complement the analyses of the parties in subsequent lawsuits.

As policymakers focus on the areas for school equalization which the lawsuits and the courts have targeted, factions develop. Rural/urban as well as wealthy/poor issues and conflicts arise. A coalition of rural Montana districts has contracted with the Northwest Regional Education Laboratory (NWREL) to examine the rural/urban cost and program differences. The data used in this study also are being examined by the NWREL researchers. The results of this study, in conjunction with the NWREL and lawsuit research, will yield a broader view of the data than could be obtained in one study. This study may provide a basis for examining school district finances and equalization issues using groupings of districts with unique fiscal

patterns. Since Montana is extremely rural, results of this study may also provide guidance in other rural settings.

General Questions to Be Answered

The information obtained from this study will be used to answer the following general questions:

- (1) Do rural school districts share characteristics that differentiate them from other school districts? What characteristics are shared? What characteristics are different?
- (2) Does the degree of local wealth affect local taxpayer effort to support schools?
- (3) Does local wealth contribute to expenditure differences between school districts?
- (4) What factors influence the level of instructional expenditures, overhead expenditures, teachers' salaries, and local taxpayer support of schools?
- (5) Can changes be predicted for fiscal characteristics of school districts based on other financial modifications?

Research Questions

This study was designed to answer the following questions to determine the relationship between the community size of elementary and high school

districts in Montana and selected school district fiscal and economic characteristics.

- (1) Is there a significant difference in per student instructional expenditures between school districts classified by community size?
- (2) Is there a significant difference in per student overhead expenditures between school districts classified by community size?
- (3) Is there a significant difference in the average teacher salary between school districts classified by community size?
- (4) Is there a significant difference in taxpayer capacity between school districts classified by community size?
- (5) Is there a significant difference in taxpayer effort between school districts classified by community size?

In addition, this study was designed to examine the relationships between selected economic and fiscal characteristics of school districts and answer the following questions:

- (6) What is the relationship of taxpayer capacity, taxpayer effort, overhead expenditures, average teacher salary, community size, and funding category to instructional expenditures?
- (7) What is the relationship of instructional expenditures, taxpayer capacity, taxpayer effort, average teacher salary, school district community size, and funding category to overhead expenditures?

- (8) What is the relationship of taxpayer capacity, taxpayer effort, instructional expenditures, overhead expenditures, community size, and funding category to average teacher salary?
- (9) What is the relationship of taxpayer effort, overhead expenditures, average teacher salary, community size, funding category, and instructional expenditures to taxpayer capacity?
- (10) What is the relationship of taxpayer capacity, instructional expenditures, overhead expenditures, average teacher salary, school district community size, and funding category to taxpayer effort?

Limitations of the Study

The study was limited in that expenditures, revenues, costs, salary, and pupil data were used as reported to the Montana Office of Public Instruction. No further verification of the data was made.

Definition of Terms

- (1) Allowable transportation costs: Those costs of transportation approved by OPI which meet the requirements set out in statute and administrative rules, and provide a statutory rate of reimbursement per mile.
- (2) Average-number-belonging (ANB): A student membership number based on student attendance and absence data for 180 pupil-instruction days and 7 pupil-instruction-related days. Regularly enrolled students count

for ANB, but full-time special education students do not. The ANB is multiplied times the foundation schedule amounts in statute to determine the foundation program funding for each school district.

- (3) Average teacher salary: The mathematical average of the reported full-time teachers' salaries for each district.
- (4) Capital outlay: Includes the costs for construction of facilities and major equipment.
- (5) Comprehensive Insurance Fund 16: The fund in which district expenditures for comprehensive insurance costs and workmen's compensation costs are reported, and are considered an overhead cost to the district.
- (6) Elementary school district: The state entity responsible for providing instructional programs for pre-kindergarten through grade 8.
- (7) Enrollment: The number of students enrolled in a school district on October 1st of a school year.
- (8) Extreme rural: A subcategory of the U.S. Census Bureau rural category, not considered isolated, determined for this study, which includes districts of fewer than 200 elementary and 100 high school students.
- (9) Extreme rural isolated: A subcategory of the U.S. Census Bureau rural category, determined for this study, including school districts of fewer than 200 elementary and 100 high school students, which are considered isolated because the schools are located 20 or more miles from another district's school.

- (10) Foundation program: The primary vehicle for providing state funding to public schools. The general fund is financed by county equalization funds, state equalization aid, and appropriations for special education.
- (11) Foundation program schedules: The financial schedule amounts provided in statute which are multiplied times the ANB of a district to determine the amount of foundation program payments to each district. The rates are scaled so that smaller schools receive more per ANB than larger schools, and high schools receive more than elementary schools.
- (12) Funding category: A classification of school districts, based on the average-number-belonging (ANB), which determines the amount of foundation program funding available for a school district.
- (13) General Fund 01: The fund where general maintenance and operational costs of a school district are reported, and state foundation program payments are deposited.
- (14) Guaranteed tax base (GTB): The state equalization assistance available to districts and counties with less than average taxable valuation per ANB.
- (15) High school district: The state entity responsible for providing instructional programs for grades 9 through 12.
- (16) Instructional expenditures: Includes school district costs for instructional activities which were reported in the fiscal 1989 end-of-year trustees report for the General Fund 01 and the Retirement Fund 14.

