

A STUDY OF FACTORS AFFECTING
COSTS OF RURAL HIGH SCHOOLS
IN CENTRAL KANSAS, 1956-1957

by

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INTRODUCTION

Development of Education in Kansas

In origin and in development, the American public school system is a local institution. Beginning with the close cooperation of neighbors to provide education for their children, schools have always operated as community institutions. In legal theory however, the public school is a state institution. It is basic that the power to maintain a system of public schools is an attribute of government in much the same sense as is the police power, the power to administer justice, or the power to tax.

Although education is a function of the state, it is obvious that no state can effectively administer its entire public educational system; no state has ever even attempted to do so. In keeping with the American tradition of local self-government, the states have frequently created local subdivisions to provide and to administer the public schools.¹ Thus it is that delegated authority and responsibility, with local autonomy, are characteristics of the public school system in the United States.

The development of a public school system in Kansas has followed that of the national pattern. During the territorial period of 1854 to 1861, however, issues which were later manifested in civil strife and war delayed the establishment of a stable and permanent system of schools. As a result the responsibility for education of the children of the territory rested upon schools established independently by people within various communities. It was thus

¹National Education Association. Your School District, page 43. Note: The responsibility for public education in some states was placed on existing governmental subdivisions.

only natural that numerous private schools sprang up in the territory alongside public free schools.¹

At the admission of the Kansas Territory into the Union in 1861 the Nation was entering the Civil War. The Kansas Constitution provided that the legislature "shall encourage the promotion of intellectual, moral, scientific and agricultural improvement, by establishing a uniform system of common schools, and schools of a higher grade, embracing normal, preparatory, collegiate and university departments."² But during this period of internal disruption, educational interests suffered in that no uniform system of education was adopted. Under such conditions the local communities continued to make provision for education and their actions served to establish a heterogeneous system of educational institutions which could not easily be altered by subsequent legislation.³

The result was that the state established various classes and types of school districts, conferred different rights and even imposed different burdens upon the several classes. This situation however, is not unique to the State of Kansas and the courts seem to be unanimous in holding that the uniformity of a school system is not violated by any classification which is based "upon real differences and distinctions and which operates equally upon all persons or things in the same class or situation."⁴

Although the Kansas constitution specifically mentions one type of district organization, it has been left to the legislature to complete the legal framework

¹Kansas State Teachers Association. The School of Tomorrow for Kansas, revised May, 1957, page 1.

²Constitution of The State of Kansas, article 6, section 2.

³Kansas State Teachers Association. The School of Tomorrow for Kansas, op. cit., page 1.

⁴Newton Edwards. The Courts and the Public Schools, page 1.

within which this organization would function and to establish new forms of legal entities for public education in "a higher grade." It is under this authority that the legislature established rural high-school districts, community high-school districts, and the various arrangements of these two basic types.

Types of School District Organization

Public primary and secondary education in Kansas is provided through six distinct types of legal entities, each acting as a "body corporate and politic with the usual powers of a corporation for public purposes."¹ Each unit is an autonomous local subdivision created by the state solely for school purposes and operating within a legal framework established by legislative action.

Common school district is the only type of school district organization mentioned in the Kansas Constitution. It is to be noted that the legal definition of a common school district includes "all school districts except community high school districts, rural high school districts and schools located in cities of the first and second classes."² Thus the common school district is the name given to a heterogeneous class of school districts providing a variety of educational programs. Such programs include districts providing only elementary education, districts offering both elementary and secondary education, and districts organized to provide for grades one through nine. All common school districts may provide for kindergarten education and some may offer a high school extension (Junior College) program. Common school districts are not necessarily coterminous with any other local governmental unit and may be organized to include territory of more than one county. In

¹This phrase is used in law in the establishment of each type of school district.
²General Statutes of Kansas, chapter 72, section 302a.

third class cities, this type of organization will frequently serve as the "city school system" and provide an integrated administrative establishment for grades one through twelve. This type of organization thus fulfills an important requirement from the standpoint of concerned educators and state school administrators.

First and second class city school districts are basically the same and might be referred to as special cases of the common school district. The titles of such school districts actually serve as a means or basis of designating the district, classifying it, and assigning it certain powers and duties.

A first class city school district will include all the territory within a first class city together with all the territory attached to such city for school purposes. The same is true for a second class city district. Both first and second class city school districts may provide a complete educational program, from kindergarten through to high school extension.

Special legislation has enabled both first and second class city school districts to reorganize as rural high school districts; second class cities may organize as community high schools, but it is not clear as to whether or not a first class city can organize as a community high school district. In reporting for the tax year 1956 and for the school year 1956-1957, the Kansas Government Journal has shown that all but one of the thirteen first class cities were organized as first class city school districts. The single city not organized as a first class city school district was located within a large metropolitan area and was served jointly with other second and third class cities of this area by a rural high school for high school purposes, and by a third class common school district for elementary education purposes. It was also noted in this publication that of the eighty-five second class cities in Kansas, fourteen were served by rural high school districts, five cities were served by community

high school districts, and four were served by the rural high school mentioned above. All of the second class cities, with the exception of two, did retain their second class city school system to provide for elementary education.¹

A county board of education is that type of school district organization which includes all the territory of an entire county. The provisions of the act establishing this type of organization are such that they apply, upon an affirmative vote by the qualified electorate, to any county in which there is no high school except a community high school.² There was only one such organization in the state during the school year 1956-1957 and in essence this may be considered as special legislation.

Community high school districts comprise all the territory of the county which is not included in the territory of any other district maintaining an accredited high school.³ During the 1956-1957 school year there were twenty-one Kansas counties with community high schools. Community high schools provide a high school education program which may include high school extension.

It is important to note that since a community high school district includes all the territory of a county which is not otherwise included in high school districts, all of the territory of the county will be included in some high school district and will thus be subject to a direct tax for high school purposes. This fact is of great significance in that the county equalization fund is obtained from revenues received by a tax levied on all the territory within each county which is not included in a high school district.

¹"Kansas Tax Rate Book," Kansas Government Journal, January, 1958, page 25.

²Laws of the State of Kansas 1953, chapter 355, sections 1 and 2.

³Laws of the State of Kansas 1951, chapter 395, section 46.

In 1865 a township in Northeastern Kansas was authorized to establish the first public high school in the state. In 1867 the legislature provided for district consolidation and the establishment of "higher branches" and by 1869, graded common school districts were authorized to provide "extension of courses." Authorization for first and second class cities to establish high schools came in 1876 and the Township High School Law was passed in 1881. The latter was replaced by the Rural High School Law in 1915.¹

The Rural High School Law permitted organization of rural high school districts within a territory of not less than sixteen square miles. This resulted in the formation of a large number of small rural high school districts throughout the state. The fact, however, that many of the districts being formed had low assessed valuations caused the legislature in 1925 to provide that no rural high school district could be organized thereafter whose assessed valuation was below \$2,000,000. As late as the 1942-1943 school year, there were still 172 rural high school districts in existence with valuations below \$2,000,000.² Again in 1951, the legislature changed the minimum valuation required for the organization of new rural high schools when they increased this figure to \$4,000,000.³ It is doubtful, however, that this amendment provided any basic change for it might well be considered as bringing the 1925 figure up to date. This is further substantiated when it is considered that the state average assessment ratio, as computed by the State Commission of Revenue and Taxation,

¹Kansas State Teachers Association. The School of Tomorrow for Kansas, op. cit., page 3.

²Kansas Legislative Council, Research Department. The High School Problem, Publication Number 133, December, 1944, page 4.

³1955 Supplement to General Statutes of Kansas, chapter 72, article 35, section 38.

has declined from 86 percent in 1933 to 22 percent in 1957.¹

Another requirement for the establishment of a new rural high school district is that there must reside within the territory to be organized fifty children under the age of twenty who are eligible for admission to high school and who have not completed the four year course of study.² It will be observed, however, that there are numerous rural high schools with enrollment under fifty.

Like common school districts, the territory of rural high school organizations need not be coterminous with any political subdivision and can include territory of two or more counties. As a rule rural high school districts include more than one common school district, the latter providing solely for primary education. It is also possible for rural high school districts to include only parts of the underlying elementary school organizations.

The great advantage of this type of organization lies in the fact that the district can be expanded to include territory which is not in any high school district and can be used to consolidate two or more common school districts for high school purposes. It leaves common school districts which are organized solely for elementary education intact. The problem of expanding a high school district is thus reduced to reorganization of districts supporting high schools. Thus with fewer districts to be considered, the processes of reorganization are simplified.

The relative importance of the rural high school district as a type of organization both in terms of number of districts and from the standpoint of aggregate enrollment is shown in Table 1. Of the 3,175 organized school

¹State Department of Public Instruction and Kansas Association of School Boards, Twenty-Five Questions and Answers on Financing Schools in Kansas, a pamphlet, January, 1957, page 41.

²General Statutes of Kansas, chapter 79, article 29, section 38.

Table 1. Number of school districts and enrollments by type of organization for Kansas, 1956-1957.

Type of District Organization	Number of Districts		Enrollments, September 15, 1956		
	Organized	Operating	Grades 1-8	Grades 9-12	Total
Common School District					
Elementary	2,530	2,286	111,138	—	111,138
Elementary and high school	185	185	32,534	14,764	47,298
Grades 1-9	4	4	2,784	294	3,078
First Class City	12	12	89,125	28,665	117,790
Second Class City	79	79	67,310	23,229	90,539
County Board of Education	1	1	362	136	498
Community High School	21	21	—	5,550	5,550
Rural High Schools					
Boards of Education*	3	3	—	806	806
Grades 7-12	1	1	2,598	3,637	6,235
Grades 9-12	339	309	—	26,004	26,004
Total	3,175	2,901	305,851	103,085	408,936

Source: State Department of Public Instruction. Statistical Annual Reports for 1956-57, pages 1-3.

*Note: Rural high school boards of education is a title which second class cities may adopt if organized as a rural high school. Not all second class cities with rural high schools are so designated.

districts in existence during the 1956-1957 school year, 2,530 were organized solely for primary education. With four common school districts organized to offer only one year of the high school educational program, there were thus 611 operating school districts providing a complete program of high school education. Of this number 309 were rural high school districts. Rural high school districts thus constitute slightly over half of the total number of school districts offering a complete high school program.

Total enrollment in rural high schools is exceeded only by the total of enrollments in the twelve first class city school districts. Enrollment in all rural high schools, including rural high school boards of education, constitutes 29.5 percent of the total enrollment in Kansas public schools for grades nine through twelve. Some indication of the prevalence of rural high school districts in non-urban communities can be derived from Table 1. Knowing that all rural high school boards of education are located in second class cities, three schools need not be considered. The single rural high school organized for grades seven through twelve also need not be considered since it is known that this school serves a large metropolitan area. Excluding also all first and second class city school districts, it can be stated that rural high school districts serve 55.6 percent of the remaining high school pupil population of the state.

This figure is not completely representative of the importance of the rural high school from the standpoint of total enrollments in small cities. Part of the error is accounted for in the fact that nine second class cities were organized as rural high school districts, but were not designated as rural high school boards of education. Another portion of the error is due to the fact that a number of community high schools are known to be established in second class cities.

To illustrate the importance of rural high school districts both in terms of the number of operating school districts and also from the standpoint of total enrollments, an attempt has been made to exclude first and second class cities from consideration. The purpose of such an attempt is evident in the scope of this study. The implication is that third class cities are homogeneous in their non-urban character. This is recognized to be untrue when it is noted that a number of third class cities constitute the suburban areas of large metropolitan centers. Solely on the basis of population, nine third class cities had populations in excess of 2,500 in 1957; one such city had a population of 4,829. On the other hand, twenty-two second class cities had populations below 2,500.¹ It is thus clear that the percentage figures given above cannot be taken as true indicators of the relative importance of rural high schools in cities under 2,500 in population. More significant figures, however, are not available.

Nature of the Problem

The number of school districts within each of a number of enrollment categories for the school year 1955-1956 is shown in Table 2. Only the three types of school districts most prevalent in non-urban areas are shown. As will be noted 240, or 79 percent, of the 306 rural high schools had enrollments of less than 100 pupils.

Per pupil costs for the same three types of school districts are shown in Table 3. For purposes here it is satisfactory to define per pupil costs as being the operating expense, exclusive of payments for bonds, interest and

¹"Kansas Tax Rate Book," Kansas Government Journal, January, 1958, page 25.

Table 2. Enrollment in three classes of public high schools in Kansas for school year 1955-1956.

Enrollment	Number of Districts		
	Common School	Community High School	Rural High School
2,000 to 3,000			1
1,000 to 2,000			
900 to 1,000			1
800 to 900			
700 to 800			1
600 to 700	1	1	1
500 to 600		1	
400 to 500			
300 to 400	1	4	3
250 to 300	1	4	3
200 to 250	3	2	4
150 to 200	10	5	10
100 to 150	29	1	42
75 to 100	29	2	34
50 to 75	39	1	77
25 to 50	59		105
0 to 25	17		24
Total	189	21	306
Median	62	237	57

Source: State Department of Public Instruction and Kansas Association of School Boards. Twenty-Five Questions and Answers on Financing Schools in Kansas, page 20.

Table 3. Per pupil costs in three classes of public high schools in Kansas for school year 1955-1956.

Cost per Pupil Enrolled (in dollars)	Number of Districts		
	Common School	Community High School	Rural High School
1,900 to 1,986			1
1,800 to 1,900			1
1,700 to 1,800			1
1,600 to 1,700			
1,500 to 1,600	1		1
1,400 to 1,500			1
1,300 to 1,400	2		3
1,200 to 1,300	3		1
1,100 to 1,200	2		5
1,000 to 1,100	7		8
900 to 1,000	7		24
800 to 900	7	1	18
700 to 800	21	1	41
600 to 700	19	3	78
500 to 600	48	3	71
400 to 500	47	11	39
350 to 400	15	2	5
300 to 350	7		6
275 to 300	1		1
250 to 275	1		
225 to 250	1		
Total	189	21	305
Median	\$547	\$477	\$639

Source: State Department of Public Instruction and Kansas Association of School Boards. Twenty-Five Questions and Answers on Financing Schools in Kansas, page 22.

capital outlay, divided by the enrollment. The median per pupil cost of rural high schools for the 1955-1956 school year was \$639 or nearly seventeen percent higher than the corresponding figure for common school districts. More significantly however, there were 254, or 83.3 percent of the rural high school districts with per pupil costs exceeding \$500. This may be contrasted with 117, representing 61.9 percent, of the common school districts where per pupil costs exceeded \$500.

Small high schools are thus prevalent throughout the state. The districts are frequently small both in respect to enrollment and also from the standpoint of the local tax base from which a major proportion of the revenues for financial support are derived. It is well known that low enrollments are reflected in high per pupil costs; it is also becoming well publicized that small enrollments in high schools have a serious adverse effect on the quality of the educational program.¹

The solution of these problems involves two major areas of consideration. One is concerned with school management and internal efficiency; the other lies in the field of school finance. Some school administrators would include a third area which would involve basic changes in school district organization.² Within the first area, however, a logical approach is to increase the size of the school district and thus by increasing enrollments and assessed valuations, spread the somewhat high fixed costs of a school over a larger enrollment and a

¹A pamphlet of the National Citizens Council for Better Schools, Dr. Conant Looks at American High Schools, February, 1959.

²This statement is implied from the following quotation from the 1954-1956 Biennial Report of the State Department of Public Instruction, page 5: "The movement to organize rural high school districts is another result of failure to provide an overall plan of school district organization. The rural high school appears to be the only vehicle, under existing laws, that will provide an adequate tax base for the support of secondary schools in many communities."

greater tax base. With population sparse as it is over much of the state, there is of course some point beyond which the district cannot be further expanded for all practical purposes. It is only, however, after the school district has been expanded and formed into the most efficient unit possible that consideration of school aid funds from higher units can be properly introduced.

As in all public and private enterprises, economic efficiency is important. The means are limited, the needs are infinite. In order to make the most of the resources at hand, there must be extensive knowledge of the factors which affect their expenditure. Management is the manifestation of such knowledge. In terms more specific to the problem at hand, school administrators, including those at the county and state levels, must know what factors significantly affect costs in education. If decision-making is to be most effective, they must be provided quantitative measures of such significance. Such considerations are important both with respect to the internal management of a single school district and with respect to the overall implications of school district organization. It was in recognition of these problems that this thesis was designed.

OBJECTIVES AND SCOPE OF STUDY

The objective of this study was to discover actual costs of instruction and school plant operation and to determine the relative significance of factors affecting these two categories of school costs in rural high schools serving rural communities of Central Kansas.

The first objective of determining actual costs for the two categories mentioned above may be considered primarily as a means for obtaining necessary information for analysis concerned with the second objective. From this standpoint the objective is singular in determining the relative significance of factors affecting the cost of instruction and the cost of school plant operation.

It is important to emphasize that considerations of educational product, or the quality of education, lie outside the scope of this investigation. While certain factors are considered and conclusions are drawn which may be interpreted by some persons to bear significantly on the resultant quality of education, it is not within the purview of this study to make such inferences.

This investigation was confined to high schools organized under the rural high school law previously discussed. As was noted, such districts are not confined to non-urban areas. Since the purpose of this study was to consider the rural high school as a rural institution, it was necessary to confine the scope of this investigation to non-urban, rural high school districts. This limitation precludes consideration of suburban villages which are believed to represent a somewhat different situation; clearly such areas are not rural in character.

This investigation does not include consideration of all rural high schools in non-urban areas of the state of Kansas. While a more detailed statement regarding the geographical limits of this study is discussed in the section on methodology, it is relevant at this point to mention that the complete population has been observed and that inference based upon conclusions drawn from this investigation must be applied with great care to schools outside of the area observed. Strict scientific method would prohibit any process of inference. While this may appear to be needlessly restrictive, it cannot be emphasized too greatly that applying the results of these conclusions to schools outside the geographical area observed would require extensive knowledge of all factors which might bear significantly upon those costs being considered.

In order to make the results of this study as useful as possible, the intention has been to consider factors which are capable of being controlled, to

some extent at least, by school and other public administrators. It was also believed important to consider factors which are meaningful to persons interested in the problem dealt with herein, and as far as possible the analysis has been built around terms currently familiar to those concerned and closely related to the problem.

It is also necessary to establish limits on the factors considered. In dynamic economic analysis it is shown that prices are the resultants of an infinite number of processes with all prices themselves reflecting interdependency. It is thus natural to concede that not all factors affecting the costs being studied can be considered. The demarcation can be stated simply: all factors to be considered in this study are those originating within the school district itself. Specific mention of such factors would include pupil enrollment, assessed valuation of the school district, the school building and other physical properties, the educational program, the number of school teachers, as well as the education and experience of each, et cetera. It is clear that there are numerous factors originating outside the school district which bear considerable influence on costs and that confounding occurs in the interdependency of all factors, both within and outside the school district. For example, teachers' salaries are determined by factors which are both internal and external to the school district. Under perfect competition salaries would be largely determined by external forces with school administrators exercising some freedom in control of such costs through adjustments in the quality of teachers hired.

Not all costs can be considered in this study. Considerations of expediency and the importance of intensifying study in the areas of factors affecting the cost of instruction and school plant operation necessarily exclude pursuit into all areas of cost. It will be observed that in some instances it is impossible to measure cost.

The first limitation with respect to areas of cost studied is the exclusion of all transportation expenditures. Rural high schools may transport students to and from school and may also provide transportation for certain extracurricular purposes.¹ At the school district's option, funds may be acquired either from expenditures from the general fund, from a special fund for transportation, or from both sources.² School districts, however, are not required to provide transportation for high school pupils and this fact necessitates separate consideration of this item. Although it is recognized that transportation represents a substantial proportion of total costs in rural high schools, study of this item lies outside the scope of this investigation.

A second limitation which applies to the areas of cost considered in this project are those resulting from expenditures from several other special funds which may be established by rural high school districts.

One such special fund is for special education to exceptional, retarded, and homebound children who cannot be educated under an ordinary program. Revenues from such taxes and, if appropriate, federal and state grants, serve to provide for this type of education. All expenditures from this fund are excluded from consideration in this study.

All expenditures from the school bus purchase fund and the special building fund are also excluded. School districts may levy a tax for these funds to acquire revenue for capital outlay for their respective purposes.

It was reasoned that expenditures from one special fund should be included in this study. School districts may establish a special fund to provide for

¹General Statutes of State of Kansas, chapter 72, article 6, paragraphs 15 and 18.

²General Statutes of State of Kansas, chapter 72, article 6, paragraph 27, and chapter 72, article 6, paragraph 30.

the district's portion of the social security payment. None of the schools observed, however, had created a fund for this purpose.

Also excluded from this study is consideration of all expenditures from the textbook revolving fund. This fund was established to provide a revolving fund for the purchase of textbooks. Such moneys may be replaced by sales to the students unless a majority vote of the electorate in the school district approves a plan for providing free school books from this fund.

Certain other limitations have been imposed through necessity. As was mentioned earlier, it is impossible to measure certain costs. As a rule school districts, unlike commercial organizations, do not maintain an accounting system that accurately reflects all true costs. All accounting is purely on a cash basis. This fact has been noted in a study of school costs and accounting methods by Hutchinson.¹ Hutchinson examined the school system of twenty Eastern cities ranging in population from 10,000 to 100,000 and concluded that not one city knew what its actual costs of education were for the previous financial year. This he attributed to the fact that no accounting was made for revenues and expenses incurred during the financial period; the only records maintained were those showing how much money was spent during the fiscal year. It is apparent that if accounting is purely on a cash basis, depreciation costs cannot be evaluated and without a record of depreciation no true costs can be shown for fixed assets including the buildings and equipment of the school.

Another limitation applicable to this study is that interest charges for bonded indebtedness are not to be included. State law requires that a special fund for bond repayment and interest charges be established upon creation of

¹J. Howard Hutchinson, School Costs and School Accounting, page 34.

any bonded indebtedness. Receipts from the sale of the bonds are paid directly to the county treasurer for credit to the special fund created; disbursements from this fund are made only upon warrants signed by officials of the school board and solely for the purpose for which the bond was issued. The law is explicit in stating that it is the duty of the board of county commissioners in each county to levy annually upon the taxable property of the district a tax sufficient to pay the interest and the maturing portion of the principal for all outstanding bonds, and that upon receipt of such tax revenues, such funds are to remain in the hands of the county treasurer.¹ With the accounting of such funds by the county treasurer, no record of interest expense for bonded indebtedness is maintained by the school district and consequently such information does not appear upon the annual financial report to the State Superintendent. No attempt was made to secure this information from other sources.

The exclusion of depreciation costs and interest on bonded indebtedness thus precludes consideration of costs associated with the acquisition and improvement of the school physical plant and school lands.

The two primary areas of cost excluded from consideration in this study are therefore transportation costs and costs associated with the establishment of school physical facilities, namely, depreciation and interest charges. While the exclusion of these two categories of cost narrows the scope of this investigation, both are independent of the areas considered for study.

It is perhaps more significant to establish the scope of this investigation from the viewpoint of defining explicitly all areas of cost considered in this study. Reference can be made to the Annual Report by Teacher, Clerk, and Treasurer to County Superintendent and State Department of Public Instruction shown in

¹Laws of the State of Kansas, 1957, chapter 414, section 3.

the appendix. A financial exhibit for the general fund is shown on page two of this report. For convenience, an exact copy of the section on general fund expenditures is shown in Fig. 1. For purposes here, the identification of each category of expenditure as copied from the report is sufficient. It can thus be stated that this study is concerned with all the expenditures included in total operation expense, line 19, except for payments made for pupil transportation, line 17.

Specific objectives to be considered in this investigation are enumerated below.

1. To estimate cost of instruction and school plant operation as defined in this study from information contained in the two basic school district reports to the State Department of Public Instruction.

2. To test the following factors for the significance of their effect on the cost of instruction per pupil and to establish a quantitative measure for such effect if reasonable significance is shown.

- a. the teacher-pupil ratio
- b. the percent of the total offering of courses within optional curriculum groups
- c. the proportion of the school administrator's time spent in non-teaching duties
- d. the average years experience of teachers and administrators
- e. the percent of the teachers with Master's degrees
- f. the ratio of male teachers to the total number of teachers
- g. the valuation of the school district tax base per pupil

3. To test for significance and establish a quantitative measure of importance for the following factors affecting the cost of school plant operation

per pupil.

- a. the average daily attendance
- b. the valuation of the school district tax base per pupil
- c. the valuation of the school buildings and grounds
- d. the valuation of school furnishings and equipment

METHODOLOGY

Area of Study

The area chosen for this study was the territory of thirty-five counties approximating the central third of the state. This area is shown by a map in the appendix. In consideration of the great regional differences from east to west within the state, it was believed desirable to restrict the area of this investigation so as to reduce the possible influence of external factors. Such factors, it will be recalled, were beyond the scope of this study. While regional differences within the area under consideration are acknowledged, it can be reasoned that such differences are less than those existing within the entire state.

All rural high schools associated with cities with a population in 1957 of less than 2,500 inhabitants and located within the counties included in this study were included in this investigation.

There were 123 rural high school districts in the area defined above. Five districts were excluded from consideration due to the limitation placed on the size of the community in which the school was located. Since this study was limited to rural high school districts in non-urban communities, the two rural high schools of Sedgwick County were excluded to avoid possible influences from the large metropolitan area of that county. Two other rural high schools

9. GENERAL CONTROL: (Board conventions, record books, etc.)
10. INSTRUCTION:
 - (a) Teachers' salary: Include withholding tax, retirement, and teachers' social security . .
 - (b) Instructional supplies
 - (c) Tuition to other districts
11. TOTAL INSTRUCTION: (a) (b) and (c) above . .
12. OPERATION:
 - (a) Janitors' salary and supplies
 - (b) Light, power, fuel and water
13. TOTAL OPERATION: (a) and (b) above
14. FIXED CHARGES: (Insurance, rent, bond premium, school's portion of social security, etc.) . .
15. AUXILIARY AGENCIES: (Library, health, recreation, textbooks, school lunch, etc.)
16. PUPIL TRANSPORTATION: (General Fund)
 - (a) To and from school
 - (b) Other than to and from school
17. TOTAL TRANSPORTATION
18. MAINTENANCE: (Upkeep of grounds, buildings, equipment, etc.)
19. TOTAL OPERATING EXPENSE
20. CAPITAL OUTLAY: (Equipment, major repairs, etc., paid from general fund)
21. TOTAL EXPENDITURES: (Excluding Supplemental Activities) (Line 19 plus line 20)
22. TRANSFER From General Fund to School Bus Purchase Fund (Cannot be more than 10% of General Fund Receipts)
23. TOTAL EXPENDITURES plus School Bus Purchase Fund Transfer (Line 21 plus line 22)
24. SUPPLEMENTAL ACTIVITIES: (Summer school, summer playground, night school, veterans' on-the-farm training)
25. GRAND TOTAL EXPENDITURES (Line 23 plus line 24) .

Fig. 1. Breakdown of general fund expenditures from the Annual Report by Teacher, Clerk, and Treasurer to County Superintendent and State Department of Public Instruction.

excluded were organized for grades seven through twelve. Although a separate breakdown of expenditures is made for grades nine to twelve in the financial report, it was believed that allocation of expense would be more nearly accurate if the scope of the educational program were uniform among all the schools considered. Through error, complete information from two schools was not obtained. There were also inconsistencies or inadequate information from four schools. This left 108 rural high school districts which could be considered for the analysis of cost of instruction. Seven of these schools, however, had to be excluded from the analysis of school plant operation cost because of inconsistencies or inadequate information.

Sources of Information

Primary sources of data for this study were two annual reports prepared by each school district for the State Department of Public Instruction. One of the reports is entitled Annual Report by Teacher, Clerk and Treasurer to County Superintendent and State Department of Public Instruction and will hereafter be referred to as the annual financial report, or simply, financial report. The other report prepared by each district is entitled High School Principal's Organization Report and this document will be referred to as the organization report. The organization report is prepared as of September 15 of each year and the financial report is prepared as of the end of the fiscal year, June 30. The former report is primarily used by the Accreditation and Field Services Division of the State Department of Public Instruction for checking teachers' certificates and determining accreditation. The submission of this report is a requirement for accreditation of the high school. The financial report is basically a report of receipts and disbursements for all funds of the school district with

the exception of the bond and interest fund mentioned earlier. Both reports are on file in the office of the State Superintendent of Public Instruction. The organization report is retained by the Division of Accreditation and Field Services, the annual financial report is filed in the Division of Finance. Sample copies of both reports are shown in the appendix.

At the time that information was ready to be extracted from these reports in the summer of 1958, annual reports for the school year 1957-1958 were still in the process of being examined by personnel of the Finance Division. For this reason, it was necessary to use data from the previous fiscal year, beginning July 1, 1956 and ending June 30, 1957. The appropriate organizational report for this period was dated September 15, 1956. For convenience, mimeograph forms were used to transcribe information from the original reports. This was accomplished in the offices of the Department of Public Instruction, State Capitol Building, Topeka, Kansas.

The complete financial exhibit for the general fund as shown on page two of the annual financial report was copied from the report to the mimeograph forms. This included both the sections on receipt of funds and the section on expenditures. Balances, receipts, and expenditures for each of the other special funds, shown on page three of this report, were also obtained from the financial reports.

It may be observed from the report form that several examples of expense items are listed for each category of expenditure in the general fund. Without any established set of instructions for uniform accounting, however, it cannot be presumed that all school districts allocated expenditures to these major categories in the same manner. The breadth of each of the major categories of expenditure does serve to minimize the importance of this deficiency.

Other basic data used in this study was obtained from the annual financial report. The average daily attendance for each school is shown on page one of this report. This figure is derived by adding the daily attendance for each day the school was in session, counting full attendance for certain authorized holidays, and dividing this sum by the length of the school term. The length of the school term includes all days the school was in session and the authorized holidays. Average daily attendance is a common unit of measure used in formulas for disbursing funds from higher governmental units to school districts. Its use in areas of school finance and in studies of school costs is more extensive than that of total enrollment as of a certain date. This figure was used in computing all per pupil costs, the assessed valuation of the school district per pupil, and both the teacher-pupil and pupil-teacher ratios.

The valuation of school buildings and grounds is shown on page three of the financial report, as is also the valuation of school furnishings and equipment. In a few instances it was noted in the report that the school building was not owned by the rural high school district. In such cases the rural high school will usually rent space in the building owned by the elementary, common school district. It was also observed that in several instances the rural high school rented space to the elementary school district. Since the valuation figures were obtained for the purpose of determining their effect on school plant operation, it was reasoned that valuation figures should be obtained regardless of which district actually owned the school building. It was believed that ownership of the school building would not always be explicit in this report.

Interest and depreciation charges are not included in school plant operation costs for the district owning the school, whereas such costs may be a

part of the rent payment.

The total number of rooms utilized by the high school was also obtained from the same section of this report. This total was derived by adding the number of rooms shown under each of the categories listed including "regular," "special," and "other" school rooms.

From the teacher information section of the annual report, page four, aggregate salaries for male and female teachers were obtained. It was from this source that average salaries were derived for each sex. The salary of the superintendent or principal was not included in this total regardless of the extent to which he served in that capacity. It was here that the salary of the superintendent was apportioned between the rural high school district and the elementary, common school district, if such was applicable.

The High School Principal's Organization Report provided much of the basic information used in this investigation. From pages six and seven of this report it was possible to obtain the following data.

1. The sex of each teacher and administrator employed by the school district could be ascertained by the given name of each teacher and administrator. This information was checked by counting up the total number for each sex and comparing this number with like information provided on page one of the report.

2. The annual salary for each teacher and administrator was obtained directly from the report.

3. The total number years experience of each teacher and administrator was derived by adding the total number of years of experience in the school currently employed to the number of years experience in all other schools.

4. All degrees held by each teacher were obtained directly from the report.

On page five of the organization report a daily program for the high school is provided. Corresponding to each teacher is a schedule showing the subjects

taught for each time period of the school day. The time periods are enumerated and the school preparing the report denotes the time at which each period begins and the time at which it ends. It was from this schedule that part-time teachers were identified.

To determine accurately the number of persons engaged in teaching, a proportion was derived for each part-time teacher. This ratio was computed by dividing the total number of periods taught by each part-time teacher by the total number of periods constituting a full program for the school. This procedure was applied to those teachers having three or more consecutive school periods vacant unless it was specifically noted that the teacher was less than a full-time faculty member.

It was recognized that the length of the school period frequently varied during the day within the same school as it also varied among different schools. Even the total number of periods in the school day was not uniform from one school to another. The number of classes held by a teacher varied somewhat both within the same school, and among different schools. Such facts tend to discredit the method used in determining part-time teachers. An alternative method, requiring more time, would have been to compute the time each part-time teacher was engaged in teaching and divide this by the average time that full-time teachers spent in class. It appeared doubtful, however, that this method would have yielded more accurate estimates.

From the basic data described above the total number of teachers was derived. It was also possible to determine a ratio denoting the proportion of the total number of teachers which were males. A percentage figure was obtained to denote the proportion of the high school faculty holding Master's degrees. For the latter figure administrators and part-time teachers were included with full-time faculty members.

The total years of experience for all faculty members of each school were added, and this figure divided by the number of teachers and administrators considered gave the average experience level for the staff of each school. Again, part-time teachers and administrators were included.

The annual total of the teachers' salaries for each school was found and this figure was compared with the expenditure for teachers' salaries in the financial exhibit for the general fund in the annual financial report. Also used in this check were the totals of the salaries for male and female teachers as determined from the financial report. In this manner it was also possible to detect new teachers hired after the organizational report was prepared. In the few instances in which the salary expenditure of the annual report exceeded the total of the salaries shown in the organization report, the number of male and female teachers shown in the annual report was used. In all instances where no major discrepancy in teachers' salaries was observed, the number of male and female teachers was derived from the organization report, which was believed to be a more accurate measure.

On page two of the organization report a list of high school courses is shown. The school district in preparing this report checks those courses offered during each of the semesters for the reporting year. All the courses are classified into nine curriculum groups: English, mathematics, social science, science, foreign language, business education, practical arts and vocational subjects, music and art, and physical education.

For accreditation the high school must offer at least six of ten groups.¹ Required courses must be offered in English, mathematics, social science, and

¹State Department of Public Instruction. Kansas Secondary School Handbook, page 39. Note: The tenth curriculum group for accreditation is obtained by separating practical arts and vocational subjects into different groups.

physical education and health. A school with a minimum program could thus offer courses in the required areas with only one additional group. For this reason a percentage figure was derived by adding all the number of courses offered in the optional areas to those courses offered in "science", and dividing by the total number of courses offered in the school's educational program, excluding physical education. The science field was added because only one course was required in this area for accreditation and also because, (like many of the courses in the optional areas of vocational and business education, music, and art), it was believed relatively expensive to extend the curriculum into these areas. Such expense would likely be due to the special equipment and teachers required. This percentage figure will hereafter be referred to as the percent of total course offering in optional curriculum groups.

Certain information was provided in this section on the age, cost, and the insurance coverage of school furnishings and equipment. The insurance coverage on the building was frequently denoted as co-insurance, yet the percentage applicable was given in only a few cases. For this reason the building and equipment valuation figures from the annual report were used, with the insurance coverage from the organization report serving as a means of verifying the accuracy of this figure. Seven reports were eliminated for inconsistencies and missing data regarding information on school buildings and equipment.

The only other source of information used in this investigation was the Kansas Government Journal, from which all school district valuations were obtained for the tax year 1956.

Methods of Analysis

As was noted in the previous section, the first objective of this study was to derive estimates of the cost of instruction and the cost of school plant

operation. The general procedure has been to group the expenditures to be considered into two groups, one representing costs directly associated with the processes of education and the other denoting costs related to the operation of the school plant. The consistency and completeness of the reports were checked in order that the estimates would be as accurate as possible.

The method of analysis has been first to consider the distribution of each of the variates in the equation:

$$\frac{C_I}{P} = \frac{T}{P} \cdot \frac{C_T}{T}$$

where $\frac{C_I}{P}$ is the cost of instruction per pupil,

$\frac{T}{P}$ is the teacher-pupil ratio

and $\frac{C_T}{T}$ is the cost of instruction per teacher.

With the cost of instruction per pupil considered as the dependent variable the relation of each of the other variates to the dependent variable was studied. Factors which influence each of the independent variables were also considered in this section of the analysis.

It was believed that this study was well adapted to the multi-variate technique of linear regression. Although it may be shown that the cost of instruction consists primarily of salaries for teachers and administrators, it was hypothesized that this quantity depended upon a number of factors and was thus suited to multi-variate analysis.

Multiple regression was also employed in the analysis of the cost of school plant operation. The model for each equation is constructed and presented in the sections of this study dealing specifically with each area of cost.

COST OF INSTRUCTION AND
SCHOOL PLANT OPERATION

The determination of accurate costs of instruction and school plant operation besides being an objective in this study is basic to all subsequent analysis. Various reports and studies on school costs in Kansas have usually shown and analyzed expenditures; often certain capital expenditures have been included. Thus what are frequently referred to as school costs may more accurately be termed school expenditures. If comparisons between schools are to be undertaken, basic improvement in the measurement of school costs must be achieved.

Some improvement was believed to have been made in the estimation of school costs. This has necessitated rather intensive efforts to check the consistency of the data from one source to another. In some instances this involved making adjustments to the data when such was obviously required.

It cannot be inferred that the method described herein has resulted in perfect estimates of cost. The estimates derived are only as good as the basic data from which they were derived. If the method and procedure are sound however, it naturally follows that more accurate figures estimating school costs have been obtained.

As was noted in the previous section, the method was to group all expenditures into two major categories of expense and from careful analysis of other financial information derive estimates for cost of instruction and cost of school plant operation.

From the financial exhibit of the general fund in the annual financial report, (Fig. 1), the major categories of general control, instruction, and auxiliary agencies were included in what will hereafter be referred to as total expenditure for instruction. Operation, fixed charges, and maintenance were

grouped under expenditures for school plant operation. The first group of expenditures constituted approximately 80 percent of the total for the two groups. This percentage was derived from aggregate expenditures for 313 organized rural high school districts during the 1956-1957 school year.¹ Table 4 shows the relative importance of each category of expenditure, both within the breakdown of expenditures constructed for this investigation and also within the total of all expenditures considered.

Table 4. Aggregate expenditures for 313 organized rural high schools in Kansas for the school year 1956 - 1957.

Categories of expense	Aggregate amount (dollars)	Percent within constructed breakdown	Percent of total operating expense excluding transportation
Cost of instruction:			
General control	264,352	2.6	2.1
Instruction	9,655,670	94.7	75.8
Auxiliary agencies	272,399	2.7	2.1
		<u>100.0</u>	<u>100.0</u>
Cost of school plant operation:			
Operation	1,620,390	63.7	12.7
Fixed charges	404,159	15.9	3.2
Maintenance	517,367	20.4	4.1
		<u>100.0</u>	<u>100.0</u>

General control consists of expenditures for the school's administrative and supervisory functions. In some of the high schools observed in this study, it was obvious that the administrator's salary was not apportioned in a manner to represent the extent to which this person served in that capacity. Probably the most uniform rule governing the allocation of such expenditure was to

¹State Department of Public Instruction. Statistical Annual Reports for 1956-1957, page 4.

include all of the salary applicable to the high school district under general control if the superintendent or principal devoted more than one-half of his time to administrative and supervisory duties. The apportionment of the administrator's salary between general control and teachers' salary, however, is somewhat unimportant since both categories are included in the total expenditures for instruction.

Aggregate expenditures for general control in 313 organized rural high school districts in the state represented about two percent of the aggregate figure for total operation expense, excluding transportation. Considering just those expenditures included in the constructed breakdown for cost of instruction, general control expenditures represented 2.6 percent of the aggregate figure for all rural high schools of the state.¹

The major category of expenditures noted as "instruction" in the financial exhibit for the general fund includes teachers' salaries, instructional supplies, and tuition to other school districts. This major category of expenditure should not be confused with the total of general control, "instruction" and auxiliary services which have been grouped together and which in this study are identified as the total expenditures for instruction.

The expenditures for teachers' salaries are shown in this group of costs, yet it is to be observed that the school district's portion of the social security is classified under fixed charges. This represents an inconsistency in that such costs should, like the teachers' salaries, be included as costs of instruction. Since such payments are small, this discrepancy is not considered serious.

¹State Department of Public Instruction. Statistical Annual Reports for 1956-1957, page 4.

School districts are also authorized to establish a special fund and levy a tax specifically to provide for social security payments. It was noted, however, that none of the schools observed in this study had established a separate fund for this purpose.

The total of the annual salaries for all the teachers shown in the organization report was checked against the expenditure for teachers' salaries shown in the financial report. The total of the aggregate salaries for male and female teachers, shown on page four of the financial report, was also checked against the exact expenditure recorded in the general fund exhibit of the financial report. This was accomplished to determine if all available information on salary expenditures within the two reports was consistent. Frequently it was found that not all three sources were in perfect agreement. As long as the expenditures in the financial exhibit were in close agreement with one of the other two sources, the report was considered valid and was included in the study.

Two other sub-classes of expenditures are included under instruction as denoted in the financial report. One includes instructional supplies and the other involves tuition payments to other school districts. The former requires no explanation. In certain instances, however, a school district may make an agreement for sending pupils residing within its own territory to a high school maintained by another district. Such agreements may require a direct tuition payment by the district in which the student resides.¹ Only two school districts among those observed in this investigation showed expenditures for such purposes.

It is not possible to show the proportion of aggregate expenditures for all rural high schools in the state for each of the sub-classes included under

¹General Statutes of Kansas, chapter 72, article 57, section 8.

"instruction" as noted in the financial report. Aggregate figures for all the rural high schools of the state are available for the major category of "instruction." This category of school costs accounted for 75.8 percent of total operating expense excluding transportation expense. Considering just the three major categories of general control, "instruction" and auxiliary agencies, this percentage is increased to 94.7.

Expenditures for auxiliary agencies include the salaries of school librarians and all expenditures for the school library, textbooks, school health services, and recreation and playground equipment. Some expenditures for the school lunch program are included under this category, yet such payments are minor and incidental to this program. Again, some indication of the relative importance of such expenditures can be illustrated by observing aggregate figures for all rural high schools of the state. Auxiliary agencies thus account for 2.1 percent of total operating expense excluding transportation for all high schools of the state. Considering just those categories of expenditure included in the constructed breakdown for the cost of instruction, this figure is increased to only 2.7 percent.

Expenditures for operation, fixed charges and maintenance were included under school plant operation. As has been noted, this figure was designed to represent all costs associated with the operation of the school plant. The term operation must be emphasized, for depreciation and interest charges have not been considered. Thus it cannot be stated that this element of costs provides for the establishment of physical facilities; it simply represents costs associated with the upkeep and operation of the school plant.

Operation expense includes salaries and supplies for janitorial services and all expenses for utilities. While representing only 12.7 percent of total operating expense excluding cost of transportation, operation expense constitutes 63.7

percent of the three categories of expense included in school plant operation.

Fixed charges included all expenditures for insurance other than those incurred in connection with transportation; rent; surety bond premium, required of the treasurer of the school board; and as previously mentioned, the school district's portion of social security. Such expenditures, however, represent only 3.2 percent of total operating expense, excluding transportation expense. Considering only the expenditures for school plant operation, fixed charges make up 15.9 percent of the expenditures for school plant operation.

Expenditures for maintenance include upkeep and repair of school buildings, repair and replacement of instructional apparatus, furniture and equipment, and the upkeep of school grounds. In the study by Hutchinson mentioned earlier, it was noted that school districts frequently made no attempt to distinguish expenditures for maintenance from expenditures for capital outlay. The assumption has been made in this study that all such expenditures were properly classified. It must be acknowledged, however, that this assumption was based primarily on considerations of expediency.

Expenditures for maintenance represent 4.1 percent of total operating expense excluding transportation costs, but 20.4 percent of the expenditures grouped under school plant operation.

In the section on receipts in the financial exhibit for the general fund, special attention was paid to all receipts from sources other than those regularly shown on the report form. It was from this source that information was acquired which necessitated compensating adjustments to the two major categories of expenditures derived.

It was stated in the report that all receipts listed under this item were to be specifically identified, yet it was observed in a number of reports that the information provided was insufficient for denoting classification required

in this study. In those instances in which the classification of the receipt could not be properly determined and in which the amount exceeded five percent of total operating expense, less transportation expenditures, the report was rejected. Three schools were excluded from this study on the basis of this restriction. While it is impractical to list all the different sources from which funds were received, major categories will be discussed.

Reimbursements from other school districts for salaries paid by the reporting district was one important item for which adjustment was required. As was noted previously, rural high schools and elementary, common school districts located in the same city will frequently share some of the services of the same teachers. It is even quite common that one administrator will serve both districts. A receipt for reimbursement for teachers' salaries evidently indicates that one district formally employs the teacher or administrator with the agreement that reimbursement by the other district will be made. In all instances where receipts were noted for reimbursement for teachers' or the administrator's salary the full amount of the receipt was deducted from the expenditure for instruction.

It was also reasoned that all payments made by pupils for shop materials should be deducted from the expenditures for instruction. In the two instances where such receipts were noted, it was believed that since the pupils were charged for these materials they were considered over and above what the school would ordinarily expect to pay in providing shop materials. The school thus knew in advance that it would be reimbursed for such expenditures. There is also the possibility that in other schools money was collected from students for similar purposes, yet expenditures were made directly from these funds and were not accounted for and included in instructional supplies.

A number of deductions were made from school plant operation expenditures. Examples of such receipts for which deductions were made were: refunds on purchases for furnishings, refunds on utility payments, and insurance premiums. Insurance payments for claims necessitating maintenance were also deducted. Receipts for rent were deducted when such were received from another school district. Deduction of the whole rental payment is not technically correct. Actually, a portion of the payment constitutes a return to capital and a reimbursement for interest. To some extent however, rent may be considered as a reimbursement for maintenance and it appears likely that if both the elementary and the high school are in a building owned by the high school, a disproportionate share of operation expense may be borne by the high school district with rental payment intended to provide reimbursement.

Not deducted from either instruction or school operation expense were rent, (when it was not stated that it was received from a school district), dividends, royalties, interest, and transfers from the school bus purchase fund. Also, receipts for veterans' on-the-farm training were not deducted since expenditures for this program are accounted for as supplementary activities and are not included in total operating expense.

The explanation for a number of the other receipts in this category was difficult to understand and of course no deductions were made in such instances. Such reports were not rejected for this investigation, however, if the total of the receipts for which the explanation was insufficient did not exceed five percent of total operating expense, less transportation expenditure.

In accordance with the procedure described above, estimates for cost of instruction and for cost of school plant operation were obtained for each of the 108 schools considered in this study. The distribution of cost of instruction per pupil is shown in Fig. 2. The median cost of instruction per pupil in

this group of high schools was \$529 per pupil and the arithmetic average was \$549 with standard deviation of \$183. The distribution is apparently skewed to the right, denoting a few schools with extremely high per pupil costs.

The distribution of derived estimates of cost for school plant operation is shown in Fig. 3. Because of incomplete information required in the regression equation for estimating school operation costs, seven schools were not considered in this distribution; it is thus based upon a total of 101 observations. The median cost estimate for school operation per pupil was \$131 and the arithmetic average was \$141 with standard deviation of \$63. It appears from the histogram that the distribution is skewed to the right although probably not to the extent noted in the distribution of the cost of instruction per pupil.

FACTORS AFFECTING COST OF INSTRUCTION PER PUPIL

Teacher-Pupil Ratio and Cost of Instruction per Teacher

In the analysis of the cost of instruction per pupil it was considered useful to consider the multiplicative relationship of

$$\frac{C_I}{P} = \frac{T}{P} \cdot \frac{C_I}{T} \quad (1)$$

where C_I/P represents the cost of instruction per pupil in average daily attendance, T/P is the teacher-pupil ratio and C_I/T is the cost of instruction per teacher. The teacher-pupil ratio is the reciprocal of the more commonly used pupil-teacher ratio. It is well to note that while the two ratios are directly related, and that either may be determined with the other known, the transformation is non-linear and represented by a smooth curve asymptotic to both axes.

From this equation it was evident that all variation in the cost of instruction per pupil must be accounted for in either or both of the other two terms. Since the primary concern was to account for variation in the cost of

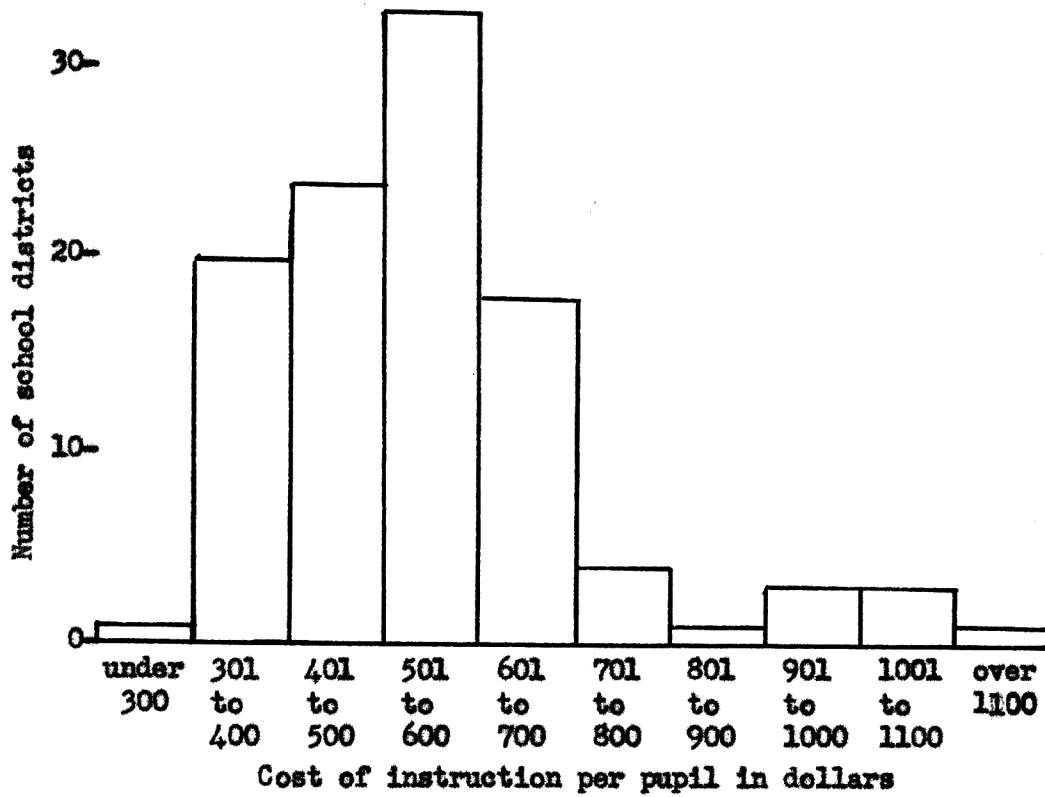


Fig. 2. Distribution of schools according to cost of instruction per pupil in 108 rural high schools in Central Kansas, 1956-1957.

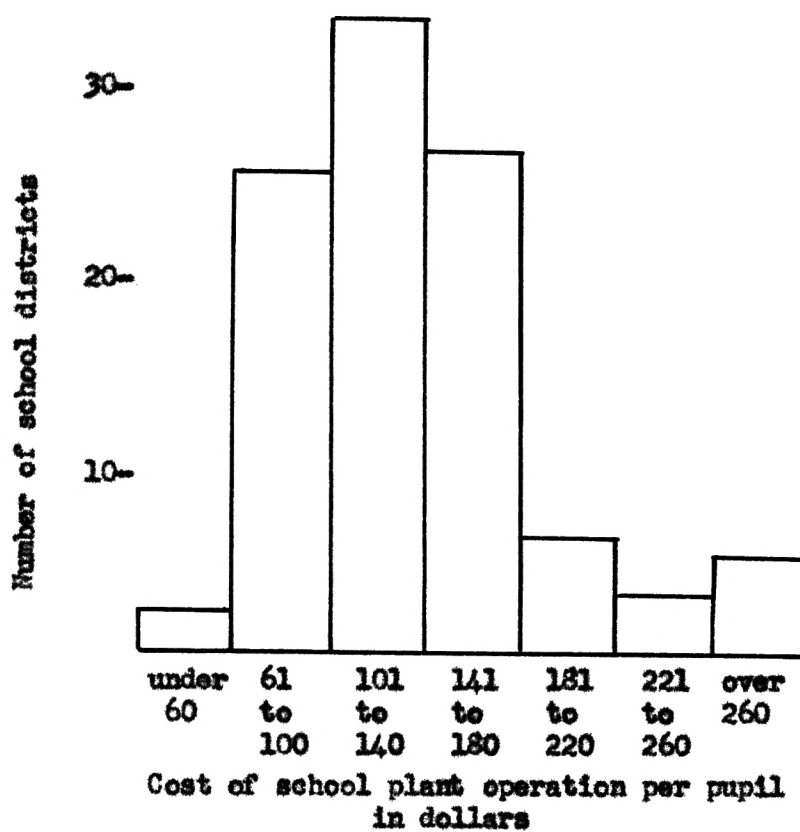


Fig. 3. Distribution of schools according to cost of school plant operation per pupil in 101 rural high schools in Central Kansas, 1956-1957.

instruction per pupil, and since the other two variables are, to some extent at least, controllable, cost of instruction per pupil was considered as the dependent variable. Each of the other variables was then considered separately as an independent variable.

The distribution of the variate denoting cost of instruction per teacher is shown in Fig. 4. The mean expenditure for instruction per teacher for the 108 rural high schools was \$5,011 with standard deviation of \$524; the median expenditure was \$5,024.

The distribution of the teacher-pupil ratio is shown in Fig. 5. The mean teacher-pupil ratio for the schools observed was .111, corresponding to the pupil-teacher ratio of 9.02; the median was .106 teachers per pupil or 9.4 pupils per teacher. This distribution is apparently highly skewed to the right and it is likely that this accounts in part for the skewness which was previously noted in the distribution of the cost of instruction per pupil.

A simple correlation of .000703 was found between cost of instruction per teacher and the dependent variable; the other coefficient denoting correlation between the teacher-pupil ratio and the cost of instruction per pupil was .950. The latter correlation is shown in Fig. 6. For the observations of this study a regression equation was derived and a graphical representation of this relation is shown in the diagram. The derived equation was

$$\frac{C_T}{P} = 47.67 + 4530.07X_{t/p} \quad (2)$$

The estimate for the coefficient of regression may be more easily understood if the variate is considered as teachers per 100 pupils. This operation made it necessary to correct the regression coefficient so that the unit of the dependent variable was preserved. This was accomplished by dividing the regression coefficient by 100. Thus it is possible to state that for each increase

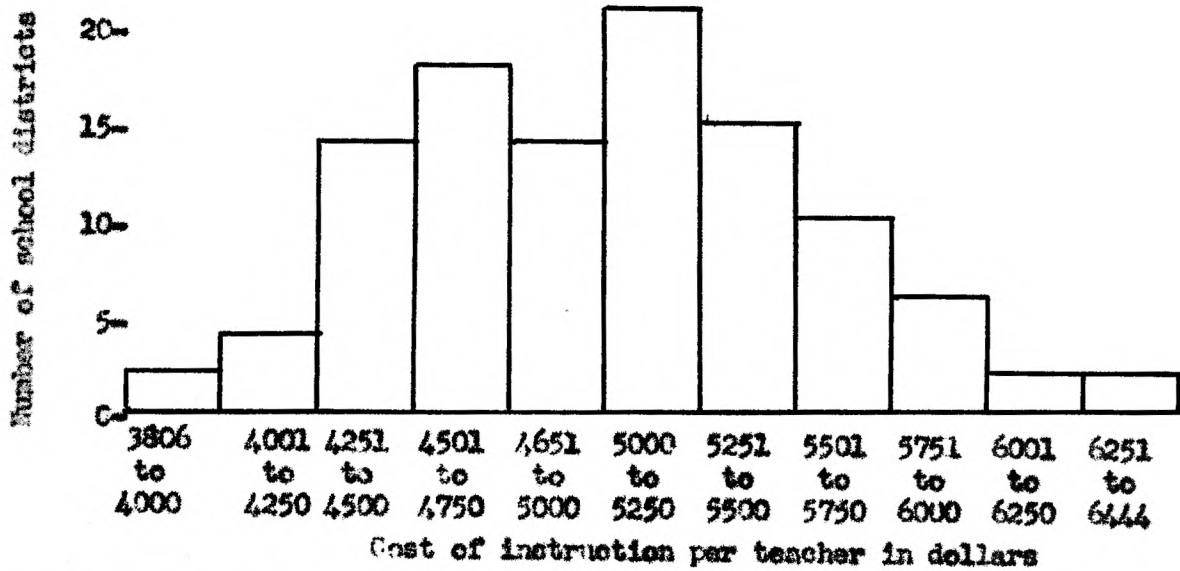


Fig. 4. Distribution of schools according to cost of instruction per teacher in 108 rural high schools in Central Kansas, 1956-1957.

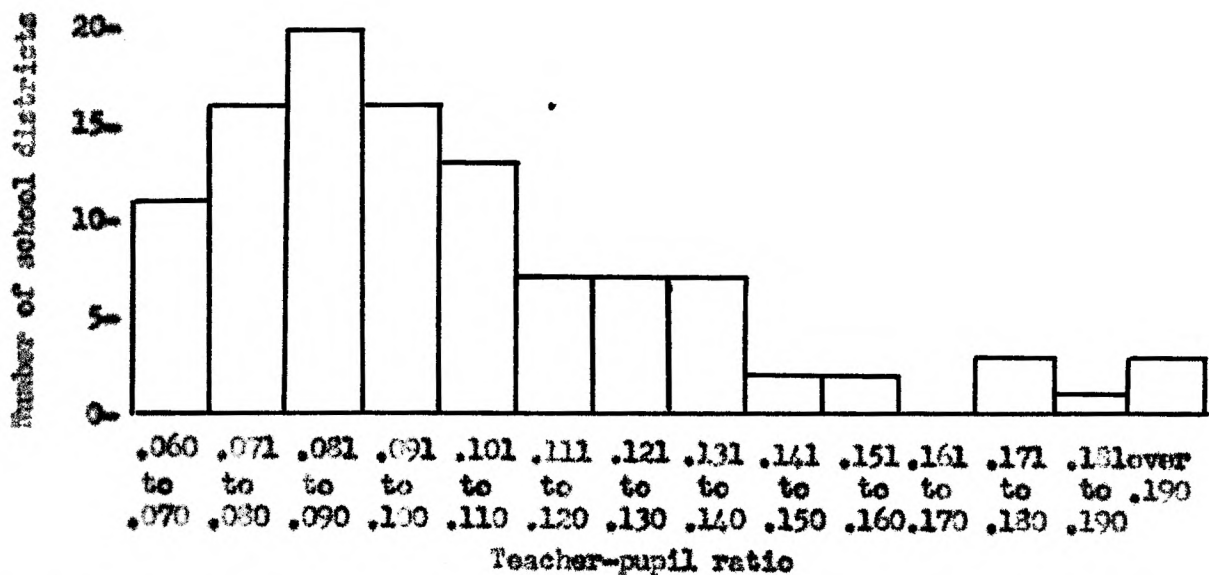


Fig. 5. Distribution of schools according to teacher-pupil ratio in 108 rural high schools in Central Kansas, 1956-1957.

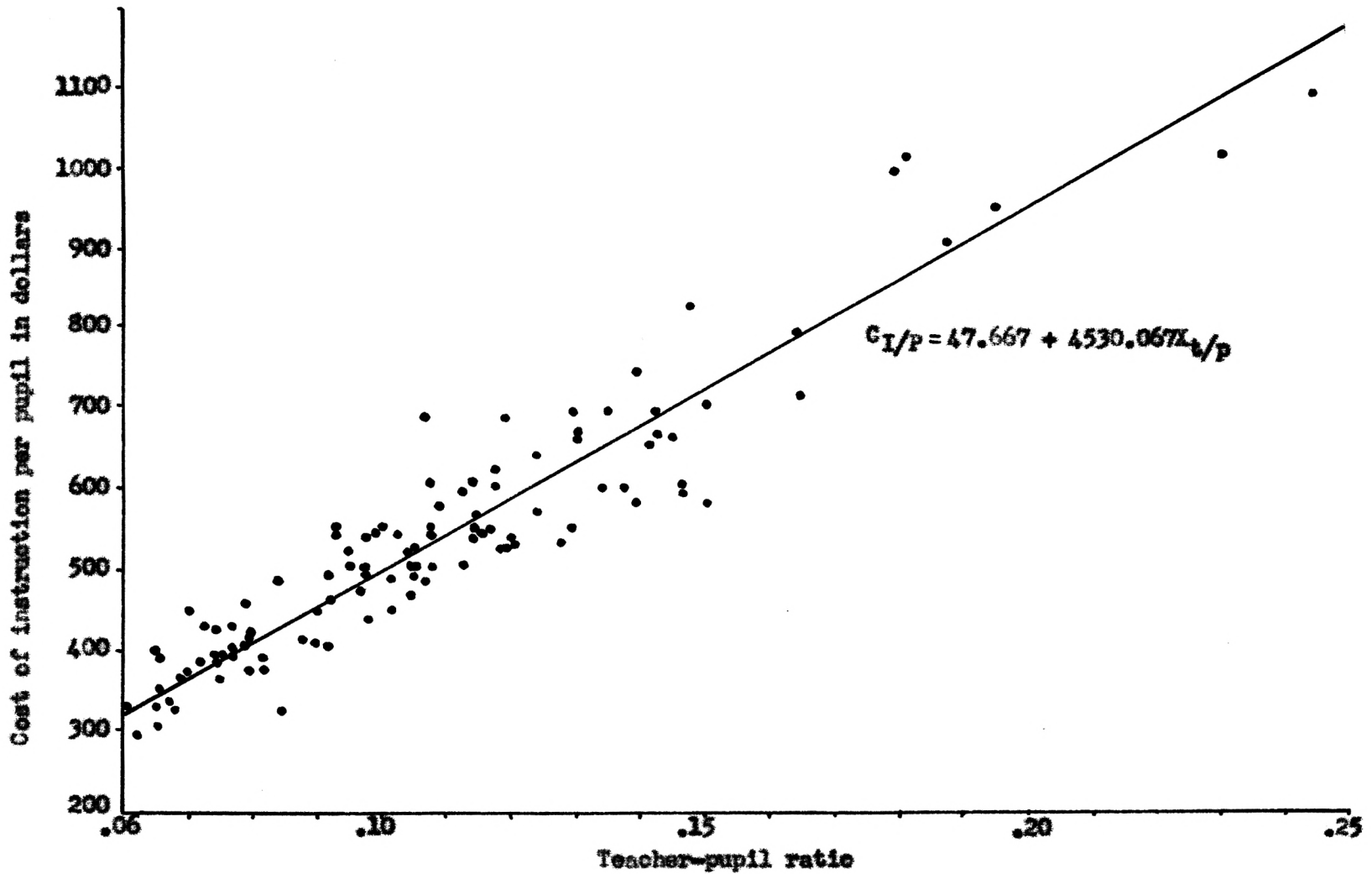


Fig. 6. Cost of instruction per pupil and teacher-pupil ratio in 108 rural high school districts in Central Kansas, 1956-1957. Note: one point, (.283, 1494) omitted.

in the number of teachers per 100 pupils, the cost of instruction per pupil increases \$45.30. The corresponding ninety-nine percent confidence interval for this estimate ranged from \$33.20 to \$57.40.

The teacher-pupil ratio with the correlation coefficient of .950 can be considered a significant factor in explaining the variation in the cost of instruction per pupil. To be contrasted with this was the other independent variable of equation (1), cost of instruction per teacher. The simple correlation between this variable and the dependent variable was .000703, which infers independence between the two. A scattergram shown in Fig. 7. illustrates this independent relationship.

It will be remembered that the plan of this section was to consider the effect of both the teacher-pupil ratio and the cost of instruction per teacher separately on the cost of instruction per pupil. The cost of instruction per pupil was designated the dependent variable; this is the factor which reflects cost per unit of "educational product." The fact that independence was found to exist between the cost of instruction per pupil and the cost of instruction per teacher is almost sufficient in itself to dismiss all further analysis of this variable. It is the teacher-pupil ratio which was found to be significant and thus it is this factor for which further consideration is deemed most important.

Before proceeding with the analysis of factors affecting the teacher-pupil ratio, the considerable variation observed in the cost of instruction per teacher among the 108 rural high schools appears to require some explanation.

The cost of instruction does not consist completely of salaries for teachers and administrators. Other items of expenditure included in this figure were instructional supplies, auxiliary services and general

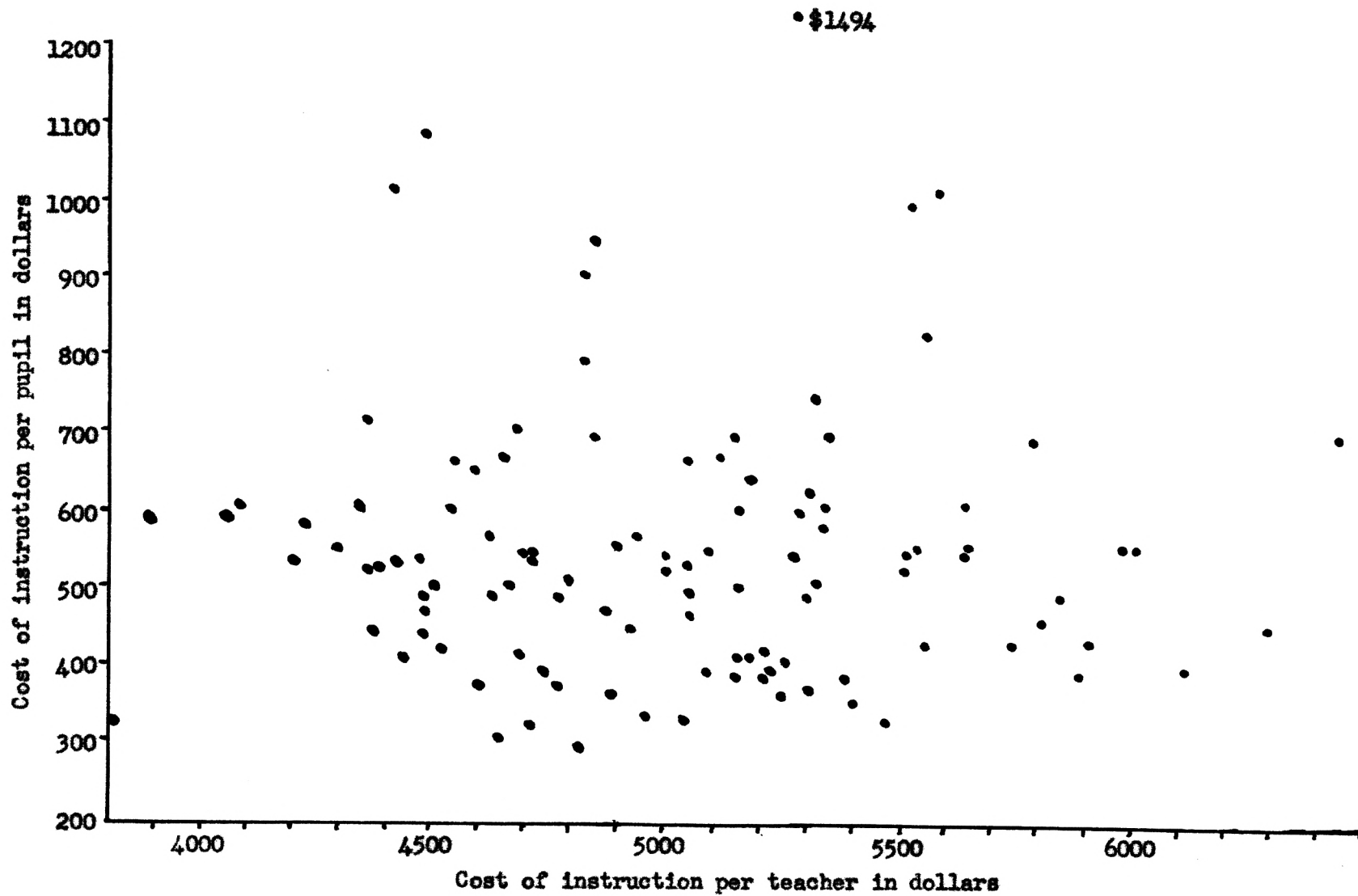


Fig. 7. Cost of instruction per pupil and cost of instruction per teacher in 108 rural high schools in Central Kansas, 1956-1957.

control.¹ It is important to note that since there was no information available to indicate the extent to which school districts provided instructional supplies and auxiliary services, consideration of factors affecting the cost of instruction per teacher must center around those factors which might influence the salaries of the school staff.

The relative importance of expenditures for salaries is shown in Table 5 with the median and range shown for each quartile of enrollment. While the range in the percent lengthens with the increase in enrollment, the median shows only a small decrease for each successive quartile.

Table 5. Salaries for teachers and administrators as related to cost of instruction in 108 rural high schools in Central Kansas, 1956-1957.

Average daily attendance			Salaries of teachers and administrators as percent of cost of instruction		
Quartile	Range	Median	Median	Range	
First	13-32	29	95	89-98	
Second	33-49	39	93	87-98	
Third	51-85	63	90	80-97	
Fourth	94-262	126	89	80-97	

Since such a large proportion of the total cost of instruction consists of salaries for teachers and administrators, differences in the average salary for male and female teachers might account for some of the variation in the cost of instruction per teacher. The average salary for male teachers was \$4,140 with standard deviation of \$230. The ninety-nine percent confidence interval for the estimate of the mean was between \$3,536 and \$4,744. The average salary for female teachers was \$3,756 with standard deviation of \$259. With a lower average

¹Direct tuition payments are also included in the cost of instruction per pupil. Since only two schools showed expenditures for this item, this element of cost may be considered unimportant.

salary than male teachers, the variance in the salaries of female teachers was higher. The ninety-nine percent confidence interval for the estimate of the mean of the salary for female teachers was between \$3,075 and \$4,437.

The significance of the difference in salaries between male and female teachers was noted in the simple correlation coefficient of .3085 between the proportion of males in each school and the cost of instruction per teacher. This correlation was significant at the one percent level. On the basis of this significance, the variable representing the proportion of male teachers in each school was considered in connection with the multivariate analysis of the next section.

Variation in the cost of instruction per teacher might be accounted for by some measure of the school district's ability to financially support the educational program. A common unit of measure to reflect this ability is the unadjusted tangible assessed valuation of the school district divided by the number of pupils in average daily attendance.

The simple correlation coefficient between the average salaries of male teachers and the district assessed valuation per pupil was $-.0395$. The comparable coefficient for the average salaries of female teachers was $.300$, which is significant at the one percent level. On the other hand, a highly significant simple correlation of $.551$ was found between the average salary of male teachers and the average daily attendance, while the correlation between the average salary of female teachers and the average attendance was $.105$ and thus not significant at the one percent level.

A multiple regression of the average annual salary for male teachers on the average daily attendance and the assessed valuation per pupil was

$$X_s = 4114.009 + .325240(X_e - 66.8611) - .032906 (X_v - 78.2685)$$

where X_s is the average annual salary for male teachers in tens of dollars

X_e is the average daily attendance

and X_v is the assessed valuation of the school district per pupil in thousands of dollars.

Thus on the average for the 108 schools there was an increase of \$32.50 in the average salary for male teachers for each increase of ten pupils in average daily attendance. The t-value for this regression coefficient was 8.03 showing significance with substantially less than one chance in a thousand that this factor was actually non-significant.

The derived t-value for the coefficient of the variable representing school district valuation was not significant. Confounding was suspected and this can be supported by the simple correlation coefficient of $-.339$ which, with significance at the one percent level, showed that high district valuations per pupil were associated with a low average daily attendance.

The fraction attributable to regression in this equation was only $.367$; the coefficient of multiple correlation was $.606$. It was clear that a substantial proportion of the variation in the average salary of male teachers was unexplained.

Average Daily Attendance and Teacher-Pupil Ratio

The distribution of the average daily attendance for the 108 schools is shown in Fig. 8. This distribution was skewed to the right indicating a scattering of schools with what may here be considered as large enrollments. The median average daily attendance was fifty with the mean near sixty-seven. The standard deviation of the mean is naturally high at forty-eight pupils. With the range in the average attendance for the population observed from

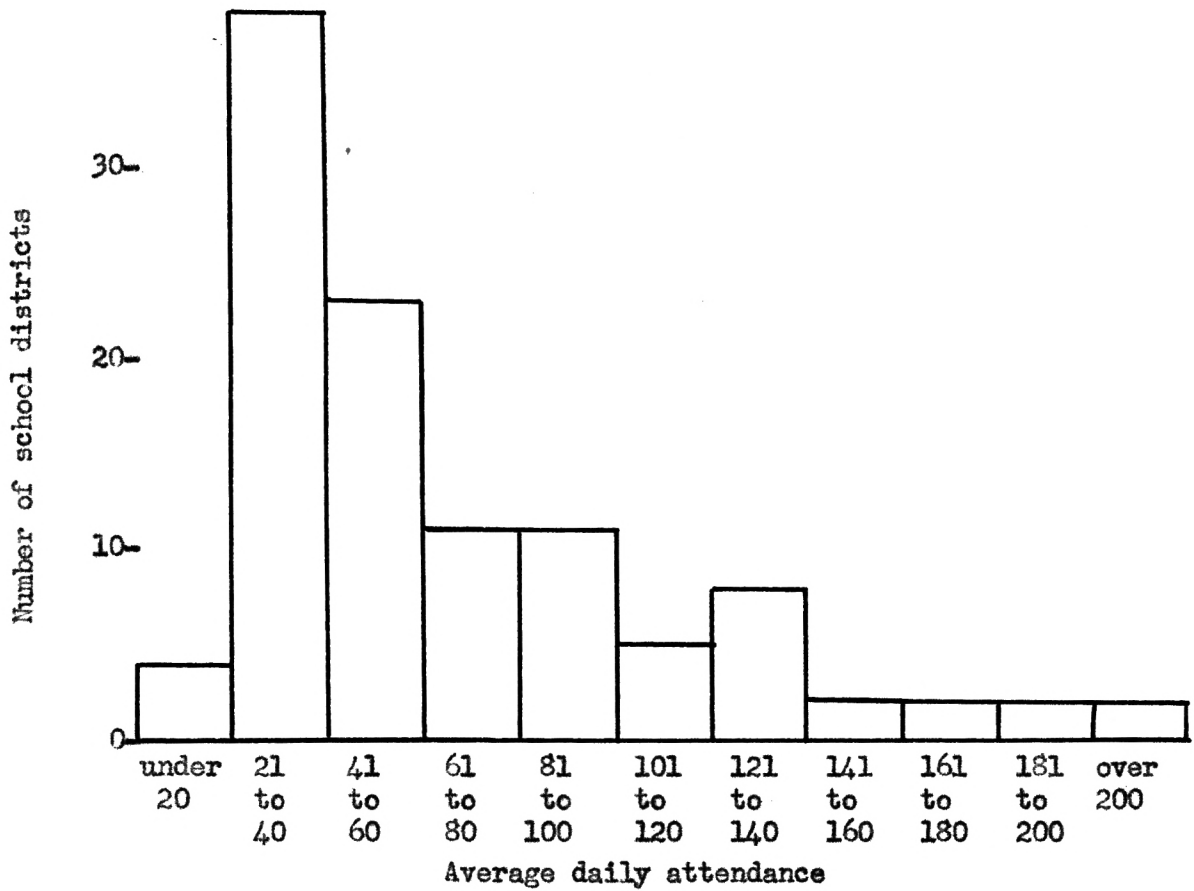


Fig. 8. Distribution of schools according to average daily attendance in 108 rural high schools in Central Kansas, 1956-1957.

thirteen to 262, it is significant to note that nearly sixty percent of the schools observed had an average daily attendance between twenty and sixty.

The simple correlation between the average daily attendance and the teacher-pupil ratio was $-.69$ denoting significance at the one percent level. A scattergram illustrating this relation is shown in Fig. 9. Considering the wide range in average daily attendance, the relation is distinctly curvilinear and appeared to be of the form $y = \frac{1}{x}$ when a translation of the axes was performed. Certain constants were also introduced to retain the units in their original form. The resulting equation for the fitted curve was

$$\frac{T}{P} = \frac{1.665}{X_e - 10} + .06 \quad (3)$$

where X_e is the average daily attendance.

This relation is not such that the teacher-pupil ratio can be determined strictly from the average daily attendance. It may only be stated that the derived equation approximates an average of the teacher-pupil ratios, given the average daily attendance for the schools considered in this study. An important characteristic of this relationship lies in the fact that while there was little variation in the teacher-pupil ratio among schools with average attendance over 100, the curve increases rapidly in slope to the left of this point and variation among schools of comparable size becomes more pronounced.

To cite a specific case from the study it was observed that among schools with an average daily attendance of thirty-two, there was a range in the teacher-pupil ratio from $.113$ to $.164$. These figures correspond to 8.8 and 6.1 pupils per teacher respectively. This appeared to indicate that school districts can have considerable freedom in determining the teacher-pupil ratio even when enrollments are small. However, no high school may be accredited with

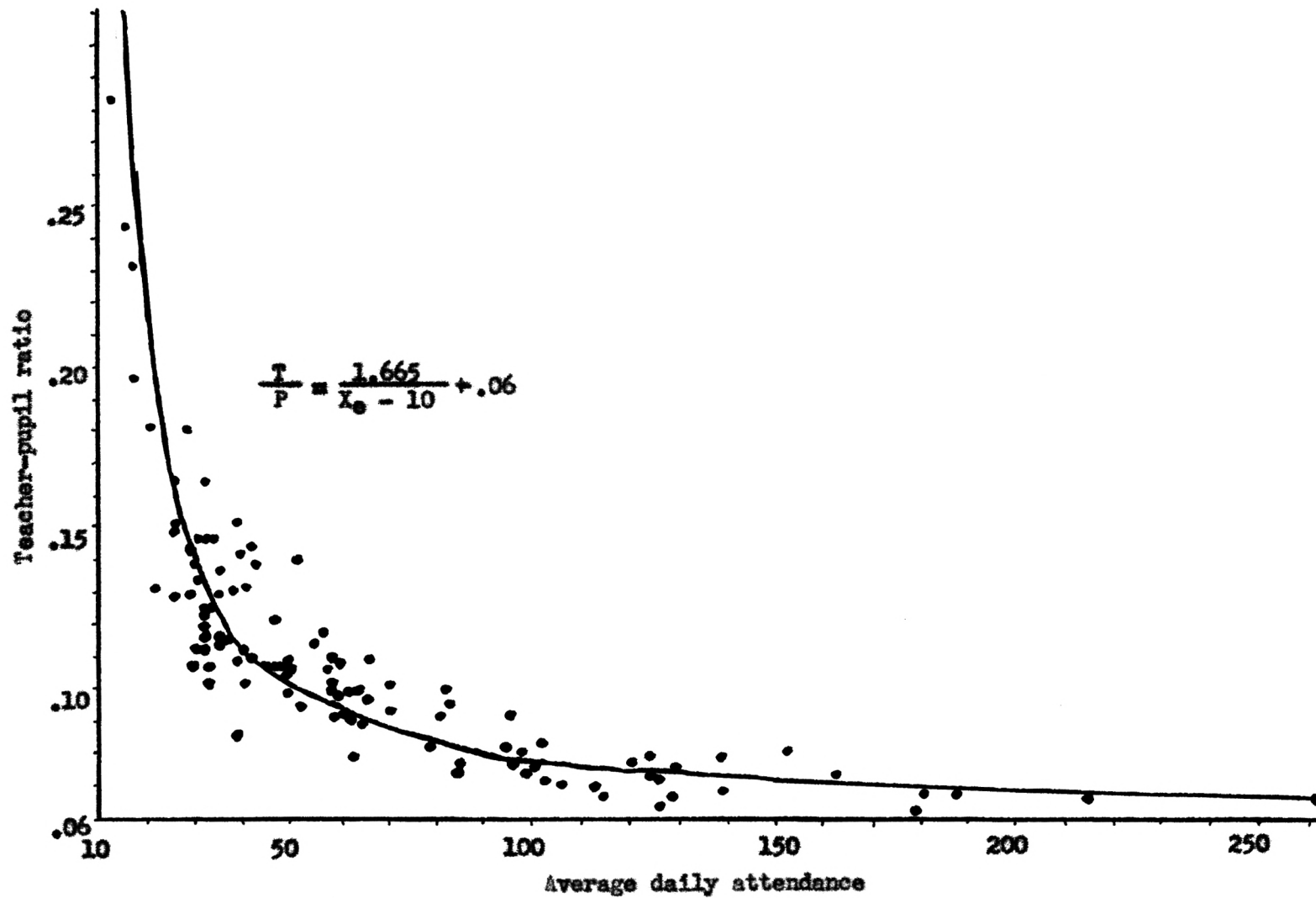


Fig. 9. Teacher-pupil ratio and average daily attendance in 108 rural high schools in Central Kansas, 1956-1957.

fewer than three teachers.¹ As such, the salaries of the three teachers constitute a fixed cost for schools with low enrollments.

District Valuation and Teacher-Pupil Ratio

Variation in the teacher-pupil ratio especially among schools with limited enrollments may be partially accounted for by the district's assessed valuation per pupil. It appeared reasonable to hypothesize that a district with a relatively high assessed valuation per pupil could maintain a higher teacher-pupil ratio than a district with a comparable enrollment but operating with a much smaller tax-base.

It is important to recognize that maximum limits to the tax rate which may be levied by the district are established by statute. The tax rate limit for the rural high schools considered here is eight mills except for one county where special legislation has increased this rate to twelve mills.²

While this limit may be increased up to twenty-five percent in an election with an affirmative vote by three-fourths of those persons voting, statutory restrictions do constitute a limit to the amount of revenue which a district may raise with a given assessed valuation.³

The percent of true value at which properties are assessed would be an important factor to consider. With limitations established on the tax-rate, assessment ratios become more important. Average ratios for both urban and non-urban real estate derived by the State Commission of Revenue and Taxation indicate that the range in Kansas counties for the tax year 1956 was from twelve

¹State Department of Public Instruction. Kansas Secondary School Handbook, page 55.

²1955 Supplement to the General Statutes of Kansas, chapter 79, article 19, section 58; Session Laws of Kansas, 1951, chapter 412, section 1.

³General Statutes of Kansas, chapter 79, article 19, section 63.

to forty-four percent.¹ Even within the counties observed in this study, assessment percentages varied from fifteen to forty-one percent.

None of the schools observed in this study had exceeded the eight mill limitation, yet some were close enough to this limit that if additional revenue of several thousand dollars were required, an election would be necessary to consider an increase in the tax rate. Since limitations to the tax rate and the assessment ratio are actually exogeneous factors with respect to the school district, any intensive analyses of these factors is beyond the scope of this investigation.

A high positive correlation between average daily attendance and district valuation suggests that the population of an area may be closely related with the taxable assessed valuation of that area. In general if the population of an area is small, the valuation consists primarily of real-estate and the sparseness of population itself may reflect a relatively low value for such property. On the other hand, a more populous area is likely to be associated with more intensive economic activity and thus reflect a higher valuation for real-estate and greater wealth in other properties. While these relations would appear to hold for agricultural communities it must be recognized that urban influences may exert other forces. Certainly in the area observed in this study, mineral deposits contributed substantially to the valuation of real estate in some school districts.

From these assumptions it might appear difficult to explain in general why school districts with low enrollments have higher tangible property valuations per pupil than do districts with larger enrollments. One reason may be that

¹State Commission of Revenue and Taxation. Report of Real Estate Assessment Ratio Study, 1956, pages 11-13.

districts with a small population are subject to greater variation in that functional relation which exists between total population and the number of children within certain school age groups. It is even possible, and common in some areas, that the population is made up of a disproportionate number of persons within a certain age group with an obvious effect upon the number of high school students.

It is believed, however, that primarily the high per pupil valuations of small school districts are due to the survival of those districts able to provide an accredited educational program. A substantial valuation per pupil is required if the district is to meet what may be considered as the high fixed costs of providing a minimum educational program. Those districts unable to accomplish this due to insufficient tax-base have been forced to close the school and have either consolidated with other districts, made agreements to have their pupils sent to other districts, or have disorganized the district.

A factor which tends to discount the importance of the district valuation is the fact that the "aid principle" exists in the state high school finance fund. An intensive analysis of this fund is beyond the scope of this investigation. It is certainly significant to note here that the formula for the distribution of this fund makes a deduction from the basic guarantee based upon a two mill tax rate applied to the adjusted valuation of the school district. The adjustment here is made separately to the valuations for rural real estate and urban real estate on the basis of ratios established by the State Commission of Revenue and Taxation.¹ In conjunction with other deductions

¹General Statutes of Kansas, 1949, chapter 79, article 14, section 37 and 1955 Supplement to the General Statutes of Kansas, chapter 72, article 63, sections 1-5.

made from the basic guarantee, it is not uncommon for a district with substantial valuation per pupil to receive no payment from this fund.¹

It is significant to mention that of the 108 rural high schools observed in this study, twenty-three received less than \$500 from the state high school finance fund. This includes districts which received no payment whatsoever. Of the twenty-three districts, all but three had per pupil valuations in excess of \$109,000 per pupil. During the 1956-1957 school year a school had to have an average daily attendance of at least twenty-three pupils in the previous school year to participate in the distribution of this fund. It appeared from the average daily attendance for the previous school year that only three of the twenty-three districts would have been eliminated on the basis of the attendance requirement. This is to imply that high district valuations in combination with the other deductions of this fund more than offset the initial basic guarantee for the remaining twenty school districts.

It may be observed from Table 6 that there was some decline in the median assessed valuation per pupil for successive increases in enrollment. While considerable variation existed in the district assessed valuation per pupil throughout the range in enrollment for the schools observed, the variation was even more pronounced among schools with lower enrollments.

From these facts it was reasoned that analysis of the effect of the district valuation per pupil on the teacher-pupil ratio would require a technique in which other factors could be equalized. For this reason, these factors were

¹Interview with Mrs. Fay Kampschroeder, Assistant Director, Finance Division, Kansas State Department of Public Instruction, August 25, 1958. Note: Besides a standard deduction based upon the average daily attendance for the preceeding school year, there is also a deduction made by a one mill tax rate applied to the unadjusted valuation of the non-high school territory in the county with this amount prorated among the schools of the county on the basis of the average daily attendance for the previous school year.

Table 6. Average daily attendance and district assessed valuation per pupil in 108 rural high school districts in Central Kansas, 1956 - 1957.

District valuation per pupil	Average daily attendance									
	0 to 30	31 to 40	41 to 50	51 to 60	61 to 70	71 to 90	91 to 110	111 to 130	over 130	over 130
over 250	2									
240 - 249										
230 - 239										
220 - 229										
210 - 219										
200 - 209										
190 - 199		1								
180 - 189			1							
170 - 179										
160 - 169	1	1						1		
150 - 159	1		1							
140 - 149	1					1				
130 - 139				1			1			
120 - 129			1	1						
110 - 119				1			1			
100 - 109	1									
90 - 99		2		1				2		
80 - 89	5	5	3		1	1				
70 - 79	3	6		2					1	1
60 - 69	1	4	4		1	1				1
50 - 59		3	1	4	5		2	3		3
40 - 49	1	3	1	1	1	2	2	3		2
30 - 39		1			1		1	2		2
20 - 29							1			
Median valuation per pupil	88	71	73	72	55	71	54	45		53

considered further in the multivariate analysis where both the district valuation per pupil and the teacher-pupil ratio were introduced in a multiple regression equation.

MULTIVARIATE ANALYSIS OF FACTORS AFFECTING COST OF INSTRUCTION PER PUPIL

Model

The model for the multiple regression on the cost of instruction per pupil used in this investigation was

$$\frac{C_I}{P} = a' + b_1'X_{t/p} + b_2'X_u + b_3'X_a + b_4'X_m + b_5'X_v + e \quad (4)$$

where

C_I/P is the cost of instruction per pupil in average daily attendance

$X_{t/p}$ is the teacher-pupil ratio

X_u is the percent of the school's educational program in optional curriculum areas

X_a is the proportion of the administrator's time spent in non-teaching duties, (administrative and supervisory work)

X_m is the percent of the school faculty which holds Master's degrees

X_v is the assessed valuation of the district per pupil in thousands of dollars

the $(b)'s$ are parameters of regression

a' is the mean of the population when all the variates equal their respective means

and e is a random variable, normally distributed with mean equal to zero.

This model was conceived after careful study was made of the simple correlations between all variables which might be suitable for the model presented above. Some variates were eliminated because of low correlation coefficients.

This was done only after careful analysis was made of all interdependencies. For example, it was hypothesized that the proportion of the administrator's time spent in non-teaching duties would affect the cost of instruction per pupil. A negative correlation coefficient of $-.19$ was observed, however. Realizing that this proportion was highly correlated with the average daily attendance, it was reasoned that the attendance factor was confounding the correlation. In multivariate analysis, however, a portion of this interrelationship could be isolated. It will be observed that the estimate of the coefficient of regression for this variable was positive and significant at the one percent level.

A preliminary regression equation was established to eliminate several non-significant variables. In this equation the pupil-teacher ratio was used in the place of the teacher-pupil ratio.

With such a high proportion of the cost of instruction represented by salaries of teachers and administrators, it was necessary that the model for the multiple regression equation be established in cognizance of this special requirement. The requirement for additive relationships among all the independent variables was maintained so that each was consistent with the unit of the dependent variable.

The teacher-pupil ratio was introduced into the multiple regression equation in the place of the more common pupil-teacher ratio primarily because of the additive requirement established by the model. As will be observed the coefficient for this variate is significant per se. The teacher-pupil ratio also had a higher simple correlation coefficient with the dependent variable than did the other ratio.

The percent of the school's total course offering in optional curriculum groups was believed to be a significant factor in affecting cost of instruction.

This factor showed a low correlation of .0796 with average daily attendance and it was thus reasoned that a high percentage in this variate was not peculiar to large schools. It was observed, however, that this was negatively correlated with the cost of instruction, the coefficient being $-.256$. This tended to cast doubt upon the hypothesis that an increase in this percent would significantly affect cost of instruction per pupil. The variate was included in the equation because of this significant correlation.

The proportion of the administrator's time devoted to administrative and supervisory functions was included because there appeared to be considerable variation in this proportion among schools of approximately the same size. The reasoning employed in consideration of this variable was previously discussed in this section.

It was believed that some factors denoting the experience and educational level of the school staff should be considered for inclusion in the regression equation. This seemed especially important since a high proportion of the cost of instruction consisted of teachers' salaries. Both the average years experience of the school staff and the percent of the faculty with Master's degrees, however, failed to show significant simple correlation even at the five percent level. A confounding of effect due to the size of school was not apparent, for it was observed that a positive correlation of .0809 existed between this factor and the average daily attendance. Both variables were introduced into the preliminary regression equation following the pupil-teacher ratio and the percent of the course offering in optional curriculum groups. In this equation a t -value of 3.11 which was significant at the one percent level was found for the variable denoting the percent of the school's staff with Master's degrees. The variable representing the average years experience of the teaching staff was determined not significant in this equation. This appeared to justify the decision to

eliminate the variable representing the average years experience of the school staff and to introduce the variable denoting the percent of the teaching staff with Master's degrees into the final regression equation.

The last variable introduced into the multiple regression equation was the assessed valuation per pupil. The simple correlation between this variable and the dependent variable was .744. This undoubtedly represented some degree of interdependency. The simple correlation between this factor and the teacher-pupil ratio was .628. This was believed to be a reflection of the influence of the average daily attendance on the teacher-pupil ratio since a significant negative correlation had already been observed between the assessed valuation per pupil and the average daily attendance. This relationship was fully understood upon the establishment of this equation. It was held, however, that both factors should be included in the regression, for they both occupied strategic positions in the model which had been formulated.

The variable denoting the ratio of the number of male teachers to the total number of teachers employed was also considered. The simple correlation coefficient between this variable and the dependent variable was $-.0414$. This was not significant and implied a relation contrary to that hypothesized. The only interdependency observed which might result in confounding was shown in the simple correlation coefficient of .167 (not significant at the five percent level) between this factor and the average daily attendance. Because of the high negative correlation between the cost of instruction per pupil and the average daily attendance, this factor was introduced in the preliminary regression equation mentioned earlier. The t -value was 1.24 for the estimated regression coefficient and the factor was dismissed from further consideration as being non-significant.

It is important to denote what each of the parameters, (b') 's, represents

in the model. This not only enables the estimates of the regression coefficients to be better understood and consequently become more meaningful, but it also serves to test the logic and the completeness of the model.

The first parameter denoted b_1' can be said to represent the average basic cost incurred in employing a teacher in all the 108 schools. With the numerator of the variate and the denominator of the coefficient representing teachers, this unit is cancelled out and the resulting product is in terms of dollar cost per pupil. This term is thus suitable for the additive model. Since costs other than those of teachers' salaries are included in the cost of instruction, it must be assumed that a portion of these costs will bear some functional relation with the teacher-pupil ratio, and as such serve to increase the magnitude of this coefficient over what otherwise might be the average basic salary of teachers in the 108 schools.

The second parameter, b_2' , represents the average additional expense per pupil, consisting of both teachers' salaries and instructional supplies, if the complete educational program was within the optional areas of the curriculum which were believed to reflect higher costs.

The third parameter, b_3' , represents the average annual salary per pupil for full-time administrators. The variate in denoting the proportion of the administrator's time spent in non-teaching duties would thus serve to reduce this factor for schools in which the administrator served as a teacher and was thus engaged less than full-time in the performance of administrative and supervisory duties. The inclusion of this variable into the equation accounts for that portion of the cost of instruction per pupil which is due to the cost of administration and supervision within each district.

The fourth parameter, b_4' , divided by 100 represents the average increment added to the cost of teachers' salaries per pupil if all teachers in the school

possessed Master's degrees. Since the variate was entered as the percent of teachers with Master's degrees, division of this coefficient by 100 was required in order to preserve the additive relation.

The fifth and last parameter, b_5' , was designed to measure any other additions to the cost of instruction per pupil which might be attributed to the greater ability of some school districts to support a more costly educational program. The variate in this term was the assessed district valuation per pupil.

Solution

Upon solution for the parameters by the method of least squares, the multiple regression equation (4) became

$$\frac{C_I}{P} = 112.197 + 3918.44X_{t/p} - 1.73777X_u + 51.2075X_a + .622890X_m + .867555X_v \quad (4)$$

(.0316)
(.0235)
(.0248)
(.0228)
(.0298)

where the standard errors for the estimates of the regression coefficients are shown in parentheses. The coefficient of multiple correlation for the estimated equation was .974; the fraction then attributable to regression was .948.

The estimate for the first regression coefficient, b_1' , was \$3,918.44, representing the average basic outlay for instruction per teacher in the 108 high schools. In terms illustrating the effect of the teacher-pupil ratio on the cost of instruction per pupil, the variate may again be considered as teachers per 100 pupils as was done in the simple linear regression on this factor discussed in the previous section. The regression coefficient may thus be divided by 100 so it is in terms of dollar cost per 100 students. Thus for each additional teacher per 100 pupils, the cost of instruction per pupil increased on the average \$39.18.

The multiple regression coefficient differs from the simple linear regression coefficient derived in the previous section. The comparable estimate was

found to be \$45.30. The difference was undoubtedly due to the influence of the other variates in the multiple regression equation and would thus indicate that the simple regression coefficient was somewhat over-estimated.

The significance of the teacher-pupil ratio on the cost of instruction per pupil of course cannot be questioned. So important is this ratio that the proportion attributable to regression from this variate was in excess of .90. There thus remained less than .10 of the deviation from regression to be explained by all the other variables.

The derived estimate for the second coefficient of regression indicated that an increase of one percent in the percentage of the schools' course offering in optional curriculum areas actually decreased the total cost of instruction per pupil \$1.74. The t-value used to denote significance in the estimate of this regression coefficient was found to be 2.38 with 102 degrees of freedom. This constitutes significance at the two and one-half percent level.

It was of course observed that the simple correlation coefficient between this variable and the cost of instruction per pupil was $-.256$, showing significance at the one percent level. With the percent of course offering in optional curriculum areas showing a low and non-significant correlation of $.080$ with the average daily attendance, this factor was considered independent of the enrollment of the school. On the other hand, the simple correlation with the teacher-pupil ratio was $.187$ which is nearly significant at the five percent level. This required a close look at the partial correlation coefficients among the variables introduced in the multiple regression equations.

In the preliminary equation where the pupil-teacher ratio was used in place of the teacher-pupil ratio, the partial correlation between the percent of the schools' course offering in the optional curriculum areas and the pupil-teacher ratio was $-.177$. In the second multiple regression equation the partial

correlation between this factor and the teacher-pupil ratio was .148. Thus in both instances this failed to denote significance at the five percent level. This would then make it unlikely that variation in the cost of instruction which might have actually been due to the percent of the course offering within the optional curriculum groups was accounted for by the teacher-pupil ratio. Partial correlation coefficients among all the other variates of the multiple regression equation (4) with this variable were not significant at the five percent level.

The estimate for the third regression coefficient was \$51.20. It will be recalled that this constant represented the average annual salary of the administrator per pupil, where the salary rate was established for full-time administrators. With the variate representing the proportion of the administrator's time spent in non-teaching duties, it can be stated that for each increase of ten percent in this proportion, the cost of instruction per pupil increases on the average \$5.12.

The t-value used in denoting the significance of this variable was found to be 2.75 which is significant at the one percent level. The reduction in variation of the dependent variable, however, was only .0084 after the previous two variates had been considered.

On the basis of this coefficient it could be stated that on the average, a full-time administrator in a school with average daily attendance of 100 pupils would receive \$5,120 as an annual salary. Although there were no full-time administrators in schools of this approximate size, it was observed that the average salary for administrators in the nine schools where average daily attendance ranged from ninety-four to 106, was actually \$5,226. In this size school, however, it was noted that approximately one-half of the administrator's time was spent in teaching. In schools with 200 enrollment, this coefficient would greatly over-estimate the salary of the administrator. This is probably

a reflection of the assumptions of linearity over the wide range in enrollments, but may also be due to other costs of administration being accounted for by this variate. In small schools this coefficient times the variate would provide a reasonable estimate for administrative costs. There was, however, considerable variation in this proportion, especially among schools with low enrollments. The range among all the schools considered was from zero to one, and the mean was .426 with standard deviation of .244.

As was expected, the partial correlation coefficient of .380 between this proportion and the teacher-pupil ratio was significant at the one percent level. This would indicate that there was some confounding in the effect of these two variables.

The estimate for the regression coefficient of the variable denoting the percent of teachers with Master's degrees was found to be \$.62. With a t-value of 1.88 and 102 degrees of freedom this factor was not significant at the five percent level. There was, however, a significant partial correlation of .198 at the five percent level denoting a confounding effect in this equation between this variable and the teacher-pupil ratio.

The estimate for the coefficient of the variable representing the district valuation per pupil was .8675. This factor was to represent the additional increase in the cost of instruction per pupil which was due to the school district's ability to support a more costly program of education. For each thousand dollar increase in the assessed valuation per pupil, the cost of instruction increased only about eighty-seven cents per pupil. This factor, however, was highly significant with a t-value of 7.30. (In declaring significance with 102 degrees of freedom and with only one chance in a thousand of being wrong, a t-value of 3.39 is required.)

With such significance, the relatively small contribution to the cost of instruction per pupil as shown by the estimate of the coefficient of regression may appear puzzling. The district valuation per pupil for the 108 school districts ranged from \$28,000 to \$327,000 with median \$63,000, mean \$78,000 and standard deviation of nearly \$30,000 per pupil. From the data it was observed that it was not uncommon for one school to have twice the assessed valuation per pupil as another school with approximately the same enrollment. There were several cases where even a much greater difference existed. From this standpoint, the rather small coefficient for this variable is merely a reflection of the unit of measure chosen for the variate.

MULTIVARIATE ANALYSIS OF FACTORS AFFECTING COST OF SCHOOL PLANT OPERATION PER PUPIL

Considerable difficulty was encountered in establishing a model for the multiple regression analysis of the per pupil cost of school plant operation. From the two school district reports previously discussed there were only six factors which might be considered as independent variables for this analysis. The six factors were: average daily attendance, school district assessed valuation per pupil, separate valuation figures for school building and grounds, and for school furnishings and equipment, age of the school building, and the total number of rooms utilized by the high school.

Simple correlation coefficients between these variables showed a large number of interdependencies. Deductive inference would certainly substantiate this finding. The assessed valuation of the district per pupil was one notable exception, for this factor was interrelated solely with the average daily attendance.

Despite the interdependent relationships existing among the independent

variables, equation (5) was established to include factors thought best able to explain the variation in the cost of school plant operation per pupil. Simple correlation coefficients between each of the independent variables and the dependent variable provided further bases for disregarding variables representing the number of rooms utilized by the high school and the age of the school building. The following multiple regression equation was then established for this analysis.

$$\frac{C_0}{P} = a' + b_1'X_v + b_2'X_e + b_3'X_f + b_4'X_b + e \quad (5)$$

where $(C_0/P)'$ is the cost of school plant operation per pupil

X_v is the assessed valuation of the school district per pupil in thousands of dollars

X_e is the average daily attendance

X_f is the valuation of school furnishings and equipment in thousands of dollars

X_b is the valuation of school buildings and grounds in thousands of dollars

a' is the mean of the population when all variables equal their respective means

the $(b')'$ s are the parameters of regression

and e is a random variable normally distributed with mean equal to zero

Unlike the model established for regression analysis on factors affecting the cost of instruction per pupil, the parameters for this regression equation are not significant per se; their significance is restricted to establishing a quantitative measure of importance for each respective variate.

Upon solution for the parameters, by the method of least squares the

equation became

$$\frac{C_0}{P} = 129.0163 + \frac{.7657X_v}{(.0752)} - \frac{.5286X_e}{(.1137)} - \frac{.01719X_f}{(.0885)} + \frac{.06676X_b}{(.1044)} \quad (6)$$

The standard errors for the estimates of the coefficients of regression are shown in parentheses.

The coefficient of regression for the first variate which represented the assessed valuation of the school district per pupil shows that on the average for the 101 schools considered in this analysis, the cost of school plant operation per pupil increased \$7.66 for each increase of ten-thousand dollars in the assessed valuation per pupil. The second coefficient, on the other hand, indicated an average decrease in the operating costs per pupil of \$5.29 for each increase of ten pupils in the average daily attendance.

From the simple correlation coefficient of $-.335$ between average daily attendance and the assessed valuation of the district per pupil, it would appear that both regression coefficients are simply showing that high per pupil costs for school plant operation are associated with low enrollments and high district valuations per pupil. It was mentioned previously that the latter variable was thought to be characteristic of schools with low enrollments. The partial correlation coefficient between these two variables, with the effect of others in the equation held constant, was $-.0766$, indicating a high probability of non-significance. This would tend to lend credibility to the derived estimates for the first two variables. The t-value for the first coefficient was 7.49 and for the second, a value of 3.49. Both factors may then be considered significant with less than one chance in a thousand that a non-significant relation actually exists between these factors and the dependent variable.

Both variables representing the valuation of school properties were non-significant on the basis of derived t-values for their respective regression

coefficients. Partial correlations between each of these variables and the average daily attendance were significant at the one percent level. This introduces the element of confounding and raises some doubt on the accuracy of the estimate derived for the coefficient of the variate representing average daily attendance.

The coefficient of multiple correlation for the derived regression equation was .740 and thus the fraction attributable to regression, denoting the goodness of fit, was .548. Considerable variation in this cost was therefore unexplained.

CONCLUSIONS

The teacher-pupil ratio was found to be the most significant factor in accounting for the extensive variation in the cost of instruction per pupil. The simple correlation between this factor and the cost of instruction per pupil was .95, and this may be contrasted with the correlation of .00070 found between the cost of instruction per teacher and the cost of instruction per pupil. This indicated that the number of teachers relative to the number of pupils was by far the better criterion for estimating the cost of instruction per pupil than was the amount spent per teacher.

It cannot be inferred that the cost of instruction per teacher was relatively constant throughout the number of schools considered, for it was noted that this amount ranged from \$3,806 to \$6,444.

The extreme variation in this cost required some explanation. A difference in the average annual salaries for each sex was thought to be partially responsible for this variation. This was substantiated by a simple correlation of .308 between the ratio of male teachers to the total number of teachers and cost of instruction per teacher. A multiple regression of the average salaries for male teachers on the average daily attendance and the assessed valuation of

the district indicated that the average annual salaries of male teachers increased on the average \$32.50 for each increase of ten pupils in the average daily attendance. A confounding element was suspected, however, for the coefficient of the term representing assessed valuation per pupil was negative, inferring that an increase in the assessed valuation per pupil would be associated with a decline in the average salary of male teachers. This result was not considered seriously, for it was shown later in a multiple regression equation that the assessed valuation per pupil contributed significantly to the cost of instruction per pupil.

There was some evidence from the simple correlation coefficients that the salaries of male teachers were significantly higher in schools with large enrollments, while average salaries for female teachers were relatively higher in the small schools. This possibility, however, was not fully explored.

The importance of the teacher-pupil ratio on the cost of instruction per pupil made consideration of other factors bearing significantly on this proportion worthy of study. The influence of the average daily attendance on the teacher-pupil ratio was examined. A scattergram illustrated a curvilinear relation between these two factors when the entire range in the average daily attendance was considered. While there was considerable variation observed in the teacher-pupil ratio among schools of approximately the same attendance, the variation was more evident in the smaller schools. This was considered important, for it indicated that school districts do have some freedom in determining this ratio even when enrollments are small.

The importance of the assessed valuation of the district per pupil was also considered in connection with the teacher-pupil ratio. Although tax-rate limitations would tend to make this an important factor, a deduction in the state high school finance fund based upon the adjusted assessed valuation of the

district would serve to decrease the importance of this factor. A significant negative correlation was derived between the average daily attendance and the assessed valuation per pupil denoting that a number of small schools had large valuations per pupil. For these reasons, the relation between the teacher-pupil ratio and the district assessed valuation per pupil was considered in the multivariate analysis. Here the partial correlation of these two variates was $-.36$.¹ This would imply that high teacher-pupil ratios are associated with low per pupil assessed valuations. The simple correlation coefficient between these two variables was $.63$. From such evidence it could not be stated that the assessed valuation per pupil significantly affected the teacher-pupil ratio.

In the multivariate analysis of the cost of instruction per pupil, the teacher-pupil ratio was found to account for about ninety percent of the variation in the dependent variable. The derived coefficient for this variable revealed that for each additional teacher per 100 pupils, the cost of instruction per pupil increased on an average of \$39.18.

The percent of the school's course offering in the optional curriculum areas was also found to be a significant factor, but the negative coefficient for this variate inferred that for each increase of ten percent, the cost of instruction decreased \$17.38.

Each additional increase of ten percent in the proportion of the administrator's time devoted to administration and supervision resulted in an average increase of \$5.12 to the cost of instruction per pupil. The partial correlation between this factor and teacher-pupil ratio was significant.

The coefficient for the variate representing the assessed valuation per

¹Other variables introduced in this regression equation were: the percent of the school's course offering in optional curriculum areas, the proportion of the administrator's time spent in administrative and supervisory duties, and the percent of the teaching staff with Master's degrees.

pupil showed that on the average, an increase of \$1,000 in this variate would bring about an increase of eighty-seven cents in the per pupil cost of instruction. Tests of significance showed that all four of these independent variables were significant at the one percent level. The other variable introduced in this equation, representing the percent of the school's staff with Master's degrees, was not significant at the one percent level.

The coefficient of multiple correlation for equation (4) was .974. The interdependencies among the independent variables, however, are somewhat disturbing. This of course is a reflection of the choice of variables introduced in this analysis. The relatively high correlation between the teacher-pupil ratio and the assessed valuation per pupil was recognized at the time that the model for this equation was conceived, yet it was believed preferable to introduce both variables.

In the analysis of the cost of school plant operation only the average daily attendance and the assessed valuation per pupil were found to be significant. These two factors were both interrelated as shown by the simple correlation coefficient. The coefficients derived in this equation indicated that on the average the cost of school plant operation increased \$7.66 for each \$1,000 increase in the assessed valuation per pupil, and that there was a decrease in this cost of \$5.29 for each increase of ten pupils in the average daily attendance. The multiple correlation coefficient was .74 and thus considerable variation in this cost was left unaccounted. This was due in part to the fact that insufficient information was available to which costs could be related.

For further study a more intensive analysis of a smaller number of schools would seem to be beneficial. In such a study it would be necessary to interview school officials, but it would appear that considerable insight could be gained into what factors are taken into account in determining the teacher-pupil

ratio, the salary system, the extent of specific auxiliary services which are provided, et cetera. By this method one would also have the advantage of obtaining better estimates of actual costs as well as being able to include depreciation and all interest charges. Under this plan it would be possible to consider the cost of pupil transportation and the increase in this cost which would be incurred upon expanding the school district to a more optimum size.

ACKNOWLEDGMENT

I wish to express my sincere appreciation to all who helped me in the preparation of this study. Special recognition is due Dr. Wilfred H. Pine, Professor, Department of Economics and Sociology, who served as my major professor and provided guidance with many helpful suggestions. I also wish to acknowledge the assistance given by Dr. A. M. Feyerherm of the Department of Mathematics, Dr. O. K. O'Fallon of the Department of Education, and Mrs. Fay Kampschroeder of the State Department of Public Instruction. My thanks also goes to those who were influential in extending to me the graduate assistantship which I have held during the past year.

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Kampschroeder, Mrs. Fay. Assistant Director, Finance Division, Kansas State Department of Public Instruction, Topeka. August 25, 1958.

APPENDIX

City _____

STATE OF KANSAS

School Year 195__ 195__

School _____

DEPARTMENT OF PUBLIC INSTRUCTION

Date Received _____

County _____

ADEL F. THROCKMORTON, State Superintendent

Class (Last Year)

(A-B-C-M)

District No. _____
If Rural or C S D. If city give street address

HIGH SCHOOL PRINCIPAL'S ORGANIZATION REPORT

DUE AT THE OFFICE OF STATE SUPERINTENDENT OF PUBLIC INSTRUCTION OCTOBER 15, EACH YEAR

ADMINISTRATION

SUPERINTENDENT _____ Salary _____

Years in present position, including current year _____

Years experience in elementary school _____ H. S. _____

Check the type of Administrator's Certificate held.

PROVISIONAL; 3 year _____ 5 year _____ Life _____

DATE OF EXPIRATION _____

PRINCIPAL _____ Salary _____

Years in present position, including current year _____

Check the type of Administrator's Certificate held.

PROVISIONAL; 3 year _____ 5 year _____ Life _____

DATE OF EXPIRATION _____

BOARD OF EDUCATION (Give name of each member):

President _____

Clerk _____

Treasurer _____

SCHOOL ENROLLMENT

YEAR	High School			Elementary School	
	Boys	Girls	Total	Grades	Grades
7				Kindrg'n	
8				1	5
9				2	6
10				3	7
11				4	8
12					
P. G.					
Total					

Number of high-school students from outside the high-school district:

Boys _____ Girls _____ Total _____

Number of high-school pupils from outside the county:

Boys _____ Girls _____ Total _____

Number of students graduated from your high school last spring:

Boys _____ Girls _____ Total _____

FACULTY

Number High-school Teachers Men _____ Women _____

Highest Annual Salary _____

Lowest Annual Salary _____

Average _____

Do you have a systematic salary schedule? Yes _____ No _____

(In the above statements do not include salaries of superintendent or principal or any faculty member who devotes one-half of his time to administrative or supervisory duties.)

ORGANIZATION

Population of city _____ Area in square miles of district _____

Valuation of district for current year _____

Bonded debt _____

Mills levied: For general operation _____; for indebtedness _____

Current budget for high school:

*Operation expenses _____ Capital outlay _____

* For High School only.

TYPE OF ORGANIZATION (As recognized by State Department of Public Instruction):

Underscore plan used. 8-4, 6-6, 6-3-3, 6-2-4, 6-4-4, 6-3-3-2.

State any change you wish in above type of organization _____

HIGH SCHOOL—Organized under what law: (Underscore):

Community, Rural, City 1, City 2, C S D, Private

Underscore the length of your class periods—40 min.; 60 min.

Length of all laboratory periods _____ Number per week _____

How many units do you require for graduation? _____

Number of Pupils Carrying for Credit

Less than 4 units	4 units	5 units	More than 5 units

SIZES OF CLASSES

No. pupils in class	1-5	6-10	11-15	16-20	21-25	26-30	31-35	Over 35
No. of Classes								

School accepting credit from nonaccredited schools thereby jeopardize their own accreditation.

On what basis do you admit students from other schools to advanced standing in your school? _____

What grade is required for passing? _____

Are accurate, complete, and cumulative records kept for each student? _____

Do you use textbooks adopted for high schools? _____

Do you use the text book rental system? _____

Date of opening of school this year _____ 19__

year ends _____; length of school term in days taught _____

(Schools are expected to teach 180 days with the pupils under the supervision of the teachers.)

LIST OF COURSES OFFERED FOR CREDIT TOWARD GRADUATION
SCHEDULES FOR GRADES 7-8 WILL BE FILLED OUT BY SIX-YEAR HIGH SCHOOLS ONLY
SCHOOLS MAINTAINING A JUNIOR HIGH SCHOOL WILL MAKE A SEPARATE REPORT

REQUIREMENTS:
 GRADES 9-12

1. Three units of language arts.
2. Two units of social studies which shall include one unit of American history, and ½ unit of government.
3. One unit of science.
4. One unit of mathematics.
5. One unit of health and physical education.

		GRADE IN WHICH SUBJECT IS OFFERED THIS YEAR				GRADE IN WHICH SUBJECT IS OFFERED THIS YEAR	
		1st Sem.	2d Sem.			1st Sem.	2d Sem.
Group I English. *Required In addition to the required English Major A Minor may be taken in this Group	*7th Grade English.....			Group V Languages.	Latin I.....		
	*8th Grade English.....				Latin II.....		
	*English I.....				Latin III.....		
	*English II.....				Spanish I.....		
	*English III.....				Spanish II.....		
	English IV.....				French I.....		
	{ Debate.....				French II.....		
	{ Speech.....				German I.....		
	{ Dramatics.....				German II.....		
	{ Forensics.....						
{ Journalism.....							
Group II Mathematics. *Required **One of these required	*7th Grade Mathematics.....			Group VI Business Education	Arithmetic.....		
	*8th Grade Mathematics.....				Bookkeeping I.....		
	{ 9th Grade Math. (Algebra I)				Bookkeeping II.....		
	{ Algebra II.....				Business English.....		
	{ Plane Geometry.....				Geography (Commercial).....		
	**{ Solid Geometry.....				Law.....		
	{ General Mathematics.....				Penmanship.....		
	{ Trigonometry.....				Shorthand I.....		
	{ Business Arithmetic.....				Shorthand II.....		
					Typewriting I.....		
Group III Social Science. *Required †One-half unit.	*7th Grade Social Science.....			Group VII Industrial and Vocational Subjects.	Typewriting II.....		
	*8th Grade Social Science.....				Junior Business Training.....		
	Citizenship.....				Secretarial Practice.....		
	Vocations.....				Salesmanship.....		
	World History.....				Office Practice.....		
	World Geography.....				Part-time Training.....		
	Ancient History.....				Work Experience Programs.....		
	Modern History.....				7th Grade Home Economics....		
	*American History.....				8th Grade Home Economics....		
	*American Government, including Constitution of the U. S....				Home Economics I.....		
Economics.....			Home Economics II.....				
Sociology.....			Home Economics III.....				
International Relations.....			7th Grade Industrial Arts.....				
Psychology.....			8th Grade Industrial Arts.....				
Guidance.....			Woodwork I.....				
†Driver Education.....			Woodwork II.....				
Family Living.....			Mechanical Drawing.....				
Group IV Sciences. **One of these required ***One of these required	**{ 7th Grade Science.....			#Three units of Voc. Agri- culture or three units of Voc. Home Economics will meet the Science Re- quirement.	General Shop.....		
	**{ 8th Grade Science.....				Auto Mechanics.....		
	General Science.....				Printing.....		
	Physical Geography.....				#Voc. Agriculture I.....		
	Agriculture (Gen.).....				Voc. Agriculture II.....		
	{ Practical Lab. Science.....				Voc. Agriculture III.....		
	{ Biology.....				#Voc. Home Economics I.....		
	{ Physics.....				Voc. Home Economics II.....		
	{ Chemistry.....				Voc. Home Economics III.....		
	Physiology.....						
Aeronautics.....							

Indicate only those subjects which are offered this year.

Indicate only those subjects which are offered this year.

SURVEY OF ACTIVITIES OF 1957 GRADUATES OF KANSAS HIGH SCHOOLS

	Boys	Girls	Total
Number of 1957 graduates: _____	_____	_____	_____
A. Number of 1957 graduates presently engaged in each of the following activities:			
1. Employed full time _____	_____	_____	_____
2. Attending junior college _____	_____	_____	_____
3. Attending senior college or university _____	_____	_____	_____
4. Attending business or trade school _____	_____	_____	_____
5. In nurse's training _____	_____	_____	_____
6. In military service _____	_____	_____	_____
7. Married (girls only) _____	_____	_____	_____
8. Miscellaneous (not included above) _____	_____	_____	_____
9. Unknown _____	_____	_____	_____
B. Number of 1957 graduates attending each of the following institutions:			
University of Kansas _____	_____	_____	_____
Kansas State College _____	_____	_____	_____
Fort Hays State College _____	_____	_____	_____
K. S. T. C., Emporia _____	_____	_____	_____
K. S. T. C., Pittsburg _____	_____	_____	_____
Washburn University _____	_____	_____	_____
Wichita University _____	_____	_____	_____
Baker University _____	_____	_____	_____
Bethany College _____	_____	_____	_____
Bethel College _____	_____	_____	_____
College of Emporia _____	_____	_____	_____
Friends University _____	_____	_____	_____
Kansas Wesleyan University _____	_____	_____	_____
Marymount College _____	_____	_____	_____
McPherson College _____	_____	_____	_____
Mount St. Scholastica _____	_____	_____	_____
Ottawa University _____	_____	_____	_____
St. Benedict's College _____	_____	_____	_____
Saint Mary College _____	_____	_____	_____
Southwestern College _____	_____	_____	_____
Sterling College _____	_____	_____	_____
Arkansas City Junior College _____	_____	_____	_____
Chanute Junior College _____	_____	_____	_____
Coffeyville College _____	_____	_____	_____
Dodge City College _____	_____	_____	_____
El Dorado Junior College _____	_____	_____	_____
Fort Scott Junior College _____	_____	_____	_____
Garden City Junior College _____	_____	_____	_____
Highland Junior College _____	_____	_____	_____
Hutchinson Junior College _____	_____	_____	_____
Independence Community College _____	_____	_____	_____
Iola Junior College _____	_____	_____	_____
Kansas City Junior College _____	_____	_____	_____
Parsons Junior College _____	_____	_____	_____
Pratt Junior College _____	_____	_____	_____
Central College _____	_____	_____	_____
Donnelly College _____	_____	_____	_____
Hesston College _____	_____	_____	_____
Miltonvale Wesleyan College _____	_____	_____	_____
Sacred Heart College _____	_____	_____	_____
St. John's College _____	_____	_____	_____
Tabor College _____	_____	_____	_____
Ursuline College, Paola _____	_____	_____	_____

EDUCATIONAL PROGRESS

What additions or changes have been made in your high school since September 15 of last year in—

(1) Building and grounds?

(2) Equipment?

Laboratory?

Library?

Shop?

Home Economics?

Business Education?

(3) Teaching force?

Number of new staff members_____ Number inexperienced_____

Give reason for any excessive turnover of teachers _____

(4) Courses of study?

Total units offered this year_____

Subjects added this year_____

Subjects dropped this year_____

List subjects alternated but not offered this year _____

TRANSPORTATION

How many buses are owned by the district?_____

How many pupils are served by the buses?_____ Cost per pupil?_____

How many pupils are transported by other means?_____ Cost per pupil?_____

How many miles are traveled daily by the buses?_____

How many miles in the longest route?_____

What is the longest time any one pupil is on bus?_____

If both (1) secondary pupils and (2) elementary pupils are conveyed, how many of each? (1)_____

(2)_____ Is adequate liability insurance provided?_____

Does the bus driver have other school duties?_____ If so, what?_____

SAFETY, HEALTH, AND PHYSICAL EDUCATION

1. List courses in which specific attention is given to safety education _____

_____ acres?_____

2. Do you have school lunch service? If so, is it sponsored locally or with federal funds?_____

What grades are enrolled? _____ Maximum size of class? _____

Boys_____ Girls_____ Boys_____ Girls_____

How many pupils are served daily?_____

No. of minutes per week? _____ Minimum size of class? _____

Boys_____ Girls_____ Boys_____ Girls_____

3. How many semesters of physical education do you require of boys?_____; for girls?_____ Is health instruction offered?_____

Does the school have a director of physical education?

(a) For boys_____

(b) For girls_____

4. Do you have an organized and functioning intramural program for boys?_____; for girls?_____

Who coaches athletic teams?

Boys_____ Girls_____

5. Is everyone required to participate in either the major athletic or in the intramural program?_____

6. Is your school a member of the State High School Activities Ass'n?_____

7. Does the school own a separate athletic field, if so, how many



HIGH SCHOOL

LIST TEACHERS ALPHABETICALLY Give full name. Do not use initials. Married women should include maiden name, if certificate was issued prior to marriage. <p style="text-align: center; margin: 0;">NAME</p>	KANSAS CERTIFICATE			Annual Salary	Years Experience (Include this year)		Name of High School in which Teacher Taught Last Year
	Kind (State exact title of certificate)	Date of Expiration			This School	Other Schools	
	(See list below)	Mo.	Yr.				
Example: Smith, Mary Jane (Jones)..... <p style="text-align: center; margin: 0;"> Last, First, Middle, (If married woman) Maiden </p>	(Degree)	June	1961	\$4,200	2	8	Glade
Superintendent..... Principal							

In giving the kind of certificate held, use the abbreviations enclosed in parentheses.

Secondary Certificates currently issued: (3 year) (5 year) (1 year).

Other Certificates: (degree life) (special life) (special in _____).

‡ This column is to be filled out only for teachers of mathematics, foreign languages, and commerce in A & B Schools. In C schools list all H. S. Units in field.

Teachers and administrators must meet all qualification requirements by October 15.

Place asterisk (*) on names of teachers devoting half time or more in grades one through eight and are reported on state school finance fund report (form 160).

Place double asterisk (**) on names that appear on both senior high school and junior high school reports.

COLLEGE TRAINING		SCHOLASTIC PREPARATION (Information is to be secured from official College transcripts)							
NAME OF COLLEGE	Degrees Held and Dates Issued	Subjects Taught in High School This Year	Sem. Hours in Subject	†H. S. Units in Field	Sem. Hours in Field	Subjects Taught in High School This Year	Sem. Hours in Subject	†H. S. Units in Field	Sem. Hours in Field
Bethany	A. B. '54	Algebra	10	1½	30	Physics	8		40
Kansas University	M. A. '55	Geometry	5	1	30	General Science	3		40
		Trigonometry	5	0	30				

OTHER PERSONNEL (NAMES)
 Custodian _____
 Transportation manager (other than superintendent or principal) _____
 School lunch manager _____
 Matron _____
 Nurse _____
 Office secretary _____
 Registrar _____

GUIDANCE SERVICES

- Name the teachers on your staff who have regularly assigned time for guidance duties, indicate the number of periods each is assigned for guidance responsibilities.
Do these teachers meet special subject and field requirements adopted by the State Board of Education? _____

Name	Periods per day	Certified	
		Yes	No

- Check following types of information maintained in cumulative records.

	Yes	No
a. Home Background: Family data.....	—	—
b. School History and Record of Class Work: Chronological record of attendance, achievement, activities, etc., including anecdotal records.	—	—
c. Mental Ability or Academic Aptitude: Results of standardized intelligence tests.	—	—
d. Achievement: Results of standardized achievement tests.	—	—
e. Health: A summary of health and physical characteristics.	—	—
f. Out-of-School Experiences: Work experiences and other activities.	—	—
g. Educational and Vocational Interests: Results of interest inventories.	—	—
h. Special Aptitudes: Comments by teachers, activities records, and results of aptitude scales. . .	—	—
i. Personality: Results of personality scales, anecdotal records, rating scales and sociometric scales.	—	—
j. Plans for the Future: Educational and occupational plans.	—	—
- Do you have a file of unbound occupational and educational information? Yes _____ No _____
- Has any member of your staff had a course in occupational information? Yes _____ No _____

- Do you have a placement program which assists graduates and drop-outs adjust to new situations whether further schooling or full or part-time job? Graduates Yes _____ No _____
Drop-outs Yes _____ No _____
- Do you follow up graduates and drop-outs in a systematic way? Graduates Yes _____ No _____ Drop-outs Yes _____ No _____
- Do you have a planned orientation program for your entering students? Yes _____ No _____

GROUNDS—BUILDING—EQUIPMENT

- How large is the school ground? _____
- When was the building erected? _____ Cost? _____
- How much insurance is carried? _____ Is it co-insurance? _____ For how much is furniture and equipment insured? _____
- Number of rooms used for high-school purposes? _____
- Does each room have equipment suitable for the purpose for which it is used? _____
- Do you have suitable furniture and equipment for Home Economics? _____ Shop? _____
Bookkeeping? _____ Typewriting? _____
- Is your laboratory equipped with suitable laboratory furniture? _____ Check the subjects for which the science equipment is adequate: General Science _____
Agriculture _____ Biology _____
Physics _____ Chemistry _____
- Is provision made for necessary decoration and repair of building? _____

AUDIO-VISUAL INSTRUCTIONAL MATERIAL

- | | |
|-----------------------------------|--------------------|
| 1. Material used—check types used | Micro-projector |
| Motion pictures | Charts and posters |
| Film strips | Globes and maps |
| Slides | Field trips |
| Mounted pictures | Radios |
| Exhibits and demonstrations | Recordings |
| Opaque Projector | |
- Amount of time given to this type of instruction _____
 - Are materials used as part of regular instruction in the classroom? _____
 - Are materials kept up-to-date? _____
 - Name of person in charge _____
 - List (below) the material and equipment in good condition _____

ADMINISTRATION

- Are meetings of board held regularly? _____
- Are formal minutes of each meeting kept? _____ By whom? _____
If school is CSD, RHS or Community are copies of minutes sent to the County Superintendent? _____
- Are the meetings attended by the Superintendent? _____, the Principal? _____
- Do you have regular faculty meetings? Yes _____ No _____ How frequently? _____
- Are these meetings mostly:
 - Routine organizational matters? _____
 - Systematic, continuous consideration of problems to improve instruction? _____
- Do you have written Board of Education Policies? _____
- Describe recent problems or studies _____

School _____
 City _____

GENERAL POLICIES, PLANS, AND PROCEDURES

Records and Pupil Accounting

1. Are school records kept in fireproof safe or vault? _____
 - 2.* Do all teachers have proper certificates? _____
 3. Is an official transcript of each teacher's college preparation kept on file? _____
 (By an official transcript is meant the institutional credit records certified by the registering officer of the higher institution, and carrying the seal of that institution).
 4. Have these official records been used as basis for reporting on teacher training in this report? _____
 5. Are official transcripts checked before employing and assigning teachers? _____
 6. Do you have a complete inventory of all equipment? _____
 7. Is the inventory kept in fireproof safe or vault? _____
 8. Is a permanent system of individual pupil records maintained? _____
 9. Do you use the Kansas Uniform Certificate of high school record? _____
 10. Check the items of information recorded on the individual pupil permanent record cards: School marks _____; Intelligence test scores _____; standardized test results _____; health, character, personality and other ratings _____; record after leaving school _____
 11. Check the record forms used: Registration card _____; program card _____; health record _____; attendance record _____; guidance record _____; activities record _____
- * This means a valid certificate in force at the beginning of the school year, or as of October 1.

EDUCATIONAL OUTLOOK

1. Do you have an active PTA? _____
2. How many teachers are members of:
 Local Teachers Association? _____
 State Teachers Association? _____
 National Education Association? _____
3. Is principal member of:
 Kansas Ass'n of Secondary School Principals? _____
 National Ass'n of Secondary School Principals? _____
4. Does the board of education elect and dismiss teachers only on recommendation of principal or superintendent? _____
5. Is there a continuous, systematic plan for in-service growth of all teachers? _____
6. How much orientation to policies and educational program is provided for new teachers? _____
 (Describe on separate sheet if necessary)
7. Is there a professional library of books, periodicals, pamphlets for teachers? _____
8. Does salary schedule encourage added teacher preparation and growth? _____
9. Is there a long range program of development in:
 Space for instruction? _____
 Equipment? _____

HANDLING OF ACTIVITY FUNDS

1. Is an accounting system used for your High School Activities? _____
2. Who is responsible for the accounting of the activities finances? _____
3. Does the person responsible have surety bond? Yes No
4. Do you issue serially numbered duplicate receipts for all money received? Yes No
5. Do you pay out money only by serially numbered checks? Yes No
6. Do you make periodic and annual summary reports to your school board? Yes No
7. Do you maintain a columnar account book? Yes No
8. Do you use serially numbered tickets for admittance to school events? Yes No
9. Do you have a regular audit? Yes No

ORGANIZATIONS OR ACTIVITIES

Names of literary, debating, athletic, music, or other pupils' organizations, clubs and activities worthy of favorable comment	Approximate membership	Number of meetings in year	Name of supervising teacher	Is school credit given for satisfactory work and, if so, how much?
1. _____	_____	_____	_____	_____
2. _____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____

SUPPLEMENTARY REMARKS

Describe the *method* used in your school to improve instruction.

It is exceedingly desirable and highly recommended that this report be discussed fully in school board meetings, so that the school board members may become familiar with the school organization, procedure, and requirements.

Before signing this report please look it over and see that every item has received proper attention.

Signed: _____ Prin. or Supt.

_____ Clerk of Board



1958-59

ANNUAL REPORT BY TEACHER, CLERK AND TREASURER TO COUNTY SUPERINTENDENT AND STATE DEPARTMENT OF PUBLIC INSTRUCTION

Common, Rural High and Community High School Districts

(This is your complete report to the annual school meeting and for the fiscal year)
For the fiscal year July 1, 1958, to June 30, 1959

District No. _____ Name of School _____ County _____

Type of School: (Check (✓) your type of school district)

- Common School District—One Teacher Rural High School
 Common School District—Elementary Only Community High School
 Common School District—Elementary and High

PUPIL DATA

1. CENSUS ENUMERATION: (Ages 5 to 21) (From page 6 of this report) Male _____ Female _____ Total _____
(Not applicable to rural and community high schools)

2. ENROLLMENT:

As of September 15, 1958: Kindergarten _____; Grades 1-8 _____; Grades 9-12 _____;
If your school has a junior high school accredited by State Superintendent of Public Instruction, place circle around grades included in junior high school. Example: (7) (8) (9).

TOTAL ENROLLMENT DURING YEAR, BY GRADES:

	Kindergarten	Elementary School GRADES										
		Ungraded	1	2	3	4	5	6	7	8	Total Grades 1-8	
Boys.....												
Girls.....												
Totals....												

	High School		GRADES			Total Grades 9-12	Enrollment Summary						
	9	10	11	12	Post-Grads and Specials		Kindergarten	Grades 1-8	Grades 9-12	Grades 1-12	Grades K-8	Grades K-12	
Boys.....													
Girls.....													
Totals....													

3. ATTENDANCE:

Total Days Attendance by All Pupils for the Term

(Count all days school was in session and pupils under supervision of teachers, plus authorized holidays observed.) (Kindergarten is on half-day basis. Divide total days attendance of kindergarten pupils by 2 before computing average daily attendance.)

Average Daily Attendance for the Term

(Divide total days attended by the length of the school term, not by the number of days school was in session.)

Grades	Length of Term*	Boys	Girls	Total	Grades	Boys	Girls	Total
Kindergarten.....		(÷2)	(÷2)		Kindergarten.....			
Elementary (1-8).....					Elementary (1-8).....			
High School (9-12).....					High School (9-12).....			

SCHOOL TERM

*(Length of term in days includes all days school was in session and pupils under supervision of teachers, plus authorized holidays observed.)

Number of days school was in session _____
 Closed for authorized holidays observed _____
 Length of term for attendance purposes _____

(Authorized holidays which can be observed: Memorial Day, Labor Day, Washington's Birthday, Lincoln's Birthday, Columbus Day and Veterans' Day.)

The teacher or superintendent should fill in on this report (3 copies) all information relative to enrollment and attendance. When the teacher or superintendent has completed the enrollment and attendance on these reports, they should be approved by the county superintendent and then returned to the clerk.

The financial section is for both clerk and treasurer, and both should sign the report.

Make and sign three copies of this report: Keep one copy for your files and send two copies to the County Superintendent. The County Superintendent, after examining the report, is to send one copy to the State Superintendent.

Mail to the County Superintendent not later than July 1.

ADEL F. THROCKMORTON,
State Superintendent of Public Instruction.

GENERAL FUND—FINANCIAL EXHIBIT

(Clerk's and Treasurer's books must balance)
(Do not include receipts from sale of bonds)

RECEIPTS: July 1, 1958, to June 30, 1959

- 1. Balance in hands of District Treasurer, July 1, 1958.....\$ _____
- 2. Received from County Treasurer, July 1, 1958, to June 30, 1959..... _____
- 3. Received from sale of property..... _____
- 4. Received from no-fund or emergency warrants..... _____
- 5. Received from Federal funds P.L. 874 (Maintenance and Operation)..... _____
- 6. Received from Vocational Education..... _____
- 7. Received from all other sources (Specify items):
 _____ \$ _____
 _____ \$ _____
- 8. TOTAL RECEIPTS DURING THE YEAR.....\$ _____

EXPENDITURES: July 1, 1958 to June 30, 1959

	Kindergarten	Grades 1-8	Grades 9-12	Total
9. GENERAL CONTROL: (Board conventions, record books, etc.).....				
10. INSTRUCTION:				
(a) Teachers' salary: Include withholding tax, retirement, and teachers' social security.....				
(b) Instructional supplies.....				
(c) Tuition to other districts.....				
11. TOTAL INSTRUCTION: (a) (b) and (c) above..				
12. OPERATION:				
(a) Janitors' salary and supplies.....				
(b) Light, power, fuel and water.....				
13. TOTAL OPERATION: (a) and (b) above.....				
14. FIXED CHARGES: (Insurance, rent, bond premium, school's portion of social security, etc.).....				
15. AUXILIARY AGENCIES: (Library, health, recreation, textbooks, *school lunch, etc.).....				
16. PUPIL TRANSPORTATION: (General Fund)				
(a) To and from school.....				
(b) Other than to and from school.....				
17. TOTAL TRANSPORTATION.....				
18. MAINTENANCE: (Upkeep of grounds, buildings, equipment, etc.).....				
19. TOTAL OPERATING EXPENSE.....				
20. CAPITAL OUTLAY: (Equipment, major repairs, etc., paid from general fund).....				
21. TOTAL EXPENDITURES: (Excluding Supplemental Activities) (Line 19 plus line 20).....				

- 22. TRANSFER from General Fund to School Bus Purchase Fund (Cannot be more than 10% of General Fund Receipts) \$ _____
- 23. TOTAL EXPENDITURES plus School Bus Purchase Fund Transfer (Line 21 plus line 22)..... _____
- 24. SUPPLEMENTAL ACTIVITIES: (Summer school, summer playground, night school, veteran's on-the-farm training) _____
- 25. GRAND TOTAL EXPENDITURES (Line 23 plus line 24).....\$ _____
- 26. BALANCE in district treasury, June 30, 1959 (Line 8 minus line 25) Line 25 plus line 26 should equal line 8.
- 27. BALANCE in county treasury, June 30, 1959 (this district).....

*Include only those school lunch expenditures paid from general fund. School lunch accounts are usually kept in another fund.

TEACHER INFORMATION: NUMBER OF TEACHERS AND SALARIES

(List part-time teachers in fractions and divide their salaries accordingly.
Include supervisors with teachers)

	Men		Women		Total	
	Number	Total Annual Salaries	Number	Total Annual Salaries	Number	Annual Salaries
Kindergarten.....						
Grades 1-8.....						
Grades 9-12.....						
Principals, Grades 1-8.....						
Principals, Grades 9-12....						

Superintendent's salary \$ _____; apportionment of salary charged to:

Kindergarten \$ _____; Grades 1-8 \$ _____; Grades 9-12 \$ _____

GRADUATES—EIGHTH GRADE AND HIGH SCHOOL

	Boys	Girls	Total
Number of eighth grade graduates, or pupils promoted to ninth grade this year.....			
Number of high school graduates this year.....			

LIBRARY

Volumes Purchased This Year	Cost of Volumes Purchased This Year	Total Number of Volumes In Library
	\$ _____	

Report of Board Membership:

Director _____ Address _____

Clerk _____ Address _____

Treasurer _____ Address _____

_____ Address _____

_____ Address _____

_____ Address _____

_____ Address _____

We hereby certify that this is a true and correct report for this district, and two copies of this report are being sent to the County Superintendent.

(Signed) _____
Superintendent or Principal

Clerk

Treasurer

July _____, 19 _____

TRANSPORTATION REPORT

For the fiscal year July 1, 1958, to June 30, 1959

- 1. Number of pupils transported to and from public school at public expense regardless of distance:
(a) Kindergarten
(b) Grades 1-8
(c) Grades 9-12
(d) Total (a, b, and c)
2. Number of pupils transported to and from non-public schools at public expense:
3. Number of pupils who live outside your district who are transported to your school at the expense of your district:
4. Number of your pupils transported to your school at public expense who reside less than 2 1/2 miles from your school building:
5. Number of pupils transported to any school:
6. Number of buses purchased this year:
7. Number of buses in use:
8. Number of private cars in use for transporting pupils.
9. Routes:
10. Total number of miles that all school buses were driven on regular routes during school year:
11. School transportation accidents during year:

TRANSPORTATION EXPENDITURES

July 1, 1958, to June 30, 1959

List expenditures from the General and Special Transportation Funds in the Proper Column. (This report should agree with your school's annual report)

Table with columns (A) GENERAL and (B) SPECIAL. Rows include: 12. Operation (Bus drivers' salaries, Gasoline and oil, Maintenance, supplies and equipment, Major repairs and replacements, Garage operation, rent, maintenance, etc.), 13. Transportation insurance, 14. Capital Outlay (For new and used buses, Transfer of funds to special bus purchase fund), 15. Contracted bus service, 16. Public carriers, 17. Mileage paid to individuals on private vehicles, 18. Total transportation expenditures (sum of 12 to 18, inc.), 19. How much of the expenditures listed above were for activity purposes, that is, for transportation other than from home to school.

NOTE: Funds transferred from General Fund or Special Transportation Fund to the Special Bus Purchase Fund should be carried as a balance in the Special Bus Purchase Fund until such time as actually expended.

SCHOOL CENSUS AS OF MAY 1, 1959

(Information gathered by Form 16)

Number of Persons

Age in Years	Boys	Girls	Total	
Under One Year				
1 to 2				
2 to 3				
3 to 4				
4 to 5				
Total Census under Five Years of Age				A
5 to 6				
6 to 7				
7 to 8				
8 to 9				
9 to 10				
10 to 11				
11 to 12				
12 to 13				
13 to 14				
14 to 15				
15 to 16				
16 to 17				
17 to 18				
18 to 19				
19 to 20				
20 to 21				
Total Census, Five Years Through Twenty Years (This is the basis for the annual school fund distribution February 15, next year.)				B
Total Number Persons in District Ages Birth Through 20 Years. (Total A+B)				C
Number of Persons Between Ages of 5 and 16 who have not completed the eighth grade (from Form 16)				D

PROJECTED SCHOOL ENROLLMENTS

In order to project school enrollments in September of any given year based on pre-school age children, will you please fill out the table below showing those children residing in your district and born during the six previous calendar years. This information can be obtained from the census enumeration by using the birthdays of the children. This information, as well as being useful to your school, will be helpful to this office and to the State Legislature in projecting future school enrollments for planning state aid and facility needs.

NUMBER OF CHILDREN BORN DURING CALENDAR YEARS

Year	Boys	Girls	Total	Will Enroll in First Grade in
1953				Sept. 1959
1954				Sept. 1960
1955				Sept. 1961
1956				Sept. 1962
1957				Sept. 1963
1958				Sept. 1964

REPORT ON EXCEPTIONAL CHILDREN

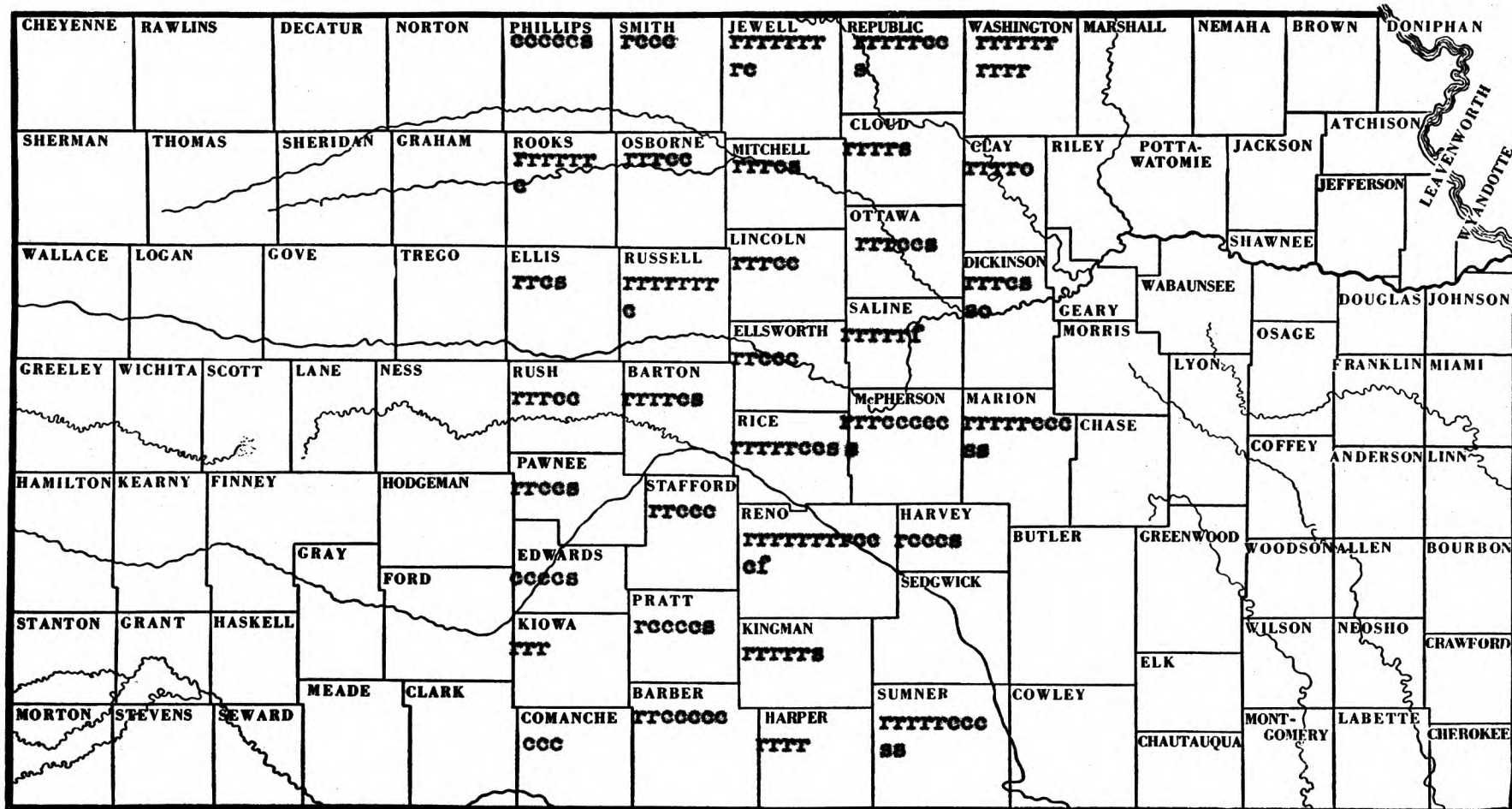
"Sec. 1 (1) Exceptional Children means children under 21 years of age who (a) are crippled; or (b) have defective sight; or (c) are hard-of-hearing; or (d) have an impediment in speech; or (e) have heart disease; or (f) have tuberculosis; or (g) have cerebral palsy; or (h) by reason of emotional or social maladjustment or (i) intellectual inferiority or (j) superiority do not profit from ordinary instructional methods; or (k) are unable to attend the regular public school classes with normal children by reason of any physical or mental defect." Sec. 72-5334, G. S. 1949.

District No. _____ : City _____ : County _____ : Year ending June 30, 19_____

Name of Child	Age	Sex	Nature of Exception											Confined to bed	Attends school: Where?	Able but not in school	Name of Parent or Guardian	Address of Parent or Guardian		
			(a) Crippled	(b) Sight	(c) Hearing	(d) Speech	(e) Heart	(f) Tuber- culosis	(g) Cerebral Palsy	(h) Malad- justed	(i) Mentally Deficient	(j) Gifted	(k) Home- bound							
(Ex.) John R. Doe	12	M			X											School for Deaf, Olathe		M. S. Doe	Route 4, Topeka, Kans.	
1																				
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				
11																				
12																				
13																				
14																				

Signed—District Clerk or Enumerator _____





Key: r - rural high school districts; c - common school districts; o - community high school districts; s - second class city school districts; f - first class city school districts.

Fig. 10. Map of Kansas showing distribution of high school districts in Central Kansas, 1956-1957.

A STUDY OF FACTORS AFFECTING COSTS IN RURAL HIGH
SCHOOLS IN CENTRAL KANSAS, 1956-1957

by

WILLARD ALAN WRIGHT

B. S., Kansas State University
of Agriculture and Applied Science, 1955
B. S., Kansas State University
of Agriculture and Applied Science, 1958

AN ABSTRACT OF A THESIS

submitted in partial fulfillment of the
requirements for the degree

MASTER OF SCIENCE

Department of Economics and Sociology

KANSAS STATE UNIVERSITY
OF AGRICULTURE AND APPLIED SCIENCE

1959

Public high schools in Kansas are supported by six basic types of public school corporations. Common school districts and rural high school districts are two of these legal organizations which are most extensive in non-urban communities throughout the state. This study has considered the rural high school district as the more important of the two both from the standpoint of number of school districts and from consideration of aggregate enrollment. This type of school district differs from the common school district in that it is organized solely for high school education whereas common school districts may provide for an educational program for grades one through twelve.

The purpose of this investigation was to determine per pupil costs of instruction and school plant operation and to relate these costs to significant and controllable factors originating within the school district. The scope of this study was limited to rural high school districts associated with cities under 2,500 in population located in thirty-four counties constituting the approximate central third of the state. No sampling was employed and thus from strict scientific consideration no inference can be made to cases outside this area. While this is held to be needlessly restrictive, it must be emphasized that careful evaluation of geographic, economic and other external factors should be considered before the results of this study are applied to comparable schools outside this area.

Two annual reports prepared by each school district for the State Superintendent of Public Instruction served as the primary sources of information for this investigation. Expenditures were grouped under two categories: those associated directly with instruction and those related to school plant operation. Financial information was examined for consistency with adjustments made to allow the expenditures to serve as estimates of cost. Capital outlay and pupil transportation costs were not considered. Because of insufficient information,

depreciation and interest on bonded indebtedness was not included in this study.

Average daily attendance in those schools observed ranged from thirteen to 262 and the range on the per pupil costs for the total of instruction and school plant operation was \$363 to \$1,973.

Cost of instruction per pupil equals the teacher-pupil ratio times the cost of instruction per teacher. With the latter two variables serving as independent variables, each was considered separately with the cost of instruction per pupil. It was observed from these relations that the teacher-pupil ratio was significant in accounting for variation in the cost of instruction per pupil while the cost of instruction per teacher was independent of the cost of instruction per pupil. In explaining variation in the cost of instruction per teacher, a significant difference in the average salaries of male and female teachers was observed; the ratio of male teachers to the total number of teachers was found significant in accounting for differences in the cost of instruction per teacher. This ratio, however, failed to show significance in accounting for variation in the cost of instruction per pupil.

Greater emphasis was placed upon the teacher-pupil ratio as a factor affecting the per pupil cost of instruction. The relation between the teacher-pupil ratio and the average daily attendance was shown as curvilinear. Although there was some variation in the teacher-pupil ratio among all schools with comparable enrollment, variation was considerably greater among schools with low enrollment.

In the multivariate analysis a regression equation was established for the cost of instruction per pupil. Variables were introduced representing the teacher-pupil ratio, the percent of the school's course offering in optional curriculum areas, the proportion of the administrator's time spent in non-teaching duties, the assessed valuation of the district per pupil, the percent of the school's staff which holds a Master's degree. The multiple correlation

coefficient was .974. All factors with the exception of the variable denoting the percent of the school's faculty with a Master's degree were found to be significant; all except the variable representing the percent of the school's course offering in optional curriculum areas contributed to the per pupil cost. Significant partial correlations were observed between the teacher-pupil ratio and the district assessed valuation per pupil denoting a confounding of effect in the derived regression coefficients. The significant coefficients showed that for each additional teacher per one-hundred pupils, the cost of instruction per pupil increased on the average \$39.18; for each increase of ten percent in the percent of the school's course offering in optional curriculum areas, the cost of instruction decreased \$17.38; for each increase of ten percent in the proportion of the administrator's time spent in non-teaching duties, the cost of instruction increased \$5.12; for each \$1,000 increase in the assessed valuation per pupil, the cost of instruction per pupil increased eighty-seven cents.

A multivariate analysis of per pupil costs associated with school plant operation was attempted despite insufficient information to which costs could be related. Variables were introduced representing the average daily attendance, the assessed valuation per pupil, the valuation of school furnishings and equipment, and the valuation of school buildings and grounds. While the first two variables were shown to be significant, the simple correlation between these two factors was also found to be significant and thus indicating that the derived coefficients were confounded.