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A Normative Intra-District Cost-Quality Study of a Selected Group of Chicago Public Elementary Schools

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A NORMATIVE INTRA-DISTRICT COST-QUALITY STUDY OF A SELECTED GROUP OF CHICAGO PUBLIC ELEMENTARY SCHOOLS

by

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LIFE

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The writer has published two articles on school safety: "Functioning of the School Safety Patrol," Safety Education, XXXIX, Section One, (December, 1949) 6,7, and 38, and "Lafayette Still Active," Safety Education, XXX, Section One, (December, 1950), 32.

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INTRODUCTION

Background

In September of 1954, there were 346 regular elementary schools with 43 branches in the City of Chicago[1]. Each one of these schools is a distinct entity - it varies in some manner from every other elementary school in the city. Per pupil educational expenditures, chargeable to the individual school (sometimes referred to as the attendance unit), vary widely from one school to another. The ability of the pupils in one school, as measured by intelligence tests, is not the same as the ability of pupils in other schools. The rate of pupil transiency in some schools is many times as great as it is in some other schools. Variations exist in the ratio of assigned teachers to authorized teaching positions. One other measurable variable is the size of the school. The student population in a given school may or may not be representative of the general community area in which the school is located.

Teachers salaries represent the largest single expenditure in the public elementary schools of Chicago. There is quite a variation in salaries because

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[1] Board of Education of the City of Chicago, Facts and Figures September, 1954, Published by the Board, 1954.

of a ten year salary schedule with an additional payment for a master's degree. During the calendar year 1954, the minimum salary for elementary school teachers was $3400, and the maximum (bachelor's degree) was $5650, with a maximum for the master's degree of $5900[2]. Substitutes were paid the minimum salary[3]. Those schools which have a relatively high proportion of assigned teachers will necessarily have relatively high instructional costs.

An examination of reports sent to the district office by the individual schools on intelligence tests given in grade 8B indicates that there are wide variations in pupil ability among the several schools.

Teachers in Chicago are free to transfer from one school to another after one year of service in a particular school. Winget[4] made a comprehensive study of teacher transfers using data from the United States Census and the Chicago Community Inventory. There were definite trends away from the center of the city toward the periphery of the city. His data on population characteristics were based upon Community Areas of the Chicago Community Inventory. Since some of these communities contain ten schools while others contain only two schools and since the highest and lowest socio-economic status are found in one community area, his study shows trends of teacher transfer within the city as a

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[2] Ibid. p. 26

[3] Ibid. p. 27

[4] John A. Winget, "Teacher Inter-School Mobility Aspirations of Elementary Teachers, Chicago Public School System, 1947 - 1948." Microfilm Doctoral Dissertation (University of Chicago, Chicago, 1952.)

whole but not within a single administrative unit such as a district. Amar[5] discusses the number of transfers of teachers in selected years but not the reasons for the transfers. The most comprehensive study of the transfer of teachers in Chicago is that of Winget.

Also probably very closely related to socio-economic status is the stability of the pupil population in a particular school. Areas with a high proportion of owner occupied homes would be more stable than areas with a high proportion of low class rental dwelling units. If teachers transfer out of what they consider undesirable neighborhoods into desirable regions, then the per pupil expenditures in areas of high transiency would be relatively low.

School size in terms of pupil enrollment may be an important factor in educational expenditures inasmuch as the smaller school would have a higher proportion of special subject teachers in relation to the total faculty than the larger school would have. There is no evidence to indicate that school size is in any way related to population characteristics.

Statement of the Problem

The problem which arises at this point is whether or not the schools which spend the most for instructional costs get better results as measured by standardized test scores of graduates in reading and arithmetic. Authorities in

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[5] Marion B. Amar, "An Analysis and Appraisal of Induction Programs for New Elementary School Teachers with Reference to the Development of a Program for Chicago." Unpublished Doctoral Dissertation (Loyola University, Chicago, 1952) Chapter III.

the field of Educational Administration feel that there is presumptive evidence that educational results are directly proportional to expenditures. This study will attempt to determine whether or not there are any significant relationships between per pupil educational costs, pupil ability, pupil achievement, ratio of assigned teachers to authorized teaching positions, rate of pupil transiency, and size of school.

A close study of recent budgets of the Board of Education of the City of Chicago indicates wide variations in per pupil educational expenditures for the several elementary schools in the Chicago Public School System. The largest educational expenditure at the attendance unit level is for the payment of teachers salaries. Costs other than salaries of teachers and other staff members constitute the smallest instructional expenditure within the individual schools. Since most of the costs other than salary are based on enrollment, they are believed to be uniform throughout the system and should obviously be highly correlated with enrollment.

Costs used in this study are instructional costs which are directly chargeable to the individual school in accord with standard policy of the Board of Education[6]. These cost items are also in accord with cost items as used by the United States Office of Education in its Biennial Survey. Salary costs used in this study are for principals, teachers and clerks. Costs other than salaries are for textbooks, school libraries (books and periodicals only, not

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[6]Board of Education of the City of Chicago, Alphabetical and Numerical Index Code Used in Annual Budget and Accounting Procedure, Published by the Board, 1949.

furniture or equipment), and for supplies and other.

Costs per pupil as used in this study are based upon "Mean True Membership" and not upon "Average Daily Attendance." True membership is a much more realistic and practical measure than average daily attendance because it includes all of the students for whom the school holds accountability, and it is also the basis for the assignment of educational personnel.

The period covered by this study is the calendar year 1954. This particular period was chosen primarily because the calendar year is the fiscal year of the Board of Education and is therefore the basic record period of the Board as far as expenditures are concerned. This period is the most recent one for which complete records were available at the time this study was begun. The basic record period for educational reports is the school month of which there are ten in both a school year and a calendar year.

There are seven distinct types of educational programs in the elementary schools of District Six as shown in Table I:

1. Grades one to eight inclusive - 26 schools
2. Kindergarten - 26 schools
3. Trainable Mentally Handicapped - 1 school
4. Educable Mentally Handicapped - 16 schools
5. Primary Social Adjustment - 1 school
6. Deaf - 1 school
7. Blind - 2 schools.

This study is concerned primarily with the educational program in grades one to eight; however, it is impossible to determine costs for the grades without a breakdown of all common costs in the individual schools.

TABLE I

EDUCATIONAL PROGRAMS OFFERED BY SCHOOLS IN DISTRICT SIX DURING 1954

School	Grades 1 - 8	Kindergarten	Trainable Mentally Handicapped	Educable Mentally Handicapped	Truant	Deaf-Oral	Sight-Saving
A	X	X		X			
B	X	X		X	X		
C	X	X		X			
D	X	X					
E	X	X					
F	X	X		X			
G	X	X					
H	X	X					
I	X	X		X			
J	X	X		X			
K	X	X		X			
L	X	X		X			
M	X	X				X	
N	X	X					
O	X	X		X			
P	X	X					
Q	X	X		X			
R	X	X					
S	X	X		X			
T	X	X					
U	X	X		X			
V	X	X		X			X
W	X	X	X	X			X
X	X	X		X			
Y	X	X		X			
Z	X	X					

The test results used in this study are taken from the reports of the individual schools' eighth grade testing program for the year 1954 as reported to the District Office. These tests include intelligence examinations and achievement tests in reading. For fourteen schools, there are also achievement tests in arithmetic. For the other twelve schools, data are available on the chronological ages of students at the time of graduation.

In this study, all of the schools are in the same legal school district in a large metropolitan area. The sample selected contains all of the elementary schools in one administrative district which is actually a subdivision of the legal school district. The legal school district in this case being coterminus with the City of Chicago.

Definition of Terms

Attendance unit - an individual school which submits a monthly summary of pupil and professional personnel data. It draws students from a well defined area commonly called, in Chicago, the local school district or the local school subdistrict.

Assigned teacher - a teacher who has passed the certification examination and who has been elected by the Board of Education to a position on a specific attendance unit faculty.

Authorized teaching position - a teaching position in an attendance unit which has been provided for in the annual budget or in the proceedings of the Board of Education. The number of authorized teaching positions in an attendance unit is based primarily upon the mean true membership.

Average daily attendance - a figure commonly used to measure the size of a school. It is the quotient obtained when the total number of pupil days of attendance is divided by the number of attendance days in the school term.

Certification ratio - the percentage that the number of assigned teachers in a school is of the number of teaching positions authorized in the school.

Cost per pupil - the quotient obtained when an expenditure is divided by mean true membership. For example, if the expenditure for teachers salaries in grades one to eight were $150,000 and if the mean true membership in grades one to eight were 1,000, then the teachers salary cost per pupil in grades one to eight would be $150.00.

District - in Chicago, an administrative unit which covers an area with a population of approximately 250,000. There is some overlapping of district boundaries since high school and elementary school sub-districts are not coterminus. Districts vary widely in area. A district includes both high schools and elementary schools. The official in charge of a district is the District Superintendent.

Mean true membership - arithmetic average of true membership for the period covered by this study. Mean true membership is about one hundred ten per cent of average daily attendance - actually the true membership for February 1953 and February 1954 averages 109.42 per cent of the average daily attendance[7].

Membership - enrollment less those pupils who have been permanently or temporarily withdrawn from the school.

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[7] Facts and Figures, September, 1954. p. 9.

Pupil-teacher ratio - the quotient obtained when the mean true membership is divided by the average number of authorized teaching positions.

Rate of pupil transiency - the quotient times 100 which is obtained when the sum of transfers in and out is divided by the mean true membership for the period.

Sparsity correction factor - a factor which must be applied to enrollments when cost-quality studies are made of small schools inasmuch as certain costs will be constant regardless of membership.

Special education (elementary) - in Chicago, all education on the elementary level except;: (1) grades one to eight inclusive, (2) kindergarten, and (3) elementary vocational schools.

Teachers of special subjects - all elementary teachers who do not have a home-room. This category includes adjustment teachers, home mechanics teachers, teacher-librarians, master teachers, physical education teachers, and in some cases assistant principals. Teachers of special subjects are not counted in computing average class size in grades one to eight inclusive. Salaries of these teachers are paid from appropriations made for the regular grades.

True membership - enrollment less those pupils who have been permanently withdrawn from school. It includes those pupils temporarily withdrawn[8].

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[8] Ibid.

General Area of the Study

The schools selected for this study are the twenty-six elementary schools in District Six of the August 1955 organization of the Board of Education. The location of District Six in the City of Chicago is shown in Figure 1. It is not claimed that this particular group of schools is a representative sample of all of the public elementary schools in Chicago. These schools are all of the elementary schools in one administrative unit of the Board of Education. District Six occupies a rather irregular area which includes the near north side, the near west side, part of the Loop, and the near northwest side of the city. If the point where Madison Street runs into Lake Michigan is taken as a starting point, then District Six can be approximately enclosed in the following manner:

West on Madison Street to Ashland Avenue, north on Ashland to Grand Avenue, west on Grand to Damen Avenue, north on Damen to Superior Street, west on Superior to Sacramento Boulevard, north on Sacramento to Augusta Boulevard, west on Augusta to Homan (Kimble) Avenue, north on Homan (Kimble) to Fullerton Avenue, east on Fullerton to Damen Avenue, south on Damen to Armitage Avenue, east on Armitage to the North Branch of the Chicago River, southeast along the river to Division Street, east on Division to Lake Michigan, south along the lake shore to Madison Street.