The instructional expenditures considered in this study included the expenditures reported by the function codes on school district trustees' fiscal 1989 reports as instruction 10, educational media 22, supportive services-instructional 20, student support 21, or student activities 34 and 35. Expenditures for capital outlay, principal and debt, judgments, and operating transfers were excluded (object codes 700 through 999).

The Retirement Fund 14 costs included employers' required benefit contributions for social security, teachers retirement and public employees retirement. These costs were not coded to specific programs, so for purposes of this study, the costs were prorated as percentages of the salaries reported in the instruction and overhead expenditures categories. If instructional salaries represented 70% of the total of the General Fund 01 object codes 100 to 199, then 70% of the retirement costs were attributed to instructional expenditures.

- (17) Instructional expenditures excluding salaries: Includes the school district costs for instructional activities, excluding salary costs, which were reported in the fiscal 1989 end-of-year trustees report for the General Fund 01. The instructional expenditures considered in this study included the expenditures reported by the function codes on school district trustees' fiscal 1989 reports as instruction 10, educational media 22, supportive services-instructional 20, student support 21, or student activities 34 and 35. Object codes 100 through 199,

personal service expenditures, were excluded. Also excluded were object codes 700 through 999, the expenditure codes for capital outlay, principal and debt, judgments, and operating transfers.

- (18) Instructional levels: The grade levels of the instructional program, either elementary (prekindergarten through grade 5) or high school (grades 9 through 12).
- (19) Large city: The U.S. Census Bureau category for a central city of a standard metropolitan statistical area (SMSA) with 400,000 or more population.
- (20) Large town: The U.S. Census Bureau category for an area that is not in an SMSA but has 25,000 or more population.
- (21) Levy amount: The amount of revenue raised by district taxpayers for funds 01, 14, and 16, and assessed against local taxable valuation.
- (22) Mid-size city: The U.S. Census Bureau category for a central city of an SMSA with populations less than 400,000.
- (23) Overhead expenditures: Includes school district costs of providing a facility and administration for the instructional program. The overhead expenditures considered in this study were reported in the fiscal 1989 end-of-year trustees' report for the General Fund 01, the Retirement Fund 14, and the Comprehensive Insurance Fund 16. The specific expenditures incorporated into the study were reported in fund 01 as function codes for general administrative services 23, building

administrative services 24, operational and maintenance services 26. Expenditures for capital outlay, principal and debt, judgments, and operating transfers were excluded (object codes 700 through 999).

The Retirement Fund 14 costs included employers' required benefit contributions for social security, teachers retirement and public employees retirement. These costs were not coded to specific programs, so for purposes of this study, the costs were prorated as percentages of the salaries reported in the instruction and overhead expenditures categories. If overhead salaries represented 30% of the total of the General Fund 01 object codes 100 to 199, then 30% of the retirement costs were attributed to overhead expenditures.

The Comprehensive Insurance Fund 16 provides for the costs of school district comprehensive insurance coverage. The costs of this fund were considered as administrative overhead costs for the district and the fund total was included as overhead expenditures.

- (24) Public school district: The school administrative unit with geographic boundaries which determine the attendance and property tax base for the schools of the district. In Montana the elementary and high school districts are separate.
- (25) Retirement Fund 14: Includes costs of employers' required benefit contributions for social security, teachers retirement and public employees retirement.

- (26) Rural: The U.S. Census Bureau category for an area with a population of 2,500 inhabitants or less.
- (27) School locale classification: Groups school districts into U.S. Census Bureau categories based on the size of the community where the schools are located.
- (28) Small rural: A subcategory of the U.S. Census Bureau rural category, determined for this study, which includes those districts not classified as extreme rural or extreme rural isolated.
- (29) Small town: A U.S. Census Bureau category for an area with less than 25,000 and more than 2,500 population.
- (30) State equalization aid: Includes the moneys deposited in a state special revenue fund to support the foundation program.
- (31) Taxable valuation: The assessed property value of a school district against which mill levies are assessed for purposes of raising revenue. The value of one mill is 0.001 of the taxable valuation.
- (32) Taxpayer capacity: Reflects the ability of taxpayers to raise local funds, measured by district taxable valuation divided by the student enrollment of the district.
- (33) Taxpayer effort: Reflects the application of taxpayer ability to raise local funds to supplement the other revenue sources for funds 01, 14, and 16, measured by the levy amount divided by the student enrollment of the district.

- (34) Urban fringe of large city: The U.S. Census Bureau category for an outlying area within the SMSA of the large city defined by the Census Bureau.
- (35) Urban fringe of mid-size city: The U.S. Census Bureau category for an outlying area within the SMSA of the mid-size city defined by the Census Bureau.

CHAPTER 2

REVIEW OF THE LITERATURE

Substantial testimony is available indicating that research on small and rural schools is deficient, as pointed out in the first chapter of this study. Even more evident is the lack of investigation of fiscal and economic features of schools in relationship to size, instructional level, or community. A review of the literature uncovers some of the reasons the research is sparse, and also points out the needs of the near future.

Definition of Rural:

The literature indicates that consensus has not been reached as to the definition of "rural," making it very difficult to compare studies or compile data. Rios (1988) discussed the need for a definition of "rural" in order to manipulate, sort and compare qualitative and quantitative data. In 1983, the United States Department of Education Committee on Rural Education compiled a list of definitions of "rural" as used by federal agencies in search of a definition for the Department's statement. The Committee members discovered 31 different definitions. Their choice was a footnote:

As defined in the 1980 census, the rural population comprises all persons living outside urbanized areas in the open country or in communities with less than 2500 inhabitants. It also includes those living in areas of extended cities with a population density of less than 1000 inhabitants per square mile. (Committee on Rural Education, 1983, p. 1)

The National Rural and Small School Consortium (1986) also recognized the need to acknowledge common definitions for rural and small schools. The Consortium made the following distinctions:

Rural School District: A district is considered rural when the number of inhabitants is fewer than 150 per square mile, or when it is located in a county where 60% or more of the population live in communities of 5,000 or fewer. Operationally, most rural school districts will have an . . . enrollment of 2,000 or fewer.

Small School District: A school district is small if fewer than 2,000 students are enrolled in grades K-8 or K-12. A small school district may also house small schools. A small elementary school enrolls fewer than 350 students. A secondary school having an enrollment of 750 or fewer in any combination of grades 7-12 is considered small. A very small high school has fewer than 350 students. (National Small and Rural School Consortium, 1986, p. 2)

If the Consortium's definitions of rural and small school districts were applied to Montana schools in 1989, the "enrollment of 2,000 or fewer" would include 526 of the 537 school districts, or 98%. Additionally, 139 of the 170 high schools (82%) would be considered "very small" high schools.

The U.S. Census Bureau, in a cooperative venture with the U.S. Department of Education, assigned all public schools in the United States to one of seven locale settings. The categories were intended to describe the size and metropolitan status of the place where the school was located. Rural

was defined as "a place with less than 2,500 people or a place having a ZIP Code designated rural by Census" (NCES, 1989, p. 5).

Contrary to general belief, rural does not equate with agricultural. Nachtigal (1988) pointed out that only 29% of non-metropolitan areas have an agricultural economic base. He found rural areas to be dependent on a variety of economic bases: mining, recreation, lumbering, manufacturing, and retirement. Cousins (1983) used economic bases to group rural districts in Colorado. His groupings ranged from predominantly agricultural to recreational, ranching, railroad, commuter, and energy development rural.

Cultural diversity also abounds in rural America. In the Midwest, Anglo ethnic groups dominate; Hispanics are the growing majority in the Southwest. Blacks are dominant in the Southeast; Native Americans present chronic pockets of rural poverty in several areas (Nachtigal, 1988).

In an attempt to focus rural research efforts, Hubel (1986) surveyed rural school superintendents to determine which NREA research area data would be most useful for them. They showed the least interest in developing a taxonomy of rural schools, i.e., location, characteristics, description of rural. Evidently they know where they are even if the researchers do not.

In the past, school data gathered at a national level were compared and compiled primarily utilizing geographic region or relative wealth measures. In 1989, the NCES developed school locale clusters for comparison of statistics and programs. States were clustered on the basis of the

predominant community size of schools within each state. Montana was grouped in the Town-rural Cluster which included 10 other states: Arkansas, Idaho, Kentucky, Maine, Mississippi, New Hampshire, South Dakota, Vermont, West Virginia, and Wyoming. Using the U.S. Census Bureau definition of rural, the average rural student membership in this grouping of states was 32.8%; in Montana it was 39% (NCES, 1989).

The definitions of rural vary widely, but the common elements of rurality appear to be sparse population and distance.

Optimum School Size

Confusion also exists concerning optimum school size. In 1980, there were 15,766 school districts in the 50 states. The number of districts ranged from 1,101 in Texas to 1 in Hawaii. No relationship is apparent between population, size, and number of school districts. For example, New York had 46 school districts and Wyoming 49; Montana 563 and Alaska 52; Illinois 1,012 and Indiana 305; Nebraska 1,037 and Nevada 17 (Burrup & Brimley, 1982). A common size for school districts is not discernible.

In Montana in school year 1988-89, only 80 of 163 high school districts (49%) had enrollments over 100; only 97 of 382 elementary school districts (25%) had enrollments over 200 (Montana OPI, 1989). Although research on school size is lacking, Montana statutes penalize very small elementary

districts that are considered non-isolated by requiring local districts to provide half the revenue for the state aid program.

A recent Montana study recommended an optimum high school size. In 1982, the Montana Board of Public Education proposed that high schools with fewer than 100 students be required either to locally finance a portion of state aid if the district were not isolated or to consolidate with another high school. The study included no rationale for selection of 100 as an optimum high school size, no analysis of high school costs, no survey of available facilities, and no analysis of related transportation costs.

In another Montana study, Ardys Clarke (1985) focused on the relationship between the size of Montana high schools and college success. Although she did not recommend a school size, she also presented no rationale for the size categories that were used to compare subsequent success in college.

In an evaluation of a North Carolina recommendation for small schools, Sher and Schaller (1986) observed that when many school researchers compile data, school size is often mixed with school district size, which may be very different. Sher and Schaller also referred to studies which suggested a variety of optimum size schools from "as large" as 1,000 or 1,500 to "no less than" 5,000 to an optimum of 10,000. The title of their study, "Heavy Meddle," leaves little doubt as to their sentiment about the North Carolina recommendation.

In 1975, the Vermont State Department of Education ordered consolidation of school districts into 56 supervisory unions. Stuart Rosenfeld (Sher, 1977) contended that no serious attempt was made to accumulate authoritative evidence as a basis for the consolidation decision. In fact, in the 60 years prior to the Vermont consolidation, various task forces had recommended the optimum number of districts as 18 districts, 25 districts, 12 districts, and 32 districts (twice). Rosenfeld suggested that the issues of consolidation are comparable to unanimous history, analogous to Columbus' discovery of America.

The 1971 version of the *Encyclopaedia of Education* illustrated the acceptance of a "common wisdom" related to optimum school size. Reorganization of small districts into large ones was supported with the statement that small schools couldn't supply the education Americans want for their children, and clearly indicated that large schools have higher quality programs than smaller ones. The *Encyclopaedia* observed that an effective administrative unit should have at least 3,500 students, but would be more economical with 20,000 to 30,000 students.

Optimum school size is often debated but the premise that bigger is better is rarely disputed. Although research on optimum size may consider economy of scale of larger schools, it rarely factors in the costs of transporting students further distances or of expanding facilities to accommodate more students. Equalization of tax bases has been the basis for determining

school district size in several states. However, Sher (1977) indicated that in states with few districts, the wealth disparities are as wide as in states with many districts.

Although studies are inconsistent, some general threads of information can be acknowledged: the smaller the school, the higher the cost per pupil and the fewer the program offerings. Arguments for optimum size stress improved education programs, yet research on achievement of students in small schools is limited and conflicting.

For years, optimum size proponents continued to pursue consolidation efforts without supportive data. By the 1980's Hobbs, Hefferman, and Tweeten (1988) felt the consolidation movement slowed because the excessively small schools had already been consolidated or the rural opposition had been effective. However, consolidation efforts are likely to be revived as costs increase, revenue continues to shrink, rural student numbers decline, and pressures to improve schooling continue.

School District Isolation

The 1971 *Encyclopaedia of Education* surmised that rural isolation had declined. Between 1922 and 1960, paved roads increased by over 500%, leading to the conclusion that supporting poor one-room elementary and small high schools permitted "a continuation of inadequate education, which reorganization would have cured" (p. 591).

Another perspective on isolation was presented by Gjelten (1978). He suggested that isolation in this era is greater than the isolation of years ago. At one time people in the United States were grouped into small communities and the sense of heritage was local; for most Americans the heritage has become broader, either regional or national. As the broader culture becomes more centralized, more urbanized, and more important to daily lives, the separation from that culture becomes more significant. Gjelten concluded that people living in remote rural communities are more isolated today than in the past because there is more from which to be isolated.

In a search for common definitions, the National Rural and Small School Consortium (1986) drafted the following definition of an isolated school:

Remote/Isolated School: A school district or school building meeting either of the definitions of small or rural schools in a location 100 or more miles from the nearest non-small school district is considered remote/isolated. (p. 2)

Any recommendation or study involving isolation is restricted by the myriad definitions of "small" and "isolated." Some agreement must be reached as to an optimum sized district or an isolating distance before determining that it is of inefficient size or too small. Bass (1990) and Verstegen (1990) both discussed the complexity of determining isolation and of the unique circumstances and needs of each state.

Bass (1990) reviewed a variety of criteria for defining isolation. Most of the definitions use density of population or distance to the nearest neighboring school. Montana's distance criterion for isolation of school districts (as

found in *Montana Codes Annotated*, section 20-9-305, MCA, and Administrative Rules of Montana 10.30.102) is for a school to be more than 20 passable miles from "another operating school(s) with room to accommodate applicants' students (Montana, ARM, 1990)." Comprehensive rules for Montana school isolation status are presented in Appendix B. Schools in the smallest funding categories (<10 elementary and <25 high school) must apply for isolation status, and elementary districts are penalized for non-isolation status by being required to provide, at the local level, half the revenue for the state foundation program. No penalty exists for small high schools that are non-isolated. In the 1989-90 school year, 50 of the 58 elementary districts with fewer than 10 students were considered isolated, as were 2 of the 5 high school districts with fewer than 25 students (Nielson, 1990).

