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Cost of Pupil Transportation

in Consolidated Schools of Iowa

By
R. C. WILLIAMS
Director of Research

DEPARTMENT OF PUBLIC INSTRUCTION
AGNES SAMUELSON, *Superintendent*

RESEARCH BULLETIN NO. 22
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FOREWORD

One of the steps which has been taken in Iowa to equalize educational opportunities is the transportation of children to school. This becomes an important matter in a rural state with such variations in road conditions, population density and other related factors, and where the management of schools is a local responsibility.

Three hundred eighty-four of our consolidated districts are transporting pupils in accordance with the special law under which they were organized. They are transporting more than 47,000 pupils at an annual cost of approximately one and one-fourth million dollars, which represents about one-fifth of the operating cost of these schools. Such facts illustrate the significance of this service in the efficient management of these schools.

Boards of education and school administrators will find this present study of value in the appraisal of existing conditions and the planning of satisfactory transportation systems. It shows in rather compact manner some of the facts regarding pupil transportation which are of more general concern and which should point the way for more careful consideration of this problem in each local school district. It will serve the general public as others in our series of publications whose purpose is to make us better informed regarding the work of our schools.

AGNES SAMUELSON

Superintendent of Public Instruction

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EXTENT OF PUPIL TRANSPORTATION IN IOWA SCHOOLS

One of the distinguishing features of the Iowa law under which consolidated districts are organized is that they are required to provide transportation at public expense for all pupils living within the district whose homes are outside of the limits of the incorporated city or town and more than one mile from school. This study presents certain information concerning the cost for transporting pupils in these consolidated districts for the school year ending June 30, 1936.

In the minds of many it is understood that only consolidated districts transport pupils at public expense. This is not the case. By statute, pupils attending elementary schools in districts which are not consolidated and who live more than two and one-half miles from the school are required to be transported at the expense of the district and the board of directors has authority to provide transportation for a shorter distance. During the school year 1935-36, upon which this study is based, Iowa school districts paid out \$1,533,788.39 for the transportation of 57,574 pupils. To provide these services 2,887 bus routes were maintained.

Of the total amount spent for transportation, \$1,275,178.67, or 83.1% of the total, was spent by consolidated schools. These schools transported a total of 47,521 pupils, or 82.5% of all pupils transported at public expense, and maintained 2,579 bus routes for this purpose. These figures will serve to indicate the extent to which pupil transportation is being carried on in the state of Iowa and also the degree to which transportation of pupils in consolidated districts may represent the problem in the entire state.

TABLE 1. FACTS ON PUPIL TRANSPORTATION

Type of District	No. of Routes			Pupils Transported		Cost of Transportation	
	Horse	Motor	Total	No.	Per Cent	Amount	Per Cent
Consolidated ...	310	2,269	2,579	47,521	82.5	\$1,275,178.67	83.1
Others	18	290	308	10,053	17.5	258,609.72	16.9
Total.....	328	2,559	2,887	57,574	100.0	\$1,533,788.39	100.0

For the school year ending June 30, 1936, the year for which the data used in this study have been assembled, there were 384 consolidated school districts which had maintained approved high schools and maintained centralized schools to which pupils were transported. In addition to this number, there were 25 districts which were legally organized as consolidated districts but which continued to operate one-teacher rural schools. None of the schools in this latter group were included in the present study.

Because of its bearing upon the general problem of pupil transportation, the type of motive power used on bus routes by Iowa consolidated schools was of interest. The accompanying table shows that 330, or 85.9% of all these districts, used motor busses exclusively; 26, or 6.8% used only horse drawn vehicles; while the remaining 28 districts used both types of busses.

TABLE 2. TYPES OF MOTIVE POWER USED

Type of Power	Districts Number	Using Per Cent
Motor exclusively	330	85.9
Horse exclusively	26	6.8
Both motor and horse.....	28	7.3
Total.....	384	100.0

It is apparent that motor transportation has come to be quite general among these districts. Since on many horse drawn routes the use of passenger cars is frequently permitted during favorable weather, it is apparent that motor transportation has come to be quite general among these districts. The extent of this trend is not fully realized until it is pointed out that ten years previously, in 1925-26, 42% of all consolidated districts used horse drawn busses exclusively, while but 27% used all motor busses at that time.

Slightly more than one out of every ten pupils attending the public schools of Iowa was provided transportation at the expense of the district in which he resided. Four and one-half per cent of the net operating expense of all the public schools of the state was spent for pupil transportation. However, in the case of consolidated districts it was more of a factor, since they transported 61% of their enrollments and devoted one-fifth of their operating expenses for this service.