District Six includes parts of six Chicago Community Areas[9] within its

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[9] Philip M. Hauser and Evelyn M. Kitagawa, eds., Local Community Fact Book for Chicago 1950, Chicago, 1953. pp. vi and vii.

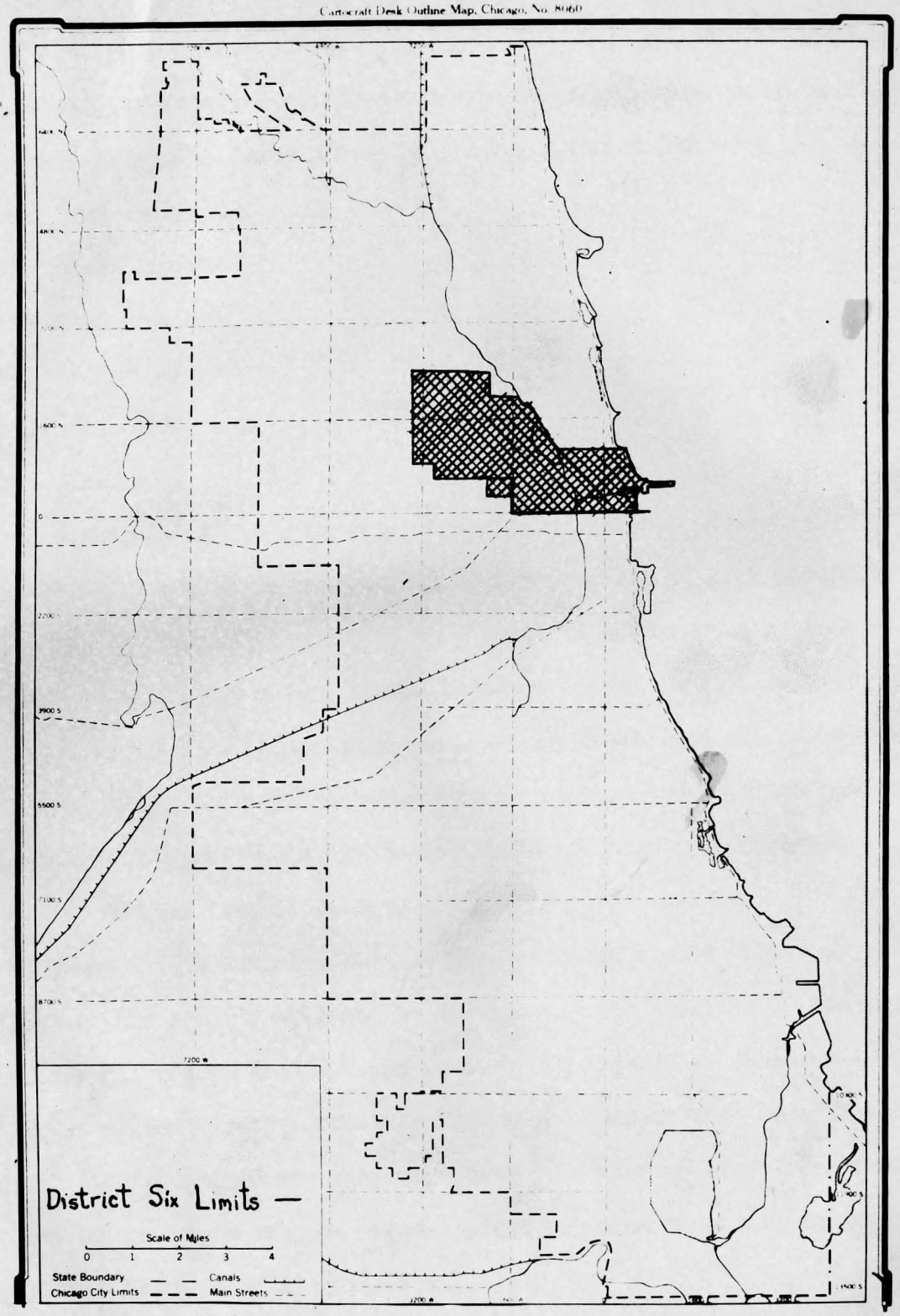

FIGURE 1

MAP OF CHICAGO SHOWING BOUNDARIES OF DISTRICT SIX

boundaries. The location of these six Community Areas are shown in Figure 2. The Chicago Community Areas partially within District Six are:

8. Near North Side

22. Logan Square

23. Humboldt Park

24. West Town

28. Near West Side

32. The Loop.

Community Areas are subdivided into Census Tracts. These census tracts are about equal in population which means that in regions of high population density the census tracts would be very small in area and in regions of low population density the census tracts would be rather large in area.

There is no correspondence between census tracts and attendance unit districts. It is difficult to determine population characteristics and socio-economic status of an individual school district from any census data available, for the City of Chicago.

Each school in District Six has been assigned a code letter so that the identity of the schools will not be disclosed. The location of the individual elementary schools in District Six is shown in Figure 3. In order to prevent disclosure of the identity of the schools, dots rather than code letters are used in this figure, so that the code letters cannot be used to determine the location of any given school. Street names are used only for the purpose of showing the location of District Six.

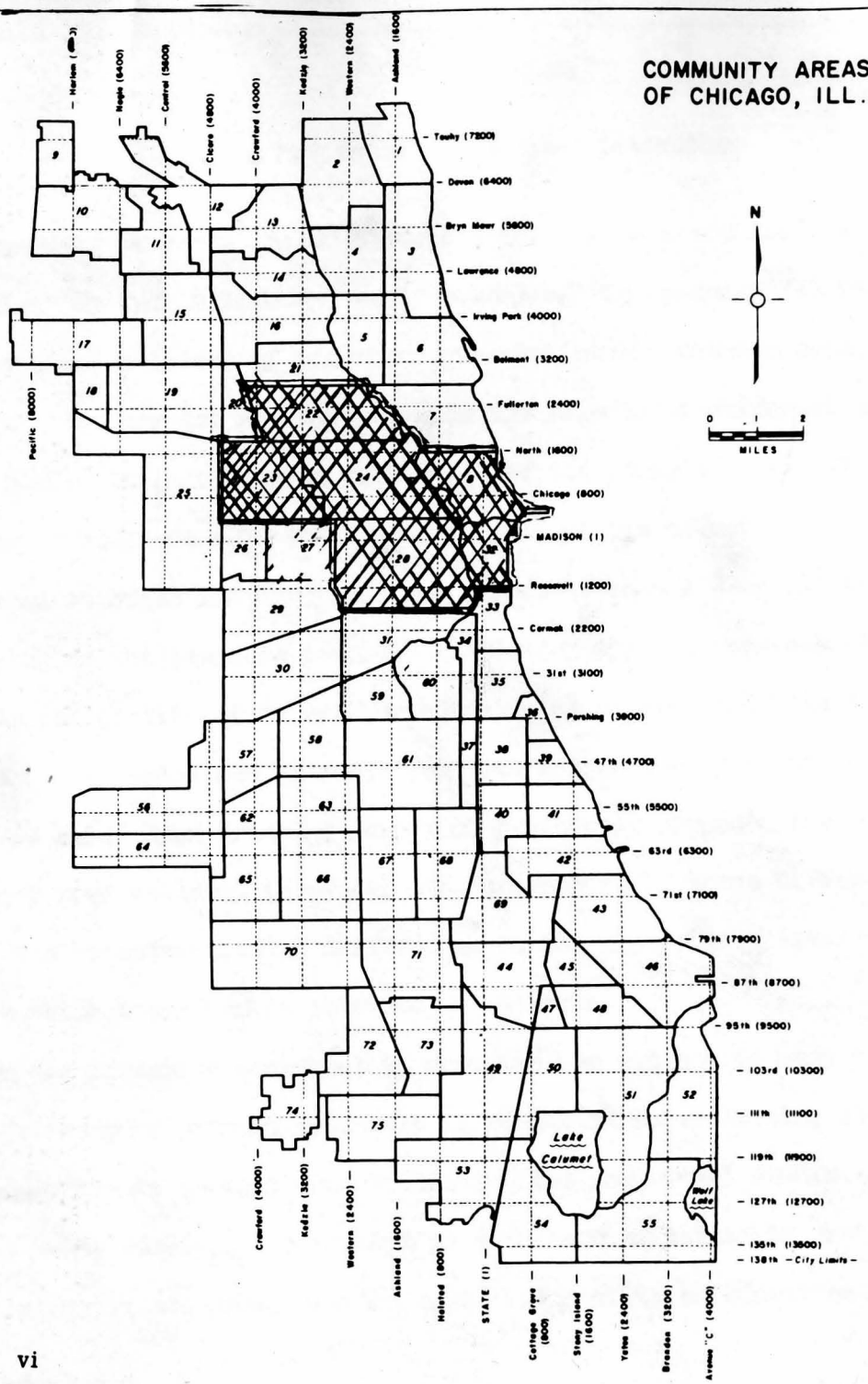

FIGURE 2

MAP OF CHICAGO SHOWING COMMUNITY AREAS PARTIALLY IN DISTRICT SIX

A Review of the Related Literature

According to Mort, cost-quality studies may be classified as being either "normative" or "adult life and early schooling" in approach[10]. The first type of study gives evidence of a continuous relationship between cost and quality. The normative approach attempts to show how schools at different expenditure levels differ in what they do with children and young people. It is presumed that what schools do with children and young people affects the pupils individual strength and happiness and through them the economic and social-well-being of the American people. The latter type of approach attempts to evaluate the quality of an earlier educational program from the standpoint of present adult social and economic characteristics now assessed as good. This method is based upon tracking down what presumably happened to these adults when they were children in school and determining if these differences among adults can be attributed to differences in the expenditure levels of the schools which these adults attended as children.

In the normative cost-quality approach, an attempt is made to determine the efficiency of present practices in education by evaluating the educational product. This is usually done by testing the individual students in the schools being studied. An attempt is then made to determine whether or not there is any relationship between costs and quality of educational achievement.

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[10] Paul R. Mort, "Cost-Quality Relationship in Education." Problems and Issues in Public School Finance: An Analysis and Summary of Significant Research and Experience. eds. R. L. Johns and E. L. Morphet, New York, 1952. p. 11.