Dunne and Carlsen (1981) and Davis (1987) found that teachers' concerns about isolation do not refer to the school district itself. Nearly 80% of the teachers in rural or small schools grew up in rural or low population areas, and prefer teaching in those settings. However, they feel a personal and a professional isolation.

Marshall (1986) pointed out the lack of research on the effects of isolation on school district programs, and the literature concurs with his observation. A review of the research on isolation indicates some examination of the effect of personal and professional isolation and the difficulties of

defining terms, but rarely involves the impact of isolation on learning, programs, and expenditures.

Teacher Salaries

Nachtigal (1988), commenting on an NEA survey, noted the increasing disparity in teacher salaries between rural and urban districts. Some studies indicated teacher salaries as predictors of student achievement level. When Biniaminov and Glasman (1983) attempted to build a model showing the effect of input variables on public school student achievement, most results were inconsistent and divergent. The only characteristic that demonstrated a consistent positive effect on student achievement was higher annual teacher salaries. If the salaries of teachers in rural districts are low and getting lower, as indicated by Nachtigal and the NEA surveys, a relationship between teacher salary and student achievement might be expected in other studies.

A disparity also exists between teachers' salaries by instructional levels. In the 1988-89 school year, the average statewide Montana teacher's salary was \$24,421 (Montana OPI, 1989), but was \$23,823 for elementary teachers and \$25,707 for high school teachers, a difference of \$1,884 (7.9%). The Montana differences are slightly lower than national differences. The average 1988-89 public school teacher's salary nationally was \$29,563 (National Education Association, 1991), and the difference between

elementary and high school salaries was \$1,222 (4.2%). The National Education Association (NEA) has pointed out that statewide averages hide as much as they reveal at the state level, and that differences in salary levels between elementary and secondary teachers result from factors that vary from state to state and district to district, adding that "it should not be assumed that elementary classroom teachers are paid more or less than secondary teachers strictly on the basis of what grade level they teach" (NEA, 1991, p. 18). Traditionally, female teachers have done more "stopping out" of the teaching force for family reasons, and when they return to the workforce they may be several steps down the pay scale from male counterparts who have not interrupted their teaching careers.

Montana's teachers are predominantly female. At the elementary level, 75% of the teachers are female, although only 37% of the high school teachers are female (Montana OPI, 1989). Those percentages are lower than national data reported by NEA (1990) showing 85% of elementary and 53% of high school teachers are female.

The American Federation of Labor (Nelson, 1989) ranked the 1988-89 average salary of Montana teachers as 41st in the nation. When adjusted for cost-of-living index, Montana ranked 36th. However, when compared to 1988 per capita personal income, the average Montana teacher salary ranking moved to 14th in the nation. Finally, when compared to 1988 annual earnings in the private sector, the Montana teacher's salary jumped all the way to 8th in the nation.

Salaries and benefits represent a major portion of school district expenditures as pointed out by Dunne and Carlsen (1981) and Jewell (1990). Jewell also found that more than 63% of the variation in average expenditures is accounted for by variations in average teachers' salaries, but was unsure which factor drove which, i.e., salary level or available resources.

School District Financial Characteristics

Jewell (1990) identified fiscal variables within 51 systems of public education in the United States — the 50 states and the District of Columbia. He concluded that only a few of the variables have truly profound effects upon the allocation of resources within public schools. Those included per pupil expenditures, per capita income, taxpayer effort, and average teachers' salaries. His study indicated that the major variations in per pupil expenditures were due in large part to two factors. The ability to pay accounted for more than 60% of the variation, and when taxpayer effort was added to the equation, 80% of the variation could be explained.

Public schools are dependent on property taxes. Nachtigal (1988) reported school revenue as basically derived from state aid and local property taxes (50.9% and 30.2%, respectively). The state of Montana exceeded those levels in 1988; school district revenue was approximately 54.3% state aid and 42.0% local property taxes (Montana OPI, 1989). Montana had no sales tax and relied heavily on property and mineral

revenues; Montana property tax revenue per capita exceeded the U.S. average by 55%, ranking 5th in the nation in 1988 (Advisory Commission on Intergovernmental Relations, 1989).

The Advisory Commission on Intergovernmental Relations (ACIR, 1989) provided biennial reports on fiscal capacity and effort of each state to quantify the relative fiscal positions of each state. The Commission defined fiscal capacity as the "relative per capita amounts of revenue states would raise if they used representative tax and revenue systems," and fiscal effort as "the ratio of actual revenues to estimated capacity" (p. 3).

Fiscal capacity measures the potential for raising revenue; fiscal effort measures the degree to which the fiscal capacity is actually utilized. The measure of effort reflects a philosophy regarding the need for the services and an attitude regarding responsibility. Research Associates of Washington (1988) also provide periodic reports on state financing as a relative comparison with other states. They concentrate on state profiles of higher education funding, and include in their model the independent factors of state tax capacity and tax effort, derived from tax base and revenue data.

Approximately 85% of 1988-89 Montana public school revenue, including both the local school levies and the state foundation program, was obtained from property taxes (Montana OPI, 1989). A major portion of that revenue was used to fund the state school equalization program. In the 1985-86 school year local revenues financed nearly 45% of the Montana public school general fund

budgets (*Helena Elementary School District et al. v. State of Montana et al.*, 1989), a figure presiding Judge Loble found inequitable because of a wide disparity in taxpayer ability to support education.

Lawsuits filed across the nation are challenging funding systems as inequitable, citing wide disparities in local wealth and expenditures. In 1989, lawsuits were active or court orders were pending in Kentucky, New Jersey, Montana, North Dakota, Connecticut, Alaska, Minnesota, Oregon, Tennessee, and Texas (Mitang, 1989). The Montana underfunded schools lawsuit was filed in 1985, and in February of 1989, the Montana Supreme Court upheld a lower court ruling which found the Montana system of funding public schools to be inequitable and therefore unconstitutional (*Helena Elementary School District et al. v. State of Montana et al.*, 1989). After long and difficult deliberation, and a special legislative session in 1989, a new funding system was devised for Montana. The restructured foundation program (including enlarged permissive levies guaranteed tax base aid, and revised tax policies) was designed to provide a more equitable system of funding Montana public schools.

Legal briefs filed in conjunction with Montana's school funding lawsuit (*Helena Elementary School District et al. v. State of Montana et al.*, 1989) cited disparities in per student expenditures and taxpayer wealth. Judge Loble, in his opinion and order, addressed the equalization of school district costs associated with general operations and maintenance, retirement, transportation, and construction of school facilities.

Financial resources are but one indicator of public school health. Kaagan and Coley (1989) pointed to fiscal resources as one of three primary input components in education; the other two are student and teacher characteristics. Policy decisions cannot control for the student and teacher characteristics, but can direct financial resources. Those researchers considered it essential that strong relationships be established among the input, process, and output factors.

The use of any statistic for policy purposes carries an implicit model of the dynamics of a system; it is better to make the model explicit and increase understanding of the statistic's significance. Ordering and examining relationships are critical if the indicator system is to reveal what leads to success or failure. (Kaagan & Coley, 1989, p. 9)

The effects of the recession in the mid-1980s and the drop in energy prices were reported to have severely impacted assessed property valuation, particularly in the energy-rich Rocky Mountain States (Richter, 1986). The impact was particularly dramatic in states with heavy reliance on the property tax. The Advisory Commission on Intergovernmental Relations (1989, p. 8) listed 10 states with the largest decrease in fiscal capacity between 1982 and 1986: Alaska, Wyoming, Oklahoma, Louisiana, Texas, Montana, North Dakota, West Virginia, Colorado, and New Mexico. The result for school districts in those states has been a shrinking tax base. The fiscal stress experienced at the state level aggravates the stress felt by many school districts in those states. Only two of the states with the greatest decrease in capacity, Montana and Wyoming, are in the most rural school district cluster as classified by NCES in 1989.

The farm recession resulted in population losses (WICHE, 1989), thus reducing the size of already small rural schools. In fiscal 1988, Montana had four high school districts enrolling fewer than 24 students in the smallest funding category. By 1989, there were eight high schools in the smallest category (Montana OPI, 1989). This loss of "critical mass" is cited as reducing schools below adequate program size (Richter, 1986), whatever "adequate" is.

Although the fiscal features of education have been compared, correlated, weighed, and ranked to evaluate schooling, very little of the measurement has included small or rural schools. Even the U.S. Department of Education did not compile data on schools smaller than 300 students until 1983 (Ellis, 1986). Researchers tend to focus on larger settings, and those who are trained in educational research are generally oriented to urban/suburban models (Dunne & Carlsen, 1981).

Burru and Brimley (1982) suggested that traditional arguments rather than research were the basis for assuming the greater economy of operation of larger school districts. Nevertheless, they stated that "most informed students of educational administration recognize some relation between the costs of education and the organizational pattern of the schools and school districts the state operates" (p. 103). They did not cite research which led them to that conclusion.

CHAPTER 3

DESIGN OF THE STUDY

This study was designed to determine if groupings of Montana school districts differed significantly, based on selected fiscal and economic characteristics. The study investigated the differences or relationships which exist between the Montana public elementary and high school districts located in different community-size settings and the quantifiable variables of school district expenditures for instruction, overhead expenditures, average teacher salary, taxpayer capacity, taxpayer effort, and funding category.

This research provides information about school districts in an extremely rural state, information which may be referenced for future Montana education studies, may be applied to rural schools in other states, or may permit prediction when the fiscal and economic characteristics undergo change. Even more significant is the contribution to a research area which has been considered woefully inadequate by major researchers.

Data

The population for this study was comprised of the 537 operating public school districts in Montana in the 1988-89 school year. An additional nine

elementary districts were non-operating and were not included. This study was designed to contribute to research on rural and small school education; therefore, statistical techniques were applied for analysis treating this population as a sample of small and rural schools in the United States. In the 1987-88 school year, Montana schools represented from 1.0 to 2.0% of the schools in the nation in each of the categories of rural, small town, and large town (NCES, 1989; Montana OPI, 1989).

The 537 Montana school districts are organized as either elementary or high school districts and were studied in those separate categories. The districts were also grouped by community size using a classification developed from U.S. Census Bureau local data by the National Center for Education Statistics (NCES) to identify individual school locations. NCES and the U.S. Census Bureau describe the size and metropolitan status of public elementary and secondary schools in the United States using seven locale designations: (1) large city, central city of a standard metropolitan statistical area (SMSA) with 400,000 or more population; (2) mid-size city, central city of an SMSA with a population less than 400,000; (3) urban fringe of large city, within the SMSA of the large city defined by the Census Bureau; (4) urban fringe of mid-size city, within the SMSA of the mid-size city defined by the Census Bureau; (5) large town, not in an SMSA but has 25,000 or more population; (6) small town, less than 25,000 and more than 2,500 population; and (7) rural, a population of 2,500 inhabitants or less.

The 1989 NCES report indicated that the school buildings in Montana conformed to five categories: (1) mid-size city (19.84%), (2) urban fringe of mid-size city (0.75%), (3) large town (3.70%), (4) small town (36.90%), and (5) rural (38.81%).

To provide a more precise examination of rural education factors for this study, the "rural" districts were divided into three subcategories: (1) extreme rural isolated, schools with fewer than 200 elementary and 100 high school students separated from other schools by 20 miles or more; (2) extreme rural, schools with fewer than 200 elementary and 100 high school students which do not fit into the extreme rural isolated category; and (3) small rural, schools in the rural locale category with 200 or more elementary and 100 or more high school students.

This study used a Montana statutory criteria of 20 miles or more from another school to define isolation of school districts in the extreme rural classification. Montana statutes require application for isolation status for the smallest funding categories of schools (<10 elementary and <25 high school). Appendix B provides the complete rules for school isolation status in Montana. Information on distances between extreme rural schools was obtained from county superintendents of schools, district superintendents, a Legislative Council study (Merrill, 1986), the 1989 OPI database, and maps of Montana. Table 1 lists the community size groupings and a description of each category.

Table 1. Community size location categories for Montana public school districts.

Category	Community Size	Description
1	Mid-size city	Central city with population less than 400,000.
2	Large town	Not a central city, but population of 25,000 or more.
3	Small town	Area with population less than 25,000 and more than 2,500.
4	Small rural	Less than 2,500 population, not extreme rural or extreme rural isolated.
5	Extreme rural	Less than 2,500 population, and district enrollment less than 200 elementary and 100 high school, and not isolated.
6	Extreme rural isolated	Less than 2,500 population, and district enrollment less than 200 elementary or 100 high school, that are separated from schools in another district by 20 miles or more.

(Sources: NCES, 1989; Montana OPI, 1989)

The instructional level categories for Montana school districts describe the program offerings of the districts. School districts are organized as either: (1) elementary districts, providing pre-kindergarten through grade 8 programs; or (2) high school districts, providing programs for grades 9 through 12.

School districts were also grouped into funding categories, which is one of the fiscal characteristics in this study. The funding categories were based on the state foundation program schedules set out in statute (*Montana Codes Annotated*, 1989). Classifying Montana school districts by funding category provides for correlation of data with prior studies, school equity

lawsuit data comparisons, and information concerning methods of grouping school districts. Montana statutes establish the categories based on a student enrollment equivalency, known as the ANB, or average-number-belonging (MCA, 1989, sections 20-9-318, 20-9-319). Table 2 lists the funding categories.

Table 2. Montana foundation program funding categories for elementary and high school district ANB.

Method of Funding	ANB Per Funding Category			
	Elementary (K-8)		High School (9-12)	
	Category No.	ANB	Category No.	ANB
base funding amount	1	1 - 9	9	1 - 24
amount per ANB	2	10 - 17	10	25 - 40
amount per ANB	3	14 - 17	11	41 - 100
amount per ANB	4	18 - 25	12	101 - 200
amount per ANB	5	18 - 50	13	201 - 300
amount per ANB	6	41 - 100	14	301 - 600
amount per ANB	7	101 - 300	15	601+
amount per ANB	8	301+		

Examination of the categories listed in Table 2 shows that overlap occurs between elementary categories 2 and 6; categories 2 and 3 include districts with 14 to 17 ANB, categories 4 and 5 overlap with 18 to 25 ANB, and categories 5 and 6 overlap with 41 to 50 ANB. Within those categories,

the request for an aide, a second teacher or a third teacher may provide differing funding for the same size school.

Table 2 also indicates that the funding scale levels out at 301 elementary students, although the largest Montana elementary district enrolls more than 10,000 students. High school funding flattens out at an enrollment level twice that of the elementary, 601 students, although the largest high school district is nearly 5,000 students, half the size of the largest elementary district (Montana OPI, 1989).

Funding category 1 (elementary) and category 9 (high school) receive a base amount of funding regardless of the number of students in those categories. Because the state school funding system in Montana recognizes the need for base funding for 9 or fewer students in the smallest elementary and 24 or fewer students in the smallest high school districts, per student costs for schools in funding categories 1 and 9 were calculated using the maximum ANB number for each category, i.e., 9 for elementary and 24 for high school districts. In some instances, two or three very small rural elementary schools are combined into one district and receive separate category 1 funding for one or more of the schools. In those instances, the divisor for per student calculations was the maximum of 9 for the school(s) with base funding in category 1, added to the other school ANB. A flat funding divisor was used for the schools listed in Appendix A in funding categories 1 and 9.

For the other funding categories, funding is provided per student on a scaled continuum. The schools in the smallest size categories receive more dollars per student than do larger schools, and the high school districts receive more than the elementary.

The 537 operating school districts are listed in Appendix A, along with the three categories into which each district was classified — community-size, instructional level, and funding category.

The other variable factors chosen for inclusion in this study were considered major economic and fiscal components of local school district finances. One of those economic factors, the district property tax base, is often a product of development, state policy decisions, and geography. The property tax base represents the ability of local taxpayers to supplement the budgets of the schools, and is measured in this study as taxpayer capacity (the district property tax base divided by the number of students enrolled in the schools of the district). The school district tax base, the local wealth, is a key factor in the lawsuits challenging public school finance systems across the country (Mitang, 1989).

The other variable factors included in this study are fiscal components subject to local decision, though they may be driven indirectly by outside forces. Local taxpayer support for schools provides a measure of the application of taxpayer capacity. For this study, taxpayer capacity is a function of school district levy revenues divided by the number of students

enrolled in the district. Teachers' salaries, measured for this study as average district teacher salary, are determined at the district level and represent a large share of the expenditures of a district (Dunne & Carlsen, 1981; Montana OPI, 1989).

Two other fiscal factors included in this study involve school district expenditures. School district budgets are locally managed and the amount expended in each area is not subject to state regulation. Since instruction is the business of the schools, instructional expenditures per student were included as a variable factor. Instruction must be supported by a facility and administrative functions; therefore, overhead expenditures per student were included as another variable factor.

Expenditure data, taxpayer information, teacher salary, enrollment figures, and funding categories for school year 1988-89 were obtained from the Office of Public Instruction database obtained from school district reports submitted to the Montana Office of Public Instruction: trustee report, budget, pupil data report, and fall report. Several researchers sought studies using existing databases (Barker & Stephens, 1985; Carlson, 1989; McIntire, 1989; Pucciano, 1987; NIE, 1985). Recent policy changes in the Montana Office of Public Instruction restructured the data input process so that information could be coordinated more easily for study. Analysis of data from years prior to school year 1988-89 would have been extremely difficult; school year 1988-89 data provided the most recent comprehensive data.

Transportation of students to and from school is also the business of schools, particularly in a rural area. Although research is also lacking in this area (Barker, 1985), transportation costs are not included in this study. The 1989 Montana Legislation mandated a study of school transportation structure and costs. The Office of Public Instruction presented a report for that study (Thomson, 1990) indicating district on-schedule costs were not uniformly reported by elementary and high school districts when those districts shared administrative services. The reimbursement methods for elementary and high school districts were disparate, and fostered decisions to receive reimbursement through the high school district rather than prorated. Consequently, the expenditure reports and the reimbursement amounts are not comparable by school district and level. It seemed inappropriate to include research factors derived from faulty data. Therefore, transportation costs are not considered in this study.

Specific school year 1988-89 data elements for each school district included: (1) foundation program schedule payments; (2) average-number-belonging (ANB) statistics; (3) NCES community-size locale classification for Montana school districts; (4) mileage between extreme rural districts; (5) taxable valuation; (6) local tax levies for the general fund, retirement, and comprehensive insurance fund; (7) enrollment as reported on October 1st; (8) reported teacher salaries; and (9) trustees' expenditures reported by accounting codes for the general fund, retirement fund, and comprehensive insurance fund.

Procedures

The following steps were taken to complete the research in this study:

Step 1. The 537 Montana operating public school districts in the 1988-89 school year were divided into four school location categories from the model used by the National Center for Education Statistics (NCES, 1989) for school locale typology: mid-size city, central cities of standard metropolitan statistical areas (SMSA) with populations less than 400,000; large town, not in an SMSA but has 25,000 or more population; small town, less than 25,000 but more than 2,500 population; and rural, a population of 2,500 inhabitants or less. Urban fringe areas for cities are within the SMSA defined by the Census Bureau.

In the 1988-89 school year, Montana schools conformed to five NCES categories: mid-size city (19.84%), urban fringe of mid-size city (0.75%), large town (3.70%), small town (36.90%), and rural (38.81%). Since the urban fringe category involved less than 1.0% of the schools, that group was included with the mid-size city category.

The school districts classified as rural were subdivided into isolated extreme rural, extreme rural, and small rural. The extreme rural subcategories include districts of fewer than 200 elementary students (approximately 22 per grade for K-8), and 100 high school students (approximately 25 students in each grade). These sizes were chosen as practical for utilization