SCOPE OF THIS STUDY

PURPOSE

This study is one of the first of its kind to be made in the state of Iowa. Previous studies have included a smaller number of consolidated districts and in most instances have been of a limited nature. It is the second in a series of inquiries into the financial aspects of consolidated school administration which has been made by the research division of the department of public instruction. Among the purposes which it is intended to serve are:

1. To give a general picture of some of the aspects of the organization of a transportation system
2. To show the cost of pupil transportation under various conditions
3. To provide a basis for evaluating various plans from a financial point of view
4. To offer a medium through which boards of education and superintendents of consolidated schools may study and appraise local transportation problems

SOURCES OF DATA

The facts upon which this analysis has been made have been secured from two sources. The total cost of pupil transportation in each district has been taken from the annual financial report for the school year 1935-36, which was filed with the department of public instruction by the county superintendent. Other information used has been taken from the report filed in this office at the beginning of the school year by the superintendent of each consolidated district.

Since the financial reports upon which this study was based give only the total annual expenditure for pupil transportation for the entire district and not the cost for each individual route, only those districts in which all routes were operated with the same type of motive power and vehicle ownership were included.

In view of the above fact, it should be noted that the cost figures, as well as other facts which have been derived, were based upon district averages and not upon individual routes.

For example, the average number of pupils per route has been found by dividing the total number of pupils transported in the district by the number of routes maintained in the district. Naturally, such a method would overlook extreme cases and individual routes. However, for the present purposes it is believed that the method of using available data will be accepted as satisfactory.

This study was based upon 323 consolidated school districts, or 84.1% of the 384 districts which maintained approved high schools and received state aid. Two particular types of facts have been organized:

1. The cost of transportation per pupil per year and the cost of transportation per route per year
2. The relative costs of pupil transportation under various conditions, such as the type of motive power and the ownership of vehicles

UNITS USED

A selection of the units to be used in determining transportation costs will depend upon a number of factors, particularly the types of data available and the purpose of the study. Various studies made in Iowa and in other states have not resulted in the development of any standardized technique for this purpose. The following units have been used:

1. Per pupil transported. This has been found for each district by dividing the total amount spent for transportation per year by the number of pupils transported. A more satisfactory pupil figure would have been the average number transported daily, but such data were not at hand.
2. Per route. This figure has been found by dividing the total amount spent for transportation by the number of routes maintained, although the subsequent use of this type of cost data is confined to a general statement.
3. Per year. This unit rather than the day or month is most commonly used in the derivation of cost data. Shorter units of time imply a refinement of procedures which this study does not attempt.

Many students of educational administration consider that certain other units more refined in nature, such as the cost per

pupil mile per day, cost per bus mile per day, etc., are more satisfactory. To do so would call for much more complete data and more extensive analysis than this study contemplates. Furthermore, it is believed that the practical value of such units is questionable in consideration of the type of records which are ordinarily kept by secretaries of boards of education.

LIMITATIONS

This study does not attempt to present complete and conclusive data regarding transportation costs and all the factors which may contribute to local variations. However, since it is not of a sampling nature, it reviews certain facts which will lead to a better understanding of the problem.

In consideration of the material from which the data for this study have been drawn, attention should be directed to the nature of this information.

1. The pupil unit used was the total number transported. To be more consistent with other pupil cost units, the average number transported daily would be more satisfactory, but, unfortunately, such a figure is not available for all these districts.
2. The total amount spent per year for transportation was taken from the annual financial report prepared by the secretary of the board of education and filed with the county superintendent at the close of the year. It is assumed that these officials have followed the uniform financial accounting procedure in these reports, and that the amounts reported represent the actual costs of pupil transportation for the year.
3. It is entirely possible that other factors, such as type of roads, may have a significant relationship to transportation costs. Information on such items was not at hand, and if it could have been used would have called for a much more detailed analysis than has been made.

Financial cost is not, in itself, a valid measure of the sufficiency of a school service. It merely represents the amount being spent. Low costs do not necessarily indicate satisfactory conditions, neither does it follow that high costs are excessive or represent the best types of service. Each board of education

must interpret its costs in consideration of the extent to which its transportation system is giving the most satisfactory service consistent with its ability to pay for it. This study has not attempted to recognize the quality of service rendered on school bus routes or to defend or criticize varying cost levels.

COST OF PUPIL TRANSPORTATION IN 323 DISTRICTS

As has been previously stated, the data herewith presented were based on 323 consolidated districts each of which operated all of its bus routes under the same arrangement. Because of the accepted difference between horse drawn and motor transportation, the eleven districts which transported all of their children in horse drawn vehicles have been shown separately from the districts using motor power.

TABLE 3. NUMBER OF ROUTES AND PUPILS TRANSPORTED IN 323 DISTRICTS

Motive Power	Number of Districts	Number of Routes	Number of Pupils Transported
Motor	312	2,049	39,877
Horse	11	81	1,052

The unit cost data submitted later in this study were based upon the districts represented in the above table and these data have been submitted to show the extent of this study. It should be remembered that the above facts will not show all of the consolidated schools of the state.

The above tabulation also shows an interesting fact regarding the arrangements made by boards of education for transporting pupils. As is shown elsewhere, there were 330 consolidated districts which used motor driven transportation exclusively. Of that number, 312 employed the same type of vehicle ownership on all of their routes. There were 26 consolidated districts in the state which transported all their pupils in horse drawn vehicles and of this total number 11 had the same type of vehicle ownership on all routes.

TABLE 4. TRANSPORTATION COSTS IN 323 DISTRICTS

Motive Power	Number of Districts	Annual Cost		Per Route
		Total	Per Pupil	
Motor	312	\$1,061,073.64	\$26.70	\$521.43
Horse	11	30,186.03	28.33	375.00

These figures show that the cost for pupil transportation per year in districts with motor driven busses was \$26.70, while for districts with horse drawn vehicles the cost per pupil per year

was \$28.33, or \$1.63 higher than the pupil cost under motor transportation. The fact that the average cost per route was less where horse drawn vehicles were provided than where motor busses were used is in part due to the fact that each horse drawn route transported an average of 12.8 children while the average number of children transported on each motor route was 20.1 pupils.

An explanation should also be made regarding an apparent inconsistency in deriving the average cost per pupil and the average cost per route. The figures given have been found by determining these unit costs for each district reported in the study and then finding the median cost of all districts of the same type. They have not been found by dividing the total cost of transportation in all districts by the number of pupils transported or the total number of routes maintained.

HORSE DRAWN VEHICLES

Reference has previously been made to certain facts of horse drawn transportation in comparison with motor driven routes. It is obvious that the use of horse drawn vehicles is rapidly disappearing in Iowa school districts. However, it seems best to present together such data as have been compiled regarding horse drawn transportation and confine the remainder of this report in general to the presentation of facts regarding motor transportation.

Attention is again directed to the fact that data submitted herewith are confined to the eleven districts which transported all of their pupils in horse drawn routes and under the same type of vehicle ownership. Later reference to horse drawn transportation will be confined to a few general comparisons.

TABLE 5. FACTS ON HORSE DRAWN TRANSPORTATION

Number of districts in this study which provide horse drawn transportation	11
Median size of districts	19.5 sq. mi.
Total number transported	1,052
Median number transported per route.....	13
Median length of routes.....	\$30,186.03
Total cost of transportation.....	5.1 mi.
Cost per pupil per year.....	\$ 28.33
Cost per route per year.....	\$ 375.00

MOTOR VEHICLES

VEHICLE OWNERSHIP

There are a great many plans followed by consolidated school districts of Iowa in providing motor transportation on their routes. This study does not attempt to enumerate all the plans followed, but does show certain facts regarding pupil transportation on motor routes where the school district had the same arrangement on all of its routes. The types of vehicle ownership which were most common and which have been followed in this study were as follows:

1. District owned—in which the school district itself owned the entire vehicle used for transportation.
2. Operator owned—in which the operator of the bus owned the entire vehicle and contracted with the district to transport pupils.
3. Divided ownership—in which the district owned part of the vehicle such as the chassis or body and the operator owned the other part of the vehicle.
4. Single contract—in which the board of directors contracted with one individual to transport all of the children eligible for transportation within the district in the cases included in this study. The contractor furnished all vehicles used.
5. All motors—in which data for all of the four groups previously listed have been combined into one series of facts representing a composite picture of districts providing motor transportation.

TABLE 6. NUMBER OF ROUTES AND PUPILS TRANSPORTED ACCORDING TO VEHICLE OWNERSHIP

Type of Vehicle Ownership	No. of Districts	No. of Routes	No. of Pupils Transported
District owned	63	364	8,248
Operator owned	107	782	13,286
Divided ownership	137	877	17,588
Single contract	5	26	755
All motors	312	2,049	39,877
Horse drawn	11	81	1,052

The above table shows that the most common type of vehicle ownership used by these districts is that in which the district owned part of the vehicle and the driver furnished the remainder.

One hundred thirty-seven, or 43.9% of the districts included in this study used this plan. Next in frequency was the plan of contracting with individuals who owned in entirety the vehicles used in transportation, this plan being followed in 107, or 34.3% of the districts. Sixty-three districts, or 20% of the entire number owned and furnished the entire vehicles used in transporting pupils. The practice of contracting with one person for the transportation of all pupils within a district was relatively infrequent.

ANNUAL COST PER PUPIL

The following table presents an interesting comparison of transportation costs under the four different plans of vehicle ownership. As pointed out previously, these figures have been found by determining the average cost per pupil and per route for each district and computing the median of these unit cost figures for each group of districts.

TABLE 7. COSTS PER PUPIL AND PER ROUTE

Type of Vehicle Ownership	Median Cost Per Year	
	Per Pupil	Per Route
District owned	\$21.30	\$ 488.64
Operator owned	29.00	525.00
Divided ownership	26.07	530.88
Single contract	31.00	1,025.00
All motors	26.70	521.43
Horse drawn	28.33	375.00

The median cost per pupil per year in all these districts using motor transportation was \$26.70. Districts which owned their vehicles secured their transportation at \$21.30, the lowest cost for any type of motor transportation. Where the district and the operator shared in the ownership of the vehicle the cost per pupil per year was \$26.07, slightly higher than under the district owned plan. Where operators of a route furnished their own vehicles the cost per pupil was \$29.00, and where districts contracted with one individual for all the transportation services the average cost per pupil was \$31.00.

The variation in the cost per route per year must be accompanied by other facts such as the average length of routes, number of pupils transported per route, etc. For example, while the single contract plan showed a median cost per route of \$1,025.00, the length of routes under this plan was 12.5 miles. Districts

which contracted with individuals to furnish vehicles and transport children on the individual route basis (operator owned) had a median cost per route of \$525.00, approximately one-half the cost under the single contract plan, but the routes maintained under the operator owned plan averaged but 6.6 miles in length. In view of such consideration, further data on costs per route will be omitted. These facts are included primarily to answer a number of inquiries for information of this type.

TRANSPORTATION COSTS ACCORDING TO CERTAIN CONDITIONS

Interest in this problem extends beyond the actual cost of transportation, and includes some of the conditions under which unit cost figures arise. Within the scope of this study certain other facts have been related to the cost data compiled, in order to observe to what degree, if any, certain relative cost figures may be accompanied by or perhaps accounted for by other conditions. While the nature of the basic information upon which this analysis has been based does not warrant conclusive statements, there are some general observations which are of sufficient merit to enumerate. The grouping according to types of vehicle ownership will be followed.

Because of the small number of schools included, figures on the single contract plan are omitted from succeeding tables in which costs are classified according to various factors.

AREA OF DISTRICT

By statute a consolidated school district in Iowa must have at least 16 square miles of area. There is no maximum limitation upon the size and the areas of these districts in Iowa vary from the minimum of 16 square miles to a maximum of 72 square miles. The median size for the 384 districts in the state was 25.8 square miles, and for the 312 districts which used motor busses, and upon which the present analysis is based, was 26.4 square miles. It will thus be noted that schools included in this study had an average size similar to all consolidated districts in the state.

TABLE 8. SIZE OF DISTRICTS ACCORDING TO VEHICLE
OWNERSHIP

Type of Vehicle Ownership	Number of Districts	Median Size of District
District owned	63	29.83 sq. mi.
Operator owned	107	25.88 sq. mi.
Divided ownership	137	25.67 sq. mi.
Single contract	5	25 sq. mi.
All motors	312	26.36 sq. mi.
Horse drawn	11	19.5 sq. mi.

This tabulation shows that those districts which had complete ownership of the motor busses were larger than those following

other plans, the median size of these districts being 29.83 square miles. Those districts which used other plans were of practically the same size and they were about four square miles smaller than those in the first group. It is of interest to note further that those districts which used horse power exclusively on bus routes have the median size of 19.5 square miles, or about seven square miles of area less than the districts which employed motor transportation.

Turning to the relationship between the size of a district and the cost of pupil transportation under different plans, the data in the following table represent the situation for the 312 districts which used motor busses exclusively.

TABLE 9. PUPIL COSTS ACCORDING TO SIZE OF DISTRICT AND VEHICLE OWNERSHIP

Area of District in Square Miles	District Owned	Cost Per Pupil Per Year			Number of Districts
		Operator Owned	Divided Ownership	All Motors	
46 and over ..	.....	\$37.00	.....	\$36.00	8
44.0-45.9	\$22.50	28.50	.....	23.50	9
42.0-43.9 .....	.....	.....	.....	.....	1
40.0-41.9 .....	.....	.....	.....	27.00	4
38.0-39.9 .....	.....	.....	\$24.50	24.33	5
36.0-37.9	22.00	27.50	27.00	26.75	27
34.0-35.9 .....	.....	27.00	31.00	28.00	16
32.0-33.9	21.33	31.00	.....	27.00	17
30.0-31.9	19.00	.....	27.00	26.00	16
28.0-29.9	21.00	30.33	28.00	28.00	30
26.0-27.9	20.00	27.50	25.50	26.40	28
24.0-25.9	23.00	27.50	26.33	26.80	34
22.0-23.9	20.00	36.67	25.50	29.00	29
20.0-21.9	24.00	29.67	23.00	28.00	26
18.0-19.9 .....	.....	27.00	21.00	26.25	19
16.0-17.9	19.50	28.25	24.75	25.38	43
Median	21.30	29.00	26.07	26.70	312

In the minds of many it has been assumed that the cost of pupil transportation would vary inversely as the size of the district. In other words, the larger the district the lower the annual pupil cost. The above table shows that this is not true, only in a very slight degree. This suggests that other factors which may be associated with either high or low cost per pupil transportation do not have a constant relationship with the area of the district. For example, a supplementary tabulation not included here showed that in the group of consolidated districts with the largest area the median length of bus routes was but

one mile greater than in the smallest consolidated districts. Table 9 shows that in the largest consolidated districts, those with an area of 46 square miles or more, the costs for pupil transportation were higher than in districts of smaller size.

It is apparent, however, that there is a pronounced difference shown by these data in favor of districts which completely owned their vehicles with the exception of districts between 18 and 22 square miles in area. In this group districts which shared the ownership of motor busses with the operators had a slightly lower pupil cost.

From the above evidence it may be said that the larger consolidated school districts of the state did not provide transportation at a much less cost per pupil than the smaller districts. It may be that these larger districts provided more satisfactory types of vehicles which would keep their costs up. Another explanation which is equally plausible is that the area of a district itself does not represent the basis upon which transportation costs are regulated and that other factors such as the shape of the district, the density of the population, and the policy of the board of education in laying out bus routes are some of the factors which need to be recognized.

NUMBER OF PUPILS PER ROUTE

This item is one which may have an influence on many issues raised in a study of this nature. Like many others it is largely regulated by the policies set up by the local board of education for the organization of its transportation system.

TABLE 10. MEDIAN NUMBER OF PUPILS PER ROUTE

Type of Vehicle Ownership	Number of Districts	Median Number of Pupils Per Route
District owned	63	23
Operator owned	107	18
Divided ownership	137	20
Single contract	5	28
All motors	312	20
Horse drawn	11	13

These data show some interesting facts as to the way in which bus routes were organized under various types of vehicle ownership. As might be expected, the number of pupils per route averaged the greatest in the five districts, each of which has contracted with one individual for the transportation of all rural

pupils. The fewest number of pupils per route in districts with motor transportation was found in those where the operators furnished the vehicles, the median number being 18 pupils. The number of pupils per route according to the other two types of vehicle ownership is between these two extremes. The median number of pupils on horse drawn routes is 13, slightly more than half the median of 20 for all motor routes.

The following data show a definite relationship between the number of pupils per route and the annual cost per pupil for transportation with some rather interesting fluctuations back and forth. Routes with a large number of pupils had a pupil cost much less than the routes with fewer pupils. The annual costs per pupil in districts which had operator owned or jointly owned vehicles followed the average cost for all motor vehicles more closely than costs in districts which owned their own vehicles. Table 11 also shows that the costs per pupil in districts which entirely own their vehicles were consistently less than the average for all types of motor transportation until the number of pupils on a route exceeded 26, and beyond this the number of districts represented was so small that comparative figures are of little value.

TABLE 11. PUPIL COSTS ACCORDING TO NUMBER OF PUPILS PER ROUTE AND VEHICLE OWNERSHIP

Number of Pupils Per Route	District Owned	Cost Per Pupil Per Year			Number of Districts
		Operator Owned	Divided Ownership	All Motors	
31 and over..	\$18.00	.....	\$21.50	\$21.00	15
30 .....	.....	.....	21.00	18.00	4
29 .....	.....	.....	.....	24.00	4
28	25.00	.....	21.00	21.50	7
27 .....	.....	.....	23.00	22.50	7
26	23.00	\$27.00	25.40	25.33	14
25	15.50	.....	28.00	25.33	12
24	21.00	27.50	22.33	23.00	17
23	19.00	25.00	26.00	25.00	12
22	21.00	27.50	25.25	25.00	22
21	22.00	28.50	24.67	25.00	24
20 .....	.....	29.50	29.00	29.25	21
19	22.00	24.00	28.25	26.33	21
18 .....	.....	32.00	23.67	26.00	22
17	23.00	27.00	27.00	26.75	23
16 .....	.....	29.50	32.00	31.00	19
15	27.00	33.00	27.00	27.50	15
14 .....	.....	31.00	31.00	31.00	13
13 .....	.....	27.00	30.00	29.00	12
12	29.00	34.00	32.50	31.00	10
Under 12 .....	.....	32.50	.....	33.00	18
Median	21.30	29.00	26.07	26.70	312

From the point of view of number of pupils per route as a single consideration, the facts presented above show that districts with relatively few pupils per route had a higher pupil cost for transportation, and there was a definite but uneven trend for cost per pupil to vary inversely with the number of pupils per route.

LENGTH OF ROUTE

As used in this study the term length of route means the mileage over which the route has been laid out and not the total number of miles a bus may be called upon to travel during the day.

While it is true that the average length of routes within a school district represents one of the policies of the board of education with regard to the administration of its transportation system, it is probably also true that the policies which the board may be following are affected by a number of other situations such as the type and ownership of the vehicle. The average length of the bus routes for the districts represented in this study is as follows.

TABLE 12. MEDIAN LENGTH OF ROUTES

Type of Vehicle Ownership	Number of Districts	Median Length of Routes
District owned	63	9.4 mi.
Operator owned	107	6.6 mi.
Divided ownership	137	7.5 mi.
Single contract	5	12.5 mi.
All motors	312	7.5 mi.
Horse drawn	11	5.1 mi.

The above table represents a rather clear-cut picture. Where the board contracted with one individual for all of its transportation facilities the longer routes were found, the average length being 12.5 miles. Where districts owned their vehicles there was a definite trend for longer routes than where vehicles were the property of the operators. As might be expected, shortest routes were found in districts which still used horse drawn busses.

The extent to which the annual cost per pupil fluctuated according to the length of the route is illustrated in Table 13. With some minor irregularities there was a slight decrease in cost per pupil on the longer routes. Due to the small number of routes which were at either extremity of the distribution (short-

est and longest) the cost figures for those intervals should not be taken too conclusively.

The table below also shows the advantage in cost on routes covered by district owned vehicles over other types. In but one instance, namely, the routes which averaged 10 to 11 miles in length, does the cost exceed that of any other type of vehicle ownership. Apparently, the average length of routes in the school district was not a large factor in per pupil cost of transportation.

TABLE 13. PUPIL COSTS ACCORDING TO LENGTH OF ROUTE AND VEHICLE OWNERSHIP

Average Length of Route (mi.)	District Owned	Cost Per Pupil Per Year			Number of Districts
		Operator Owned	Divided Ownership	All Motors	
14 and over	\$21.50	.....	\$28.00	\$23.50	13
13.0-13.9	17.00	.....	21.50	21.33	10
12.0-12.9	17.00	.....	33.00	30.50	13
11.0-11.9	24.00	\$29.00	33.00	27.50	13
10.0-10.9	33.00	31.00	29.00	30.33	17
9.0- 9.9	22.00	.....	25.67	25.33	20
8.0- 8.9	18.33	29.00	25.00	23.00	39
7.0- 7.9	25.50	28.83	28.00	28.71	61
6.0- 6.9	23.00	27.00	24.25	24.63	47
5.0- 5.9	24.00	31.50	25.00	27.86	51
4.0- 4.9	.....	28.00	27.50	27.75	21
3.0- 3.9	.....	27.50	.....	27.00	7
Median	21.30	29.00	26.07	26.70	312

NUMBER OF ROUTES PER DISTRICT

While we should not give this item independent consideration in the study of pupil costs, it is of interest to note the result when such a comparison is made. As a general condition the number of routes is affected by other matters, such as the size of the district, shape of the district, density of population, and also the policy of the board of education as it may have developed from year to year.

TABLE 14. MEDIAN NUMBER OF ROUTES

Type of Vehicle Ownership	Number of Districts	Median Number of Routes
District owned	63	6.1
Operator owned	107	7.4
Divided ownership	137	6.8
Single contract	5	5.5
All motors	312	6.8
Horse drawn	11	8.5

These data show that districts which employed nothing but horse drawn vehicles had the largest number of routes per district. In districts employing motor vehicles those which followed the plan of operator ownership had the most routes, and at the other extreme the fewest number of routes were found in those districts which used the single contract plan. However, these data are of particular interest when related to information shown on page 19 in which the median size of districts with these various types of vehicle ownership were set forth. Districts with horse drawn transportation were considerably smaller than those using motor busses, but they also had the larger number of routes. Districts which owned their complete busses were larger in size than those with other types of vehicle ownership but also had relatively few routes. As a general statement the difference as shown above in the median number of routes per district cannot be attributed solely to the size of districts using each type.

TABLE 15. PUPIL COSTS ACCORDING TO NUMBER OF ROUTES AND VEHICLE OWNERSHIP

Number of Routes	District Owned	Cost Per Pupil Per Year			Number of Districts
		Operator Owned	Divided Ownership	All Motors	
12 and over ..	.....	\$31.00	.....	\$27.67	9
11 .....	.....	21.00	.....	29.00	7
10 .....	.....	31.00	\$25.00	29.50	7
9 .....	.....	26.67	25.67	26.13	27
8	\$22.75	28.50	29.00	27.50	32
7	21.50	34.50	27.20	27.38	57
6	21.00	29.75	25.33	26.25	77
5	22.00	29.00	26.25	26.14	45
4	15.00	28.50	25.00	26.00	38
3	22.00	29.00	.....	25.00	10
2 .....	.....	.....	.....	21.00	3
Median	21.30	29.00	26.07	26.70	312

However, a glance at the above table which shows the costs per pupil grouped according to the type of vehicle ownership and the number of routes per district indicates that there was a direct relationship between the number of routes in a district and the annual cost for pupil transportation within that district. This undoubtedly represents the influence of other factors, such as the number of pupils per route and the length of routes. In view of the relationship between the number of pupils per

route and the cost per pupil, it may be said that the larger number of routes in a district does not necessarily mean a larger total number of pupils transported. It may be due to shorter routes.

The variation between pupil costs on different types of vehicle ownership is very pronounced in Table 15. When grouped according to the number of routes per district, pupil costs under district owned vehicles were lower than under any other plan and those districts with operator owned vehicles had with but two exceptions the highest pupil costs.

TOTAL NUMBER TRANSPORTED

As a general rule it should be possible for the board of education which has a large number of pupils for whom transportation must be provided to operate a transportation system at a lower cost than a district which has a small number to transport. The data submitted below will show the extent to which this was true.

TABLE 16. MEDIAN NUMBER TRANSPORTED PER DISTRICT

Type of Vehicle Ownership	Number of Districts	Median Number Transported
District owned	63	134
Operator owned	107	119
Divided ownership	137	125
Single contract	5	145
All motors	312	125
Horse drawn	11	95

As shown by this table the five districts which employed the single contract plan for motor transportation were those which had the most pupils to transport, the average number for these districts being 145. Horse drawn transportation was employed where the fewest number must be brought to school, the average being 95 pupils per district as compared with an average of 125 in all districts which used motor transportation. It is also shown that districts which owned their vehicles in entirety were those which transported more pupils than those in which the operators owned all or part of the vehicles.

The table on page 26 bears out the anticipation that pupil costs would be lower where larger number of pupils are transported. While the general downward trend as the number of pupils transported increased was not as pronounced as some might expect it was sufficient to show the tendency. In this connection it should be remembered that these data were based upon aver-

TABLE 17. PUPIL COSTS ACCORDING TO NUMBER TRANSPORTED PER DISTRICT AND VEHICLE OWNERSHIP

Total Number Transported	Dis- trict Owned	Cost Per Pupil Per Year			Number of Districts
		Operator Owned	Divided Ownership	All Motors	
210 and over..	.....	.....	\$24.00	\$25.00	8
200-209	.....	\$25.67	29.00	25.50	10
190-199	.....	28.00	.....	28.00	4
180-189	.....	27.00	25.00	25.00	8
170-179	\$20.50	27.00	26.50	26.25	11
160-169	22.50	27.00	27.00	24.00	24
150-159	22.50	35.00	30.00	28.00	14
140-149	21.50	29.00	22.67	24.50	29
130-139	20.00	26.50	26.67	25.75	31
120-129	23.00	31.80	23.00	25.33	34
110-119	21.50	32.00	27.33	27.33	30
100-109	.....	27.00	29.00	28.00	30
90- 99	19.00	28.00	28.00	27.67	27
80- 89	.....	30.00	27.00	29.00	17
70- 79	27.00	33.00	27.00	29.00	18
60- 69	29.00	29.33	29.50	29.33	12
Under 60	.....	38.50	.....	33.00	5
Median	21.30	29.00	26.07	26.70	312

age costs for all the routes within a district and not costs on individual routes. The spread in these costs was not as great between different types of vehicle ownership and the figure for all types combined into one group, as has been shown on some previous comparisons. However, the relative positions of average costs under district ownership and private ownership of vehicles which have been previously pointed out once more appear in the above tabulation.

PER CENT OF ENROLLMENT TRANSPORTED

The number of pupils to be transported in a district depends somewhat upon the area of the district. Another factor, the population of an incorporated town within the district, will affect the percentage of total enrollment which is transported and consequently the magnitude of transportation costs as a part of the total school budget.

TABLE 18. PER CENT OF ENROLLMENT TRANSPORTED

Type of Vehicle Ownership	Number of Districts	Per Cent of Enrollment Transported
District owned	63	57.3
Operator owned	107	60.2
Divided ownership	137	64.8
Single contract	5	54.2
All motors	312	60.8
Horse drawn	11	68.8

The data in the above table have particular interest in consideration of many conditions which cannot be enumerated here. It will be noted that districts which employed horse drawn transportation were those which brought to school a larger percentage of their total enrollment, and that districts which used the single contract plan transported but 54.2% of their enrollment. Under other types of transportation the average percentages of enrollment followed between these two extremes. Other specific observations on this point should be withheld until a more complete array of facts is available for study. One of these elements is the total number transported which has been previously reviewed.

However, the following evidence does show that there was a tendency for lower pupil cost for transportation in those districts which transport a relatively high percentage of their total enrollment. It may be of interest that seven of the 323 districts represented in this study transported their entire enrollments to school and 28 others transported at least 90% of their pupils enrolled. We may again point out that pupil costs in districts which owned their motor vehicles were lower than those with other types of vehicle ownership, and the differential between costs of district owned transportation and all types of transportation was greater than for any other type.

TABLE 19. PUPIL COSTS ACCORDING TO PER CENT OF ENROLLMENT TRANSPORTED AND VEHICLE OWNERSHIP

Cost Per Pupil Per Year					
Per Cent Transported	District Owned	Operator Owned	Divided Ownership	All Motors	Number of Districts
100	.....	\$22.00	\$27.00	\$23.50	7
95.0-99.9	.....	30.00	24.50	27.00	16
90.0-94.9	..... \$18.00	.....	24.50	22.00	8
85.0-89.9	..... 18.67	25.00	23.00	21.00	18
80.0-84.9	..... 24.00	28.00	22.00	25.00	12
75.0-79.9	..... 17.00	27.33	26.50	26.80	20
70.0-74.9	..... 19.00	25.00	25.50	25.00	20
65.0-69.9	..... 19.00	28.67	28.00	26.75	33
60.0-64.9	..... 21.00	28.00	25.50	26.67	26
55.0-59.9	..... 25.00	30.33	27.00	28.40	38
50.0-54.9	..... 23.50	28.00	27.50	27.50	33
45.0-49.9	..... 20.50	28.00	29.00	27.50	25
40.0-44.9	..... 23.00	40.00	31.00	30.00	18
35.0-39.9	..... 25.00	35.00	30.50	30.50	13
30.0-34.9	.....	33.00	23.67	29.00	13
25.0-29.9	.....	27.00	25.00	26.00	6
Less than 25..	27.00	.....	.....	29.00	6
Median	..... 21.30	29.00	26.07	26.70	312

SUMMARY

The total amount spent by Iowa school districts for pupil transportation during the year 1935-36 was \$1,533,788.39. Eighty-three per cent of this amount, or \$1,275,178.67 was spent by consolidated districts, and the remainder by other types of districts.

This analysis of pupil transportation cost was based upon expenditures during the school year 1935-36 by 323 consolidated school districts in Iowa, representing 84% of the entire number in the state which were approved by the department of public instruction. Of this number 312 used motor busses exclusively, while eleven used horse drawn vehicles.

The data upon which this analysis has been built have been taken from the annual reports received from the officials of the districts included. Only those districts in which the type of motive power and vehicle ownership was constant for all routes were included.

The major observations which have been made in this study are:

1. The median annual cost per pupil for transportation was \$26.70 on motor routes and \$28.33 on horse drawn routes.
2. Districts which employed horse drawn transportation were smaller than those using motor busses, had shorter routes, and transported fewer children per route.
3. The most frequent type of vehicle ownership found was that in which the district owned part of the vehicle and the operator of the route owned the remainder of the vehicle. Next in order of frequency were districts with operator owned vehicles and those with district owned vehicles.
4. Of the 312 districts included in this study which had motor transportation, only five districts adopted the plan of each contracting with one individual to provide the vehicles and drivers and transport all the children in the district who were eligible for transportation at public expense.

5. The median annual cost per pupil for motor transportation was \$21.30 for those districts which owned the complete vehicles, \$26.07 for districts in which the operator and school district shared in vehicle ownership, \$29.00 for districts in which operators owned the complete vehicles, and \$31.00 for districts which followed the plan of each contracting with one individual for all their transportation service.
6. Districts which owned the complete vehicles were slightly larger than those using other arrangements.
7. Considered as a separate item, the size of the district was of little consequence in comparative costs.
8. With slight variations, the cost per pupil decreased as the average number of pupils per route increased.
9. The median annual cost per pupil in districts which had relatively long routes was slightly less than that in districts whose routes were shorter.
10. There was a slight tendency for pupil costs to increase with an increase in the number of routes maintained by a district.
11. Districts with a larger number of pupils to be transported were able to secure transportation at a somewhat lower pupil cost than those which transported a relatively smaller number.
12. As the per cent of total enrollment transported increased, there was a trend toward lower pupil costs.

CONCLUSIONS

This study presents a few facts regarding the cost of pupil transportation in the consolidated school districts of Iowa. In their interpretation the reader is cautioned to confine any inferences to the actual situations as set forth, and to avoid applications which might be enticing, but are not warranted by the data submitted. For example, pupil costs for transportation have been classified according to certain conditions, such as size of district, length of bus route and others. However, it does not necessarily follow that either of these items is an exclusive cause of differences in cost figures. This study does not invoke the precision of data or analysis which such conclusions would presume. It is intended to point out the need for more careful consideration to the planning of transportation systems. Some of the more or less obvious facts revealed are:

1. About one-tenth of the pupils attending the public schools of Iowa are transported at public expense.
2. The consolidated districts of the state transport three-fifths of their enrollments and devote about one-fifth of their operating costs to this service.
3. Transportation of pupils by motor driven vehicles has increased considerably and is today the predominant method.
4. The annual cost per pupil for motor transportation is less than for horse drawn transportation.
5. Transportation expenditures are less in districts which own the entire motor vehicles than in those wherein the operator owns all or part of the vehicle.
6. Pupil costs vary inversely with the number of pupils per route, the total number of pupils transported by a district, and the per cent of total enrollment which is transported. Relationships between other factors and pupil costs are not so evident.

One of the most important elements in the operation of a system of pupil transportation is the quality of service received, a factor which is not measured by the financial cost. A low pupil

cost does not necessarily indicate a satisfactory condition, nor does it follow that the best service is purchased by a relatively high expenditure. In evaluating transportation costs, school officials should take into consideration such matters as safety of bus, dependability of the bus operator, comfort of children, distance pupils walk to meet busses, time spent en route to school, and other conditions.

The inadequacy of existing financial records is a serious limitation upon any inquiry into costs of pupil transportation and contributing factors. There is some confusion as to what items should be considered a part of the cost of operating a transportation system. Boards of education can profit by taking concern over this matter and authorizing their secretaries, superintendents, bus drivers and other employees to record and file throughout the school year essential facts regarding pupil transportation, to identify and include all expenditures which are a legitimate part of transportation costs and to follow adequate accounting technique which segregate such costs by individual routes wherever applicable. The primary purpose of these practices should be to point the way for local officials toward more efficient organizations and supervision of transportation facilities.

As boards of education plan their transportation systems and invest funds in busses, attention should be given to the provisions of the new motor vehicle laws, the comfort and safety of the children, and to factors which may influence transportation costs, such as bus capacity, length of routes, road conditions, layout of routes and many others which are of significance in particular situations.

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