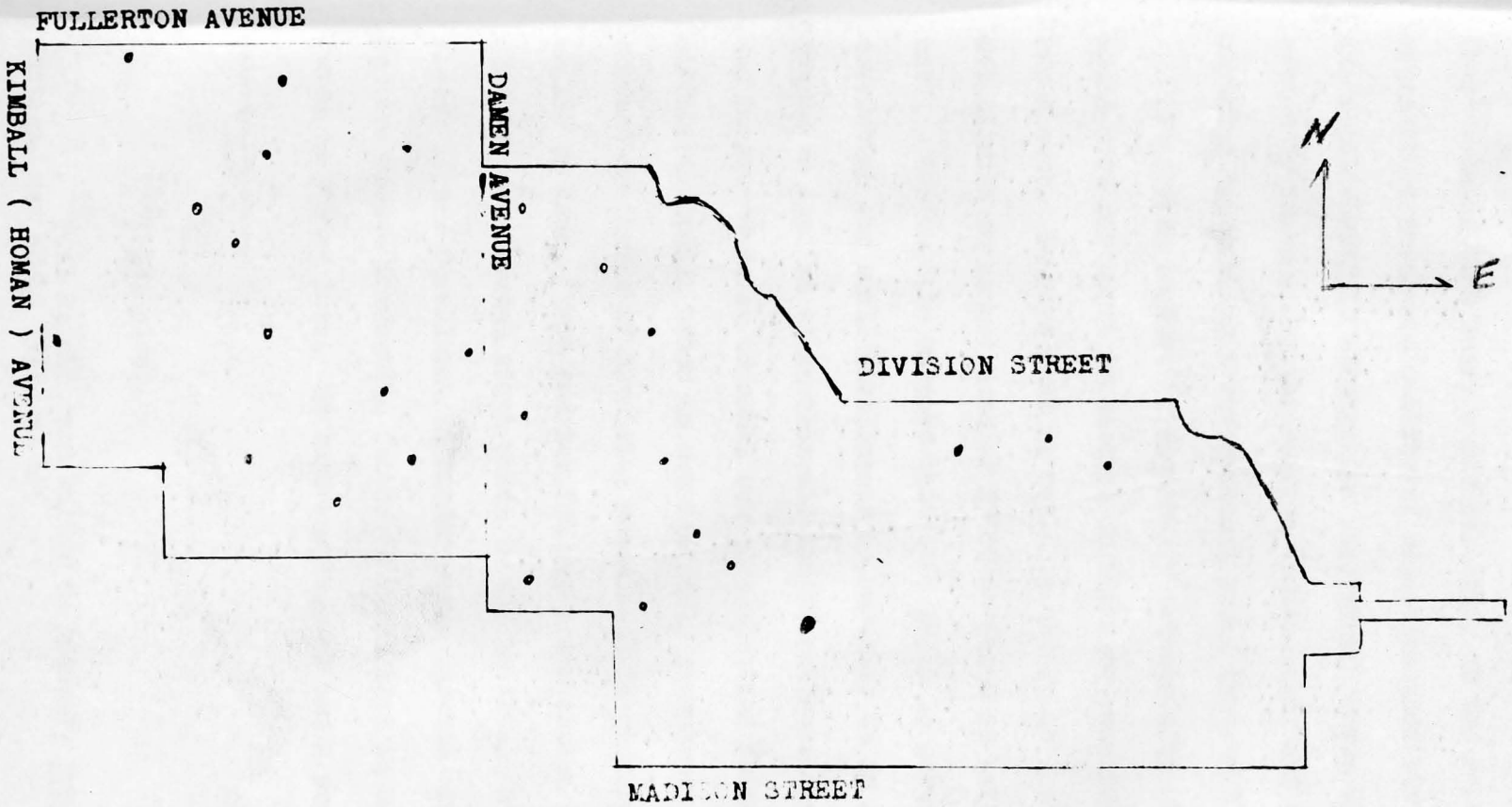

FIGURE 3

MAP OF DISTRICT SIX SHOWING LOCATION OF SCHOOLS

Mort[11] claims that every empirical study of the relationship between expenditure level and quality of education adds its bit to the presumption that the relationship is strong. He says that he uses the word "presumption" advisedly inasmuch as the studies individually and collectively do not give anything approaching a mathematical proof that this is the case.

According to Mort[12], elementary schools with an enrollment under 300 must spend more per pupil to accomplish the same results than schools with a larger enrollment. He says that it would be absurd to consider that one pupil in a school with an annual cost of $3000 to $4000 is getting an education worth this much. It should be assumed that this pupil is getting a $200 education. The correction for small enrollments is referred to as a "sparsity factor" and should be applied to enrollments before cost-quality studies are made. Mort and Reusser[13] refer to small school correction factors as used in five different studies based on average daily attendance. Norton and Lawler use a correction factor if the total enrollment in kindergarten through eighth grade is 135 or less. Mort and Schmidt use a correction factor if the enrollment in kindergarten through sixth grade is 315 or less. Strayer uses a correction factor if the enrollment in kindergarten through eighth grade is 332 or less. McClure uses a correction factor if enrollment in kindergarten through eighth grade is 304 or less. McClure and Cornell use a small school correction if the

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[11] Ibid.

[12] Ibid. p. 61.

[13] Paul R. Mort and Walter C. Reusser, Public School Finance, Second edition, New York, 1951. p. 495

enrollment in kindergarten through eighth grade is 289 or less.

The figure used by Mort and Schmidt actually requires the largest attendance inasmuch as the average daily attendance of grades seven and eight would be multiplied by 1.3[14] before being added to the corrected average daily attendance for kindergarten through sixth grade.

One of the major cost-quality studies of the past two decades was the New York State School Survey directed by Grace and Moe[15], often referred to as the "Regents' Inquiry". This survey included schools in all parts of the state on both the elementary and high school level.

In discussing the relationship between cost and quality in education, Grace and Moe[16] say:

> It is as difficult to determine if high-priced education is usually high-quality education as it is to determine just how good a school system is. The Regents' Inquiry does not claim to have answered the first question satisfactorily, but because of its importance an answer has been attempted.
>
> After examining test results, visiting the schools selected, and weighing such other evidence as had been gathered forty-three school systems were graded on a five point scale: highest, above average, average, below average, and lowest. Elementary and secondary schools were ranked separately and the ranks were then combined to give a composite rank for the system. This procedure is less objective than might be desired, but it represents a careful consideration of the factors that determine a school's quality.

The conclusions of the Regents' Inquiry may be stated as[17]:

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[14] Ibid. p. 74.

[15] A. G. Grace and G. A. Moe, State Aid and School Costs: The Regents Inquiry, New York, 1938.

[16] Ibid. p. 324.

[17] Ibid. pp. 324, 325 and 329.

1. High educational efficiency is not achieved without high expenditure

2. The group of schools with superior educational results devotes a larger proportion of the entire budget to direct instruction than is true of the schools with lower achievement

3. The best schools do not have an exceptionally small number of pupils per teacher, but they do pay a high average salary to the instructors

4. The best schools were all large, and permitted organization of fairly large classes with a rich curriculum

5. Schools with average educational results have relatively low costs unless the number of pupils per teacher is low

6. In the large districts which get poor results in spite of relatively high costs, undoubtedly poor administration of both the financial and educational program is the cause

7. High costs in small districts which get poor results are at least partly governed by circumstance. Their size, however, is an evil which can generally be cured by redistricting

8. The median number of pupils per teacher does not vary greatly among the schools of the different educational rankings, which indicates that an increase or decrease in the pupil-teacher ratio, at least within the limits found within this group, does not seriously affect education efficiency

9. The small school compelled by its size to have small classes, must economize by paying low salaries. Because of the low salaries and the requirement to teach several subjects, good teachers will rarely go to these districts unless they are inexperienced, in which case, as soon as they have gained experience, they find employment in better paying districts. The

natural and obvious result of this practice is educational inefficiency.

There is no indication that the Regents' Inquiry used a sparsity factor to correct small school enrollments before making comparisons of cost and quality.

Felty[18] made a study of per pupil costs in suburban Philadelphia schools for the school year 1952 - 1953. Costs per pupil in average daily attendance range from $141 to $402 with a median cost of $251. Felty uses a measure which he refers to as staff adequacy to determine quality of education. This is actually the number of staff members per thousand pupils in average daily attendance. The schools with relatively high costs per pupil have more staff members per thousand pupils than do the schools which have low expenditures per pupil.

Frailey[19] selected schools in Wisconsin on the basis of three indices: (1) size of school measured by average daily attendance; (2) valuation per pupil; and (3) geographic location. The total number of schools in the sample was 409. About 95 per cent of the schools had an average daily attendance of less than 300[20]. No information is given as to the size of the 23 schools which had an average daily attendance of over 300. There is no evidence that Frailey used any small school correction factor. Schools were located in almost every county in Wisconsin. Conclusions in Frailey's study may be

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[18] C.C. Felty, "Educational Costs in Suburban Philadelphia Schools." Pennsylvania University Schoolmens' Week Proceedings, 1954, p. 93.

[19] Charles Upton Frailey, "Relation of Size of School and Valuation per Pupil to various Educational and Financial Aspects of Elementary Schools in Wisconsin." Unpublished Doctoral Dissertation, University of Wisconsin, Madison, 1952. p. 5.

[20] Ibid. p. 16

summarized in part as follows[21]:

1. The size of the school is positively related to: (1) adequate building facilities, (2) types of equipment available, (3) school services offered, (4) breadth of educational program, (5) professional preparation of teachers, (6) experience of teachers, and (7) per pupil valuation of buildings and sites

2. Size of school is not related or only slightly related to cost per pupil

3. In planning for improved schools in Wisconsin, size of school is an important factor to be considered

4. In general, elementary schools with less than 100 pupils are less satisfactory than schools with more than 100 pupils and schools with 300 or more pupils are more satisfactory than schools of any other size - attendance units should include at least 100 pupils and preferably as many as 300 pupils.

Sprol[22] studied the effect of academic achievement on school size. His subjects were 1750 pupils in grades four, five and six in the elementary schools of a Maryland County. The size of the schools ranged from an average enrollment of 20 to an average enrollment of 700 pupils. The number of teachers in a school ranged from one to seventeen. Sprol states that the achievement of pupils in the small schools is not inferior to that of pupils in the large schools, and that academic achievement is not increased by

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[21] Ibid. p. 224.

[22] Samuel Joseph Sprol, "The Influence of School Size on Academic Achievement." Unpublished Doctoral Dissertation, Johns Hopkins University, Baltimore, 1940. p. 128.

increasing the size of the school. He believes that there should be a relaxation of the attitude that the small school is inherently bad and that the elimination of the small school is the only way to secure good results.

Iowa School Districts maintaining high schools were studied by Peck[23]. In his summary[24], he states that size of school had a positive relationship to the quality of educational opportunity. From his study it is apparent that "quality of educational opportunity" refers to the number of different courses offered in a given high school. He further states that there was an inverse ratio between size of school and per pupil cost. This is probably due to the fact that 97.5 per cent of the high schools he studied had an average daily attendance of less than 500 and no small school correction factor was used. Mort and Reusser[25] recommend the use of a small school correction factor if high school enrollments are less than 673 in the formula of McClure and Cornell and less that 724 in the formula of Norton and Lawler. In conclusion, Peck[26] states that size of school was a more important determinant of quality of education that was educational cost and that therefore the state might spend considerably more effort in reorganizing its school districts.

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[23] Roderick B. Peck, "Influence of Enrollment and Expenditures upon Quality of Education in Iowa School Districts Maintaining High Schools." Unpublished Doctoral Dissertation, Iowa State College, Ames, 1952.

[24] Ibid. p. 113.

[25] Mort and Reusser. pp. 74 and 495.

[26] Peck. p. 113.

Holy and Ruch[27] made a cost-quality study in selected Iowa High Schools. They conclude that there are no significant relationships between school costs and the following measures - achievement, intelligence, or success in college[28].

Ferrell studied cost-quality relationships in 120 county school systems and 129 independent graded systems in Kentucky[29]. He uses six measures of educational efficiency[30]:

1. Per cent average daily attendance is of the census

2. Holding power, measured by the sum of (a) per cent eighth grade enrollment is of first grade enrollment and (b) per cent high school enrollment is of the total public school enrollment

3. Per cent of teachers employed who have a given amount of preparation

4. Per cent of teachers employed who have had three or more years of teaching experience

5. Per cent the number of teachers is of the number of pupils

6. Per cent the number of days the elementary school term is of 200 days.

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[27]T.C. Holy and C.M. Ruch, "Efficiency as Affected by the Cost of Instruction." National Society for the Study of Education: Twenty-Seventh Yearbook: Part II. pp. 125 - 128 Incl.

[28]Ibid. pp 127 and 128.

[29]Doctor Thomas Ferrell, Relation between Current Expenditures and Certain Measures of Educational Efficiency in Kentucky County and Graded School School Systems, Doctoral Dissertation, George Peabody College for Teachers, Contribution to Education #216, Nashville, 1936. p. 2.

[30]Ibid. p. 21.

Ferrell[31] concludes his study by saying that there are definite relationships between expenditures for instruction and educational efficiency, and also that the combined effect of the six measures of educational efficiency is significant as shown by multiple correlation coefficients.

Powell[32] studied educational returns based on various levels of current educational expenditures. He chose one county in New York State and from the 90 one room schools in this county he selected 70 for his sample. All of the 70 schools were located in four supervisory districts. There were an equal number of schools above the median in expenditure and below the median in expenditure in each supervisory district. The median referred to is the New York State Median of average expenditures for all one room schools in the state for a three year period[33].

Only those pupils who were 10, 11, 12, 13 and 14 years of age and only those who had attended the same school for five years were examined. The total number of students in the groups was 298[34].

There was no appreciable difference in intelligence or in chronological age for the two groups of students[35].

In all of the nine subject matter fields in which tests were administered,

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[31] Ibid. p. 89.

[32] Orrin E. Powell, Educational Returns at Varying Expenditure Levels. Teachers College, Columbia University, Contributions to Education #573, New York, 1953.

[33] Ibid. pp 5 - 10.

[34] Ibid. p. 11.

[35] Ibid. pp 14 and 15.

the students in the high expenditure group had a higher mean achievement than did the pupils in the low expenditure schools. In total achievement, the difference in the mean between the two groups was 0.37 of one year with 93 chances out of 100 that this difference is a reliable difference[36].

When the two groups were each subdivided into two sub-groups, the difference between the high sub-group of the high group and the low sub-group of the low group in mean total achievement was 1.44 years with the chances of reliability of the difference being real of about 998 out of 1000[37].

The conclusions of Powell can be stated in part as follows[38]:

1. Expenditures and returns as measured by pupil achievement rise and fall together

2. The lowest group of schools obtain a 59 cent return on the dollar as compared to the highest group of schools

3. The following factors are associated with higher level of average pupil achievement: (1) higher level of average teacher training, (2) higher level of average teaching experience, and (3) larger pupil enrollments.

Grimm[39] made a study of cost-quality relationships in a group of small city schools in Illinois. His total sample consisted of twenty-four small city school system which he divided according to average per pupil current

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[36] Ibid. pp. 20 and 21.

[37] Ibid. p. 28.

[38] Ibid. pp. 52 and 53.

[39] L. R. Grimm, Our Childrens' Opportunities in Relation to School Costs. Department of Research, Illinois Education Association, Springfield, 1938.

expenditures for a two year period into three sub-samples. The group spending the most, he refers to as high expenditure schools, the second group of schools is referred to as median expenditure schools, and those spending the least are called low expenditure schools[40].

Comparisons are made between the three expenditure groups in the following fields: (1) pupil personnel services[41], (2) general organization[42], (3) equipment and materials of instruction[43], (4) teacher personnel items[44], (5) administration and supervision[45], (6) school-public relations[46], (7) scores for school sites and buildings[47], (8) scores for classrooms[48], and (9) testing results in advanced grades[49].

The seventh grade tests consisted of achievement examinations in reading, arithmetic, and language, an intelligence examination, and life age in months. The eighth grade tests consisted of achievement tests in reading, health, and

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[40] Ibid. pp. 2 - 4.

[41] Ibid. pp. 9 - 11.

[42] Ibid. pp. 14 - 17.

[43] Ibid. pp. 21 - 25.

[44] Ibid. pp. 26 and 27.

[45] Ibid. pp. 29 and 30.

[46] Ibid. pp. 31 - 33.

[47] Ibid. pp. 34 and 35.

[48] Ibid. pp. 36 and 37.

[49] Ibid. pp. 37 - 43.

geography, an intelligence examination, and life age in months.

In all comparisons, except life age in months, it was found that the high expenditure level schools surpassed the median expenditure level schools and the median level schools surpassed the low expenditure level schools.

Grimm states in his conclusions[50]: (1) that children of low expenditure level schools are not given a program equivalent to that enjoyed by children of upper level expenditure schools, and (2) children in low expenditure level schools not only achieve less in the common branches tested but they have less subjects offered to them.

All of the cost-quality studies referred to previously have been what Mort calls normative studies[51]. An example of an adult life and early schooling approach would be that of Bowyer[52], who feels that educational expenditures should be considered in the nature of capital expenditures. Bowyer made a comparison of educational expenditures and per capita wealth.

Bowyer's conclusions are[53]:

> 1. When the percent of wealth or income expended for public schools is taken as an index of the educational status of the various states, a positive relationship is found between this index and subsequent economic progress for the period 1890 to 1946. This relationship is so generally consistent as to indicate that the work of the schools has had a causal bearing upon economic development.

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[50] Ibid. p. 41.

[51] Mort, "Cost-Quality Relationship in Education." p. 12.

[52] Vernon Bowyer, "Measuring the Economic Value of Education to the States." Improving Educational Research. Official Report of the American Educational Research Association, Washington, 1948.

[53] Ibid. p. 178.

2. School support, in the terms previously indicated and considered for the period mentioned above, apparently has begun to affect economic progress within ten or twelve years after the date of the school expenditures and has continued this positive influence for several years thereafter. At the end of about twenty years, the influence of school support upon economic progress begins to wane, or at least evidence of it becomes submerged by the influence of a more recent period of school support.

3. The amount of economic return apparently resulting from such school support has become sufficient within ten or twelve years to cover not only the original school expenditures but also a liberal rate of interest for the intervening years.

The Chamber of Commerce of the United States conducted a study with a two fold purpose[54]:

1. To show that good schools benefit the community, the state and the nation; and
2. To encourage local and state business and professional men to help develop greater educational opportunities for the youth of the country.

By means of graphs and charts, this study shows the economic value of an education to the individual. Charts 1 and 2[55] show that there is a direct relationship between median years of school completed and income of all males 25 years of age or older. For income of less than $500 per year, the median years of school completed was 7.1. For income between $3000 and $3999, the median years of school completed was 10.5 and for income above $10,000 the median years of school completed was 13.5. The statement is also made that 82 per cent of men with incomes over $10,000 have a high school or college education. It is also stated that good schools strengthen the whole community by equipping

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[54] Education Department, Chamber of Commerce of the United States. Education an Investment in People, Third Edition, Washington, no date. Introduction, no page number.

[55] Ibid. pp. 2 and 3.

the individual to earn more money and have more buying power.

A direct relationship exists between the median years of school completed by farm operators and the value of farm products[56]. Farm operators who produce less than $1200 annually have a median of 6.9 years of school completed, while those who produce more than $10,000 annually have a median of 10.2 years of school completed. On the whole, more successful farmers have completed more years of school.

In metropolitan areas of over 250,000 with 11 - 12 years of schooling completed, the per capita retail sales average $1100. In areas of comparable size with 8 - 9 years of schooling completed, the retail sales average $917. In metropolitan areas of over 100,000 but less than 250,000 the corresponding per capita average retail sales are $1076 and $836. The statement is made that this association of business sales with education level justifies business leaders in pressing for adequate schools in their communities[57].

Some of the other conclusions of the study are:

1. . . . that effective advertising and communications in general are related to the educational development of people[58].
2. Education is an essential means to successful self-government and the protection of our political freedom[59].
3. The proportion of men rejected for military service for mental reasons was higher (1950 - 1951) in those states where high school "drop outs" were higher[60].

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[56] Ibid. pp. 4 and 5.

[57] Ibid. pp. 6 and 7.

[58] Ibid. p. 8.

[59] Ibid. p. 10.

[60] Ibid. p. 14.

4. When ten nations were picked for which facts about literacy, per capita income, newspaper circulation and radio set ownership were available, a positive relationship was revealed between literacy and living standards.

The rank order of the nations in literacy and in income is identical.

This evidence indicates the interdependence of business and education internationally. It also suggests that education is the key to better communication and hence to a better informed citizenry[61].

The study of the Chamber of Commerce of the United States is concerned primarily with the number of years of schooling completed, rather than with current educational expenditures. In this respect this particular study may be considered similar to the study of Bowyer, since both feel that educational expenditures result in an increase in the real wealth of the region making the expenditure.

Evaluation of Previous Studies and Their Relationship to the Present Study

The studies reviewed differ from the present study in at least six aspects:

1. All of the reviewed studies are comparisons between schools located in different legal school districts. The present study makes comparisons between schools in the same legal school district

2. Enrollment figures in the reviewed studies are based upon average daily attendance whereas this study uses mean true membership as the enrollment figure

3. The reviewed studies all use average total district current expenditures per pupil instead of actual expenditures per pupil at the attendance unit level

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[61] Ibid. p. 16.

4. All of the reviewed studies are based upon the school year rather than upon the fiscal year of the school district

5. In the reviewed studies, the length of the school term varies while in the present study all of the schools have the same number of pupil attendance days

6. Since all of the schools in the present study are over 300 in mean true membership in grades one to eight inclusive, no sparsity correction need be applied.

The results of the Regents' Inquiry are not comparable to the present study because the Regents' Inquiry is primarily a cost-quality study of school districts which maintain and operate both elementary and secondary schools. In the Regents' Inquiry, all schools within a given system are considered as having equal expenditures per pupil on either the elementary or secondary level within the system.

A study which recognises that there are wide variations in costs per pupil at the attendance unit level among schools which are located within the same legal school district is that of Woodham. He does not give any factual evidence that this is so. In his summary, he states that variations in cost per pupil were found not only for the state as a whole but were also evident within individual administrative units[62].

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[62]William Jesse Woodham, Jr. "The Relationship between the size of Secondary School, the Per Pupil Cost, and the Breadth of Educational Opportunity." Microfilm Doctoral Dissertation, University of Florida, 1951. p. 126.

In all except one of the studies reviewed in this chapter, it is the consensus that higher education expenditures result in greater educational return. The one exception was the study of Holy and Ruch. All of the studies discussed in this review of the literature were inter-district studies. In all of them it was assumed that all costs in a given legal school district were equal for each pupil enrolled in the district. This present study will attempt to show that there are wide variations in costs per pupil between different schools within the same legal school district.

Comparisons between the reviewed studies are rather difficult to make inasmuch as there is some question as to the uniformity of accounting procedures. Variations in the number of days in the school term also make it rather difficult to compare one study with another.

The present study is concerned with schools which are all located within the same legal district - an intra-district study rather than an inter-district study such as those previously reviewed. No report of a normative intra-district cost-quality study has been found in a rather comprehensive search of the literature.

Procedure of the Study

Data for this study have been obtained from three primary records of the Board of Education of the City of Chicago: (1) information pertaining to pupil membership and teacher personnel was obtained from the "Principal's Monthly Summary"[63], (2) data on expenditures were obtained from ledgers and account

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[63] Division of Statistics, Department of Administration and Research, Central Office of the Board of Education.

cards[64], and (3) records of pupil achievement, ability, and chronological age were obtained from school reports[65].

Since the schools now in District Six were in Elementary Districts Three and Four prior to the present reorganization, there were some differences in the methods of reporting test scores to the district offices. It will therefore be necessary to divide the schools into two groups - fourteen schools previously in one district and twelve schools formerly in the other district. Arithmetic test scores were not available for the group of twelve schools and chronological ages for students at the time of graduation were not available for the group of fourteen schools.

The part of the sample represented by fourteen schools will hereafter be referred to as Group I, while the twelve schools in the other sub-sample will be referred to as Group II. Lists of graduates were available for Group I schools for January 1954 and June 1954, for Group II schools, lists of graduates were available for June 1954 and January 1955.

The size of the schools in total mean true membership is shown in Table II. This total mean true membership has not been corrected for one-half day kindergarten attendance, it does, however, include all special education classes. Since the smallest school in this study has a mean true membership of 362.30 pupils in grades one to eight inclusive, there is no need to apply any

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[64] Office of the Auditor, Department of Finance, Central Office of the Board of Education.

[65] Office of the District Superintendent, District Six, Yates School, 1839 North Richmond Street.

small school correction factor. If to this figure of 362.30 is added the adjusted figure of 25.60 for kindergarten, then the mean true membership in kindergarten through eighth grade is 387.90 which is above the breaking point in the study of Mort and Schmidt.

It is well known that vacancies in authorized teaching positions are a serious administrative problem in many of the elementary schools of Chicago, however, it is felt that the reasons for such lack of assigned teaching personnel are beyond the scope of this study. This problem would probably be very closely related to the nature of the population in the attendance unit area. United States Census Data and Chicago Community Inventory Information are not very helpful because the basic areas of enumeration are not coterminus with the attendance unit districts in Chicago.

It is felt that it is beyond the scope of this study to establish the validity and reliability of the tests approved for use in the Chicago Public Schools as measures of intelligence and achievement. The results of these tests are accepted in Chicago as being reasonably valid and reliable for placing beginning high school freshmen in the proper classes.

Salaries of engineer-custodians, janitors, firemen, and janitresses are not classified as instructional costs. These salaries are classified under "operation of the physical plant" and hence are not used in this study.

Salaries of supervisors and bath attendants are paid from central office budget accounts[66] and are not directly chargeable to the individual attendance

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[66] Facts and Figures, September, 1954. pp. 24 and 26.

TABLE II

SUMMARY OF MEAN TRUE MEMBERSHIP IN DISTRICT SIX SCHOOLS DURING 1964

School	Grades 1 - 8	Kindergarten	Trainable Mentally Handicapped	Educable Mentally Handicapped	Truant	Deaf-Oral	Sight Saving	Total
A	834.70	118.00		12.70				965.40
B	488.80	73.60		66.50	26.80			655.70
C	546.00	56.50		13.90				616.40
D	552.60	65.60						618.20
E	481.00	76.10						557.10
F	362.30	51.60		48.50				462.40
G	1052.80	134.60						1187.40
H	540.80	66.60						607.40
I	560.00	70.30		15.00				645.30
J	1564.00	223.90		15.60 (a)				1795.70
K	775.60	77.20		31.80				884.60
L	1025.00	131.20		48.80				1199.00
M	1023.70	148.40				59.60		1231.60
N	775.30	99.40						874.70
O	471.30	48.20		11.44 (b)				529.80
P	758.40	88.80						847.20
Q	550.90	68.20		16.60				635.70
R	490.30	59.20						549.50
S	988.20	113.60		15.70				1117.50
T	488.00	58.40						546.40
U	591.70	95.70		286.90				974.30
V	708.70	105.10		132.60			19.40	965.80
W	979.80	145.60	30.30	15.30			20.90	1191.90
X	400.20	48.00		36.00				484.20
Y	602.40	91.90		15.60				709.90
Z	656.30	80.70						737.00
Total	18268.80	2396.40	30.30	776.94	26.80	59.50	40.30	21590.10

a for five months only

b for nine months only

unit. Such salaries are therefore not used in this study.

Chapters II, III, and IV will present the basic data and statistical relationships of this study. Chapter V will apply a variation of Powell's Method to the material developed in the three preceeding chapters and Chapter VI will be a summary of the entire study and will contain certain recommendations.

CHAPTER II

DATA AND STATISTICAL RELATIONSHIPS CONCERNING PUPIL ENROLLMENT AND NUMBER OF TEACHERS

It is the purpose of this chapter to present all data with regard to pupil enrollment and number of teachers and also to present the statistical relationships between the variables having to do with pupil membership and professional personnel. The data in this chapter have been obtained from the Principal's Monthly Summaries which consist of four sections: (1) teacher personnel data showing number of authorized positions and number of assigned teachers in each teaching category; (2) total pupil personnel data showing enrollment (or re-enrollment), transfers in and out of the school, intra-school transfers, withdrawals, average daily attendance, true membership, per cent of attendance, and various other items; (3) pupil personnel data showing membership by sexes and total membership in each of the special educational programs in the school; (4) pupil membership data by sexes and total membership for each semester grade from 1C to 8A inclusive for all students enrolled in the regular grades. The principal's monthly summary is the grand total of the monthly summaries prepared by the individual classroom teachers for each home room class in the school including grades one to eight inclusive, kindergarten, and special education divisions.

Mean True Membership

Mean true membership was obtained from the principal's monthly summary sheets by totalling the true memberships for the ten school months in the calendar year 1954 and dividing this total by ten. Mean true membership for all of the schools in the sample selected for study has previously been presented in Table II. The total mean true membership for all schools for the calendar year 1954 was 21,590.10.

For each school, there were lists of graduates from grade 8A for two consecutive semesters. No particular purpose is served by retaining the semester groupings, therefore all data pertaining to graduates is combined and listed in Table III. This table does not show the graduates from advanced ungraded divisions which are listed separately by the schools inasmuch as standard test scores are not usually available for the students from the ungraded divisions. The number of graduates ranges from 29 in School X to 98 in School W. The total number of graduates for all schools is 1,470, 844 from Group I Schools and 626 from Group II Schools. The average number of graduates per school for two consecutive semesters is 56.54.

Rate of Pupil Transiency

Pupil transiency is sometimes thought to be a factor which limits educational efficiency by making it difficult to maintain continuity of the instructional process for a desirable period of time. Pupil transfers are shown on the summary sheets as a cumulative figure for the semester. It was therefore necessary to use the figures for the semesters ending in January 1954,

TABLE III

NUMBER OF GRADUATES FOR TWO CONSECUTIVE SEMESTERS FOR ALL SCHOOLS

School	Number of Graduates
A	63
B	30
D	40
G	79
H	54
I	45
K	56
M	88
N	70
P	51
S	65
W	98
Y	44
Z	61
C	46
E	48
F	41
J	97
L	81
O	40
Q	52
R	57
T	45
U	36
V	54
X	29
Total	1470
Mean	56.54

June 1954 and January 1955. This gave the total number of transfers in and out for a fifteen month period. These figures were reduced to a calendar year basis by dividing by 15 and multiplying by 10. Pupil transiency is figured on an all school basis, it is not possible from the summaries to figure pupil transiency for the various educational programs in the school. The rate of pupil transiency for each school is shown in Table IV. The rate of pupil transiency varies from a low of 14.85 in School L to a high of 93.56 in School P. The median rate of pupil transiency would be midway between School Q with a rate of 49.18 and School V with a rate of 42.80, or a rate of 45.99. The rate of pupil transiency is not related to school size as measured by total mean true membership, at least in the schools selected for this study.

Certification Ratio

A measure of school size, other than mean true membership, is the average number of authorized teaching positions. This measure is determined in a manner similar to that used in obtaining mean true membership. The number of positions authorized in each category for each school month during the calendar year 1954 was recorded and tallied. This total was then divided by ten to get the average number of authorized positions. In the elementary schools of Chicago, there are the so-called "fractional teachers". A school may be so small that it cannot maintain a full time kindergarten teacher in the school. Another school may be of such size that it could not carry two full time physical education teachers, but it does need more than one. Physical education teachers are commonly assigned as tenths in which one day at a school

TABLE IV

PUPIL TRANSIENCY FOR THE CALENDAR YEAR 1954

School	Transfers In	Transfers Out	Total Mean True Membership	Rate of Pupil Transiency
A	188.00	221.33	965.40	42.40
B	187.33	180.00	655.70	56.02
D	112.00	104.67	616.20	35.05
G	188.68	179.33	1187.40	30.99
H	104.67	138.00	607.40	39.95
I	79.33	109.33	645.30	28.93
K	391.33	303.33	884.60	78.53
M	151.33	209.33	1231.60	29.28
N	148.67	194.00	874.70	39.18
P	306.67	486.00	874.20	93.56
S	201.33	264.67	1117.50	41.70
W	340.00	308.67	1191.90	54.42
Y	280.67	256.67	709.90	75.69
Z	130.00	155.33	737.00	38.72
C	287.33	180.67	616.40	67.81
E	70.00	110.67	557.10	32.42
F	89.33	90.00	462.40	38.78
J	356.00	698.67	1803.50	58.48
L	86.67	91.33	1190.00	14.85
O	136.00	131.33	530.94	50.35
Q	147.33	165.33	635.70	49.18
R	143.33	168.00	549.50	56.66
T	171.33	155.33	546.40	59.78
U	428.00	421.33	974.30	87.17
V	215.33	198.00	965.80	42.80
X	242.67	208.67	484.20	93.21

during a two week payroll period would represent one-tenth of a physical education teacher. The average number of authorized teaching positions for the calendar year 1954 are shown in Table V. The number of teaching positions authorized in grades one to eight inclusive, varies from 12.50 in School F to 46.30 in School J.

A high percentage of assigned teachers in a school, ninety per cent or above, is generally considered to be a mark of quality in a school. It is, however, a topic on which there is little in the current literature. Since this study is concerned primarily with the educational program in grades one to eight inclusive, only the certification ratio for the regular grades will be calculated. An examination of Table VI shows that the certification ratio varies from 60.22 in School U to a high of 99.20 in School F. In other words, School U had only six regularly assigned teachers for every ten teaching positions authorized in the school during the period covered by this study. Four out of ten teaching positions in School U were filled by teachers who did not meet, in full, the certification requirements of the Board of Education. At least ten schools had a certification ratio of ninety or more, these ten schools had at least nine regularly assigned teachers for every ten authorized teaching. In the schools selected for this study, there is no statistically significant relationship between school size and certification ratio.

Pupil-Teacher Ratios

Another question investigated in this study is in regard to pupil-teacher ratios in grades one to eight inclusive. Average class size is not reported

TABLE V

AVERAGE FACULTY AUTHORIZED IN DISTRICT SIX SCHOOLS DURING 1954

School	Grades 1 - 8	Kindergarten	Trainable Mentally Handicapped	Educable Mentally Handicapped	Truant	Deaf-Oral	Sight-Saving	Total
A	24.90	1.85		1.00				27.75
B	16.00	1.00		4.00	2.00			23.00
C	17.70	1.00		1.00				19.70
D	16.90	1.00						17.90
E	16.50	1.05						17.55
F	12.50	1.00		2.90				16.40
G	31.30	2.10						33.40
H	18.00	1.00						19.00
I	17.50	1.25		1.00				19.75
J	46.80	2.90		1.00 (a)				49.70
K	22.40	1.00		2.00				25.40
L	32.90	2.05		2.40				37.35
M	32.00	2.10				8.00		42.10
N	24.00	1.55						25.55
O	15.30	1.00		1.00 (b)				17.20
P	25.50	1.50						27.00
Q	16.90	1.00		1.10				19.00
R	15.50	1.05						16.55
S	30.40	1.60		1.00				33.00
T	15.50	1.00						16.50
U	18.60	1.50		19.82				39.92
V	22.40	1.50		8.00			2.00	37.60
W	30.60	2.00	2.00	1.00			2.00	37.60
X	15.30	1.00		3.00				19.30
Y	19.20	1.50		1.00				21.70
Z	21.00	1.20						22.20
Total	575.10	36.70	2.00	50.62	2.00	8.00	4.00	678.42

a for five months only

b for nine months only

on the monthly summaries. One reason for this is that all teachers of special subjects are counted as teachers in the regular grades. The salaries of teachers of special subjects are paid from the same appropriation accounts as are used to pay the regular grade teachers. The authorized teaching positions in grades one to eight inclusive include all of the special subject teachers authorized in a given school. The pupil-teacher ratio is related to school size, since the number of teachers of special subjects is not directly proportional to mean true membership in grades one to eight. For example, one physical education teacher is assigned to a school with a total mean true membership of more than 600, one and one-half physical education teachers are assigned to a school if the membership exceeds 1250, and two physical education teachers are assigned if the membership exceeds 1600. The same thing applies to the other teachers of special subjects. Therefore, the proportion of special subject teachers to authorized teaching positions is highest in the small schools and lowest in the large schools. This failure to assign teachers of special subjects in direct proportion to mean true membership results in variations in educational expenditures per pupil.

An examination of Table VII shows a range in pupil-teacher ratios from a low of 26.16 for school X to a high of 33.78 for School J - incidentally School J is the largest school in the sample. School J has 1.291 times as many pupils per teacher in the regular grades as has School X. This is a variation of almost thirty per cent in the pupil-teacher ratio.

TABLE VI

CERTIFICATION RATIO IN GRADES ONE TO EIGHT FOR ALL SCHOOLS

School	Average number of Assigned teachers	Average number of Authorized teaching Positions	Certification Ratio
A	21.20	24.90	85.14
B	12.60	16.00	78.75
D	14.00	16.90	82.84
G	29.90	31.30	95.53
H	16.80	18.00	93.33
I	15.70	17.50	89.71
K	17.90	22.40	79.91
M	30.40	32.00	95.00
N	19.10	24.00	79.58
P	22.26	25.50	87.29
S	28.70	30.40	94.41
W	26.40	30.60	86.27
Y	16.25	19.20	84.63
Z	20.00	21.00	95.24
C	12.00	17.70	67.80
E	15.30	16.50	92.73
F	12.40	12.50	99.20
J	30.10	46.30	65.01
L	32.40	32.90	98.48
O	10.70	15.30	69.93
Q	16.50	16.90	97.63
R	14.40	15.50	92.90
T	13.25	15.50	85.48
U	11.20	18.60	60.22
V	20.04	22.40	89.46
X	14.20	15.30	92.81

Statistical Relationships

Four variables have been tabulated up to this point. School size, in itself, is not a measure of quality or lack of quality in a school except as it is related to the pupil-teacher ratio. It will be shown later that there can be high or low pupil achievement in large schools as well as in small schools. The certification ratio is an indication of faculty quality inasmuch as it is a measure of the relative number of regularly assigned teachers in comparison with the number of faculty positions authorized, assuming that the positions not filled by regularly assigned teachers are filled by substitutes who for some reason are not qualified for a regular assignment. Since assigned teachers are paid more than substitutes are paid, the certification ratio is directly related to teachers salary costs per pupil. The pupil-teacher ratio may be considered as an inverse measure of quality in a school. A high pupil-teacher ratio would be considered less desirable than a lower pupil-teacher ratio. The rate of pupil transiency may be considered as a factor limiting educational efficiency inasmuch as it makes it difficult for a school to maintain continuity in its educational program when the student population is continually changing.

Inasmuch as there is a certain non-normality in the distribution of the four variables, it is justifiable to use a rank difference method of correlation to determine whether or not any statistically significant relationships exist between the four measures. This will prevent giving undue weight to the one very large school in the sample and possibly to the three other schools which

TABLE VII

PUPIL TEACHER RATIOS FOR GRADES ONE TO EIGHT INCLUSIVE FOR THE CALENDAR YEAR 1954

School	Pupil-Teacher Ratio
A	35.22
B	30.55
D	32.70
G	33.64
H	30.04
I	32.00
K	34.62
M	31.99
N	32.30
P	29.74
S	32.51
W	32.02
X	31.38
Z	31.25
C	30.85
E	29.15
F	28.98
J	33.78
L	31.16
O	30.80
Q	32.60
R	31.63
T	31.48
U	31.81
V	31.64
X	26.16

have a mean true membership in grades one to eight of more than 1000 pupils[1]. The rankings of the schools in the four characteristics are shown in Table VIII. In all cases the rankings are made in a descending order. The highest numerical value in each case is one and the lowest numerical value is twenty-six. In these four measures, there are no ties among the rankings. For the certification ratio, the rank of one is the most desirable and the rank of twenty-six is the least desirable. For the pupil-teacher ratio and also for the rate of pupil transiency, the rank of twenty-six would be the most desirable and the rank of one would be the least desirable.

The rank difference coefficient of correlation is equivalent to the product moment coefficient of correlation in almost all cases. If there is a difference, the rank difference coefficient of correlation tends to be slightly less than the product moment coefficient of correlation. The standard error of the rank difference coefficient of correlation is 1.04 times as large as the standard error of the product moment coefficient of correlation. In using rank difference coefficients of correlation, it is necessary to take this difference in the standard error into account in figuring the statistically significant values of the rank difference coefficients of correlation. With twenty-six pairs there would be twenty-four degrees of freedom. A product moment coefficient of correlation with this size sample would be statistically significant at the five percent level of confidence at 0.388 and would be

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[1]James E. Wert, Charles O. Neidt, and J. Stanley Ahmann, Statistical Methods in Education and Psychological Research. New York, 1954. p. 89.

TABLE VIII

RANK OF SCHOOLS IN VARIOUS CHARACTERISTICS FOR GRADES ONE TO EIGHT

School	Size of School Mean True Membership	Certification Ratio	Pupil-Teacher Ratio	Rate of Pupil Transiency
A	7	17	4	15
B	21	22	21	10
C	18	24	19	6
D	16	19	5	21
E	23	11	24	22
F	26	1	25	19
G	2	4	3	23
H	19	9	22	17
I	15	12	10	25
J	1	25	2	8
K	8	20	1	4
L	3	2	18	26
M	4	6	11	24
N	9	21	8	18
O	24	23	20	12
P	10	14	23	1
Q	17	3	6	13
R	20	8	14	9
S	5	7	7	16
T	22	16	15	7
U	14	26	12	3
V	11	13	13	14
W	6	15	9	11
X	25	10	26	2
Y	13	18	16	5
Z	12	5	17	20

statistically significant at the one per cent level of confidence at 0.496. For rank difference coefficients of correlation, the respective figures would be 0.404 and 0.516. Inter-correlations between the four variables discussed in this chapter are shown in Table IX.

Size of school as such does not seem to be an important factor in the retention of teachers or in the proportion of pupil transfers in and out of the school. The relationship between size of school and pupil-teacher ratio, statistically significant beyond the one per cent level of confidence, can be accounted for due to the fact that a small school needs a certain number of special subject teachers in its basic organisation and the number of teachers of special subjects is not directly proportional to pupil enrollment.

There is no appreciable relationship between the certification ratio and the pupil-teacher ratio. There is a tendency for teachers to leave schools which have a high rate of pupil transiency. This is shown by a rank difference coefficient of correlation of -0.491 which is statistically significant between the five per cent and the one per cent levels of confidence. It might be stated that there is a direct relationship between the transfer of educational personnel and the transfer of pupil population within a school.

No appreciable relationship exists between the pupil-teacher ratio and the rate of pupil transiency.

If the school size is not considered as a measure of school quality, then there are three measures which can be used as indicators of school quality: (1) certification ratio, (2) pupil-teacher ratio, and (3) rate of pupil transiency. The thirteen schools with the most desirable rankings in these

TABLE IX

INTERCORRELATIONS OF RANK-DIFFERENCES IN VARIOUS CHARACTERISTICS

	Certification ratio in grades 1-8	Pupil-teacher ratio in grades 1-8	Rate of pupil transiency
School size as measured by mean true membership in grades 1-8	0.102	0.642**	-0.251
Certification ratio in grades 1-8		-0.183	-0.491*
Pupil-teacher ratio in grades 1-8			-0.128

* Significant at the 5 percent level of confidence

** Significant at the 1 percent level of confidence

three characteristics are shown in Table X.

TABLE X

LISTING OF SELECTED SCHOOLS IN CERTAIN CHARACTERISTICS

Thirteen Schools highest in certification ratio	Thirteen schools lowest in pupil-teacher ratio	Thirteen schools lowest in rate of pupil transiency
E	B	A
F	C	D
G	E	E
H	F	F
I	H	G
L	L	H
M	O	I
Q	P	L
R	R	M
S	T	N
V	X	S
X	Y	V
Z	Z	Z

Five schools - E, F, H, L, and Z - appear three times.

Seven schools - G, I, R, S, V, X, and M - occur twice.

Ten schools - Q, B, C, O, P, T, Y, A, D, and N - appear only once.

Four schools - J, K, U, and W - do not appear at all.

On the basis of three measures the schools can be placed on three quality levels:

High Quality level schools - E, F, H, L, and Z

Median Quality level schools - G, I, R, S, V, X, M, Q, B, C, O, P, T, Y, A, D, and N

Low Quality level schools - J, K, U, and W.

On the basis of three measures the schools could also be placed on four levels as follows:

High Quality level schools - E, F, H, L, and Z

Above average Quality level schools - G, I, R, S, V, X, and M

Below average Quality level schools - Q, B, C, O, P, T, Y, A, D, and N.

Low Quality level schools - J, K, U, and W.

It will be noted that distinct differences between schools are apparent on the basis of three measures of school quality. As additional measures are developed, comparisons will be made with these rankings.

CHAPTER III

DATA AND STATISTICAL RELATIONSHIPS CONCERNING PUPIL ABILITY, PUPIL ACHIEVEMENT AND CHRONOLOGICAL AGE OF GRADUATES

It is the purpose of this chapter to present all data with regard to pupil ability, pupil achievement and chronological ages of graduates. This chapter will also present the statistical relationships existing between these variables. The data in this chapter have been obtained from reports made by the schools to the District Superintendent.

Pupil Ability

The frequency distribution of indexes of pupil ability as measured by scores on intelligence examinations are recorded in the appendix. These data are recorded separately for the January 1954, June 1954 and January 1955 graduates. These results were then combined and the means for each school and each group were then calculated. The intelligence examination used in all of the schools in this sample was the Chicago Primary Mental Abilities Test, published by Science Research Associates. All examinations were administered from four to six weeks before the end of the 8B semester. Only those pupils graduating from the regular grades are given standardized tests at this time. There is no definite schedule of testing for those pupils in ungraded divisions

who are deemed capable of going to high school. Since there were no arithmetic scores available to this research worker for Group II Schools and since there were no chronological ages available for graduates of Group II Schools, it is necessary to keep pupil ability scores separately for the two groups.

A summary of the frequency distribution of pupil ability for all schools is shown in Table XI. An examination of this table reveals a rather wide range of pupil ability. A total of eighteen students are listed as having intelligence quotients below 65. On the other end of the scale, seventy-six pupils are listed above 135. In Group I, in Group II and in the total, the highest frequency occurs in the interval from 95 to 99. In Group I, the second highest frequency occurs in the interval from 100 to 104 and the third highest frequency occurs in the interval from 110 to 114. In Group II, the second highest frequency occurs in the interval from 85 to 89 and the third highest frequency occurs in the interval from 90 to 94. In the total, the second highest frequency occurs in the interval from 90 to 94 and the third highest frequency occurs in the interval from 100 to 104.

The mean for the 844 pupils tested in Group I is 104.72, while the mean for the 626 pupils in Group II is 96.74. This is a difference of 7.98. If it is assumed at this point that the 844 and 626 pupils represent two distinct samples drawn from the same population, then a "t" ratio can be calculated to determine whether or not the difference between the means of Groups I and II are statistically significant. The "t" ratio calculated under these conditions is 8.74. With samples this large, a "t" ratio of 2.58 would be significant at the one per cent level of confidence. The use of a "t" ratio may not be entirely

TABLE XI

SUMMARY OF FREQUENCY DISTRIBUTION OF PUPIL ABILITY FOR ALL SCHOOLS

Interval	Group I	Group II	Total
160 - 164	1	0	1
155 - 159	1	0	1
150 - 154	4	1	5
145 - 149	13	1	14
140 - 144	22	6	28
135 - 139	22	5	27
130 - 134	39	8	47
125 - 129	37	9	46
120 - 124	56	17	73
115 - 119	53	21	74
110 - 114	77	33	110
105 - 109	69	69	138
100 - 104	87	64	151
95 - 99	98	89	187
90 - 94	73	80	153
85 - 89	48	88	136
80 - 84	56	58	114
75 - 79	35	38	73
70 - 74	24	27	51
65 - 69	13	10	23
60 - 64	16	2	18
Total	844	626	1470
Mean	104.72	96.74	101.28

valid under these circumstances, however, the size of the "t" ratio indicates that there is very probably a real difference between the two groups of schools in pupil ability.

The mean and rank for intelligence test score means for all schools are shown in Table XII. An inspection of this table shows that there are ten schools out of fourteen in Group I with a mean pupil ability of more than 100. School K with a mean pupil ability of 93.57 is the lowest school in this group. School G with a mean pupil ability of 111.99 is the highest school in Group I. Six schools in Group I - B, D, G, M, N, and S have a mean intelligence test score higher than the mean for all of the pupils in Group I. In Group II, there are only three schools out of twelve with a mean pupil ability of more than 100. The range in mean pupil ability in Group II is from a low of 91.71 for School R to a high of 108.35 for School F. This analysis of Table XII indicates that Group I and Group II are distinct groups and that Group I is definitely superior to Group II.

Including the three personnel measures developed in Chapter II, there are now four measures common to all of the schools: (1) certification ratio, (2) rate of pupil transiency, (3) pupil-teacher ratio, and (4) mean pupil ability. The thirteen schools lowest in (1) and (4) and the thirteen schools highest in (2) and (3) are listed in Table XIII.

TABLE XII

STATISTICAL CHARACTERISTICS OF PUPIL ABILITY

Group	School	Mean	Mean rank of school	
			In group	In total sample
I	A	97.58	11	15
	B	104.83	7	8
	D	109.70	5	5
	G	111.99	1	1
	H	97.32	13	17
	I	101.83	10	12
	K	93.57	14	24
	M	111.76	2	2
	N	110.57	4	4
	P	97.50	12	16
	S	111.73	3	3
	W	102.09	9	11
	Y	104.09	8	9
	Z	107.01	6	7
II	C	93.91	10	23
	E	102.92	2	10
	F	108.35	1	6
	J	94.05	8.5	21.5
	L	98.07	4	14
	O	94.38	7	20
	Q	100.48	3	13
	R	91.71	12	26
	T	96.83	5	18
	U	92.78	11	25
	V	95.46	6	19
	X	94.05	8.5	21.5

TABLE XIII

LISTING OF SELECTED SCHOOLS IN CERTAIN CATAGORIES

13 schools lowest in certification ratio	13 schools highest in rate of pupil transiency	13 schools highest in pupil-teacher ratio	13 schools lowest in mean pupil ability
A	B	A	A
B	C	D	C
D	K	G	H
J	J	I	J
C	O	J	L
K	P	K	L
O	Q	M	O
N	R	N	P
P	T	Q	R
T	U	S	T
U	W	U	U
W	X	V	V
Y	Y	W	X

Three schools - J, K, and U appear in all four columns.

Six schools - A, C, O, P, T, and W occur in three places.

Eight schools - B, D, N, Y, Q, R, X and V appear twice.

Six schools - H, L, G, I, M, and S occur only once.

Three schools - E, F, and Z do not appear at all.

On the basis of these four measures, the schools can be placed in three quality levels as follows:

1. High quality level schools - E, F, Z, H, L, G, I, M, and S

2. Median quality level schools - B, D, N, Y, Q, R, X, and V

3. Low quality level schools - J, K, U, A, C, O, P, T, and W.

When this placement is compared with the placement of the schools on the basis of three personnel factors, the following statements can be made:

Schools E, F, H, L, and Z are high quality level schools in both placements

Schools G, I, M, and S are median quality level schools on the basis of three factors and high quality level schools on the basis of four factors

Schools B, D, N, Y, Q, R, X, and V are median quality level schools in both groupings

Schools A, C, O, P, and T are median quality level schools on the basis of three measures and low quality level schools on the basis of four measures

Schools J, K, U, and W are low quality level schools in both groupings.

Pupil Achievement in Reading

Test scores showing grade achievement in reading were available for all graduates. The frequency distribution of reading grade scores for each school is listed in the appendix. The tests used in all of the schools were the Chicago Reading Tests now published by the E. M. Hale Company. All of the tests were administered during the first ten weeks of the 8A semester so that the results would be available for parent interviews held during the tenth week

of the 8A semester.

A summary of the frequency distribution of reading grade scores for all schools is shown in Table XIV. The range in reading grade scores is from 3.0 to 13.4, or a range of 10.4 years in reading achievement as measured by the tests used. The mode for Group I is in the interval from 8.0 to 8.4, this is also the mode for the entire sample of schools. In Group II, the mode is in the interval from 7.0 to 7.4. The second highest frequency in Group I is in the interval from 9.0 to 9.4 and the third highest frequency is in the interval from 7.0 to 7.4. In Group II, the second highest frequency occurs twice - in the interval from 6.0 to 6.4 and in the interval from 8.0 to 8.4. For all schools, the second highest frequency is in the interval from 7.0 to 7.4 and the third highest frequency is in the interval from 7.5 to 7.9.

If a "t" ratio is calculated from the differences of the means, it has the value of 8.30 which would indicate that it is statistically significant beyond the one per cent level of confidence. It will be noted that this "t" ratio is of the same magnitude as the "t" ratio between intelligence test score means of Group I and Group II. This would seem to indicate that there is a highly significant positive relationship between pupil ability and pupil achievement in reading inasmuch as Group I is definitely superior to Group II in both measures.

The mean reading grade score and mean rank of the school are shown in Table XV for all schools. Five schools out of fourteen schools in Group I have a mean reading grade of 9.0 or higher, only two schools out of twelve in Group II are as high as this. Two schools in Group II have a mean reading grade score of less than 7.0, there are no schools in Group I as low as this.

TABLE XIV

SUMMARY OF FREQUENCY DISTRIBUTION OF READING GRADE SCORES FOR ALL SCHOOLS

Interval	Group 1	Group 11	Total
13.0 - 13.4	33	14	47
12.5 - 12.9	30	8	38
12.0 - 12.4	28	13	41
11.5 - 11.9	13	12	25
11.0 - 11.4	33	8	41
10.5 - 10.9	34	15	49
10.0 - 10.4	54	35	89
9.5 - 9.9	48	31	79
9.0 - 9.4	80	30	110
8.5 - 8.9	63	26	89
8.0 - 8.4	117	71	188
7.5 - 7.9	63	56	119
7.0 - 7.4	76	79	155
6.5 - 6.9	38	41	79
6.0 - 6.4	47	71	118
5.5 - 5.9	42	45	87
5.0 - 5.4	20	33	53
4.5 - 4.9	12	24	36
4.0 - 4.4	10	9	19
3.5 - 3.9	1	2	3
3.0 - 3.4	2	3	5
Total	844	626	1470
Mean	8.74	7.86	8.36

From the rankings of the schools in mean pupil ability and in mean pupil achievement in reading, a rank difference coefficient of correlation was calculated which was 0.848. For this size sample, a rank difference coefficient of correlation of 0.516 is statistically significant at the one per cent level of confidence. At least in the sample selected for this study, mean pupil ability and mean pupil achievement in reading are very closely related.

The thirteen schools lowest in mean pupil achievement in reading are: B, C, H, J, K, O, Q, R, S, T, U, V, and X. If this listing is combined with the four measures previously used to place schools on different quality levels, there will be five measures for classifying the schools.

Three schools - J, K, and U appear in all five listings.

Three schools - C, O, and T appear four times.

Eight schools - A, P, W, B, Q, R, V, and X occur three times.

Five schools - D, N, Y, H, and S occur twice.

Four schools - L, G, I, and M appear only once.

Three schools - E, F, and Z do not appear at all.

On the basis of these five measures, the schools can be placed in three quality levels as follows:

1. High quality level schools - E, F, Z, L, G, I, and M

2. Median quality level schools - D, N, Y, H, S, A, P, W, B, Q, R, V, and X

3. Low quality level schools - C, O, T, J, K, and U.

When this placement is compared with the placement of the schools on the basis of four measures, the following statements can be made:

Schools E, F, Z, L, G, I, and M are high quality level schools in both

TABLE XV

STATISTICAL CHARACTERISTICS OF READING GRADE SCORES

Group	School	Mean	Mean rank of school	
			In group	In total sample
I	A	8.46	10	13
	B	7.95	13	17
	D	8.64	8	11
	G	9.76	1	1
	H	8.00	12	15
	I	9.16	3	4
	K	7.05	14	24
	M	9.04	5	6
	N	9.71	2	2
	P	9.05	4	5
	S	8.29	11	14
	W	8.77	7	9
	Y	8.88	6	8
	Z	8.54	9	12
II	C	7.30	10	23
	E	9.00	2	7
	F	9.52	1	3
	J	6.87	11	25
	L	8.65	3	10
	O	7.94	5	18
	Q	7.99	4	16
	R	7.66	8	21
	T	7.76	7	20
	U	6.69	12	26
	V	7.62	9	22
	X	7.80	6	19

groupings

Schools H and S are high quality level schools on the basis of four measures and median quality level schools on the basis of five measures.

Schools B, D, N, Y, Q, R, X, and V are median quality level schools in both groupings

Schools A, P, and W are low quality level schools on the basis of four measures and median quality level schools on the basis of five measures

Schools C, O, T, J, K, and U are low quality level schools in both groupings.

On the basis of five measures the schools can also be placed in four quality levels as follows:

1. High quality level schools - E, F, Z, L, G, I, and M
2. Above average quality level schools - D, N, Y, H, and S
3. Below average quality level schools - A, P, W, B, Q, R, V, and X
4. Low quality level schools - J, K, U, C, O, and T.

Rank difference coefficients of correlation are shown in Table XVI for the variables that have been measured. Since it is felt that school size is not an important factor in school quality and since school size is not statistically related in any significant manner to any of the other measures except the pupil teacher ratio, the rank difference coefficients of correlation between school size and the other variables are not shown in this table.

There is a positive relationship, statistically significant between the five per cent and one per cent levels of confidence, between the certification ratio and mean pupil ability. This would seem to indicate that teachers tend to transfer into schools where the ability of the pupils tend to be above average.

Undoubtedly, there are other factors involved in the transfer of teachers such as neighborhood characteristics and the socio-economic status of the school population, however, it is rather difficult to analyse these factors on the basis of the attendance unit because of the lack of congruence of the attendance unit district with basic census enumeration areas in the City of Chicago.

TABLE XVI

RANK DIFFERENCE COEFFICIENTS OF CORRELATION BETWEEN SELECTED MEASURED VARIABLES

	Certification Ratio	Rate of Pupil Transiency	Pupil-teacher Ratio	Mean Pupil Ability
Certification Ratio				0.463*
Rate of Pupil Transiency				-0.696**
Pupil-teacher Ratio				0.151
Mean Pupil Ability	0.463*	-0.696**	0.151	
Mean Pupil Achievement in Reading	0.508*	-0.607**	-0.079	0.848**

* significant at the five per cent level of confidence

** significant at the one per cent level of confidence

A high negative relationship, statistically significant beyond the one per

cent level of confidence, exists between the rate of pupil transiency and mean pupil ability.

No statistically significant relationship exists between the pupil-teacher ratio and mean pupil ability.

A positive relationship, statistically significant between the five per cent and one per cent levels of confidence, exists between the certification ratio and mean pupil achievement in reading. This would seem to indicate that assigned teachers get better results in the teaching of reading than do substitute teachers.

The relationship between the rate of pupil transiency and mean pupil achievement in reading is negative and is statistically significant beyond the one per cent level of confidence. It might be suggested here that perhaps some of the pupils are not in any one school long enough to adjust to the school and hence do not benefit from instruction.

There is no statistically significant relationship between the pupil-teacher ratio and mean pupil achievement in reading.

The rank difference coefficient of correlation between mean pupil ability and mean pupil achievement in reading is 0.848, which is statistically significant beyond the one per cent level of confidence.

The relationship between the certification ratio and mean pupil achievement in reading is also positive and is statistically significant between the five per cent and one per cent levels of confidence. The relationship between the certification ratio and mean pupil ability is also positive and is of the same order of statistical significance, it is possible that there is no real relationship between the certification ratio and achievement in reading

when the effect of intelligence is removed. The size of the first order partial coefficient of correlation - 0.19 - would indicate that intelligence as well as the proportion of assigned teachers is an important factor in reading achievement. This is also shown by a multiple coefficient of correlation of 0.8604 which is well beyond the one per cent level of confidence.

Pupil Achievement in Arithmetic

Arithmetic grade scores were available only for the graduates of the fourteen schools in Group I. This was the primary reason for dividing the entire sample into two sub-samples. The arithmetic achievement tests used in all of the schools were the Chicago Arithmetic Tests now published by the E. M. Hale Company. The arithmetic tests were adminat approximately the same time that the reading tests were given, that is during the first ten weeks of the 8A semester.

Achievement in arithmetic is not as variable, at least as it is measured, as is achievement in reading. Grade scores for individual pupils in arithmetic range from 3.00 to a high of 10.00, while the variation in reading grade scores was from 3.00 to 13.00. In arithmetic grade scores, the mode is in the interval from 7.5 to 7.9 with the second highest frequency in the interval from 7.0 to 7.4. The summary of the frequency distribution of arithmetic grade scores is shown in Table XVII.

TABLE XVII

SUMMARY OF FREQUENCY DISTRIBUTION OF ARITHMETIC GRADE SCORES

Interval	Frequency
10.0 - 10.4	2
9.5 - 9.9	20
9.0 - 9.4	11
8.5 - 8.9	108
8.0 - 8.4	102
7.5 - 7.9	225
7.0 - 7.4	159
6.5 - 6.9	40
6.0 - 6.4	13
5.5 - 5.9	20
5.0 - 5.4	11
4.5 - 4.9	7
4.0 - 4.4	4
3.5 - 3.9	0
3.0 - 3.4	1
Total	844
Mean	7.94

The mean and the mean rank of each school in arithmetic grade scores are shown in Table XVIII. Mean pupil achievement in arithmetic ranges from a low of 6.76 in School K to a high of 8.73 in School N. Arithmetic grade scores are lower than reading grade scores. Only six schools have a mean pupil achievement in arithmetic of 8.0 or above while twelve schools had a mean pupil achievement in reading above 8.0.

TABLE XVIII

STATISTICAL CHARACTERISTICS OF ARITHMETIC GRADE SCORES

School	Mean	Rank	School	Mean	Rank
A	7.93	10	M	8.44	3
B	8.20	4	N	8.73	1
D	8.64	2	P	7.66	11
G	7.94	8.5	S	7.30	13
H	7.94	8.5	W	7.65	12
I	8.19	5	Y	8.07	6
K	6.76	14	Z	7.96	7

For Group I Schools there are six measured variables which are indicative of quality in a school. The listing of selected Group I Schools in these six variables is shown in Table XIX.

TABLE XIX

LISTING OF SELECTED GROUP I SCHOOLS IN CERTAIN CHARACTERISTICS

Characteristic	Schools
Seven schools lowest in certification ratio	A, B, D, K, N, W, and Y
Seven schools highest in rate of pupil transiency	A, H, K, P, S, W, and Y
Seven schools highest in pupil-teacher ratio	A, D, G, K, N, S, and W
Seven schools lowest in mean pupil ability	A, B, H, I, K, P, and Y
Seven schools lowest in mean pupil achievement in reading	A, B, D, H, K, S, and Z
Seven schools lowest in mean pupil achievement in arithmetic	A, G, H, K, P, S, and W

Two schools - A and K appear in all six listings.

Three schools - W, H, and S occur four times.

Four schools - B, D, Y, and P appear three times.

Two schools - N and G occur in two listings.

Two schools - I and Z appear only once.

One school - M does not appear at all

On the basis of these six measured variables, the schools in Group I can be placed in three quality levels as follows:

1. High quality level schools - M, I, Z, N, and G
2. Median quality level schools - B, D, Y, and P
3. Low quality level schools - A, K, W, H, and S.

Five measures were used to place all of the schools in three quality levels A comparison can be made between the two placements and the following statements can be made:

Schools M, I, Z, and G are high quality level schools with regard to five measures with all schools and with regard to six variables for Group I

School N is median quality level with respect to all schools, but is a high quality level school with respect to Group I

Schools B, D, Y, and P are median quality level schools with respect to both ratings

School K is a low quality level school in both respects

Schools A, W, H, and S are median quality level schools with respect to all schools but are low quality level schools with respect to Group I

Only one school - N - has moved upward from median quality level with respect to all schools to high quality level with respect to Group I

Four schools - A, W, H, and S have moved downward from median quality level with respect to all schools to low quality level with respect to Group I

The remaining nine schools are in the same quality level in both placements.

Chronological Ages of Graduates

The chronological ages of students at the time of graduation is felt to be an indication of quality in a school inasmuch as it gives some information with regard to the proportion of students who graduate within the limits regarded as normal for eighth grade students. To a certain extent, the chronological ages of students at the time of graduation would also be an indication of pupil over-ageness within a school.

For Group II Schools, the chronological ages of students at the time of graduation were available for the semesters ending in June 1954 and in January 1955. The individual frequency distributions for each school are listed in the appendix. The summary of the frequency distribution of chronological ages for all schools for the two consecutive semesters is shown in Table XX. It will be noted that the ages of the individual students vary from twelve years to seventeen years and three months. The mode is in the interval from 13.75 to 13.99 and the second highest frequency is in the interval from 14.00 to 14.24. The total number of students for whom ages were available is 626. The average for all students at the time of graduation is 14.23 years, or approximately 14 years and three months of age at the time of graduation

The mean pupil age at the time of graduation and the rank of the schools in mean chronological age are shown in Table XXI. Three schools have a mean below fourteen years of age and the other nine schools have a mean between fourteen and fifteen years of age. The mean for all pupils is 14.23 years. The data in Tables XX and XXI do not show total overageness within a school, they show only the age at time of graduation for those pupils graduating from grade 8A.

TABLE XX

FREQUENCY DISTRIBUTION OF CHRONOLOGICAL AGES OF GRADUATES

Interval	Frequency
17.25 - 17.49	2
17.00 - 17.24	
16.75 - 16.99	1
16.50 - 16.74	2
16.25 - 16.49	10
16.00 - 16.24	8
15.75 - 15.99	13
15.50 - 15.74	17
15.25 - 15.49	26
15.00 - 15.24	36
14.75 - 14.99	38
14.50 - 14.74	55
14.25 - 14.49	62
14.00 - 14.24	86
13.75 - 13.99	94
13.50 - 13.74	59
13.25 - 13.49	50
13.00 - 13.24	33
12.75 - 12.99	15
12.50 - 12.74	13
12.25 - 12.49	3
12.00 - 12.49	3
Total	626
Mean	14.23

TABLE XXI

MEAN CHRONOLOGICAL AGE OF GRADUATES AND RANK OF SCHOOLS

School	Mean Chronological Age	Rank of School
C	14.90	1
E	13.73	12
F	13.90	11
J	14.08	8
L	14.24	7
O	14.61	3
Q	13.95	10
R	14.01	9
T	14.67	2
U	14.40	4
V	14.34	5.5
X	14.34	5.5

Six variables are available for Group II schools: (1) certification ratio, (2) rate of pupil transiency, (3) pupil-teacher ratio, (4) mean pupil ability, (5) mean pupil achievement in reading, and (6) mean chronological age of graduates. The listing of selected Group II Schools in these six measures is shown in Table XXII.

TABLE XXII

LISTING OF SELECTED GROUP II SCHOOLS IN CERTAIN CHARACTERISTICS

Characteristic	Schools
Six schools lowest in certification ratio	C, J, O, T, U, and V
Six schools highest in rate of pupil transiency	C, J, R, T, U, and X
Six schools highest in pupil-teacher ratio	J, Q, R, T, U, and V
Six schools lowest in mean pupil ability	C, J, O, R, U, and X
Six schools lowest in mean pupil achievement in reading	C, J, R, T, U, and V
Six schools highest in mean chronological age of graduates	C, T, O, U, V, and X

One school - U - appears in all six listings.

Three schools - C, J, and T - occur five times.

Two schools - V and R - appear four times.

Two schools - O and X - appear three times

One school - Q - occurs only once.

Three schools - E, F, and L - do not appear at all.

On the basis of these six measures, the schools in Group II can be placed

on three quality levels as follows:

1. High quality level schools - E, F, L, and Q
2. Median quality level schools - O, X, V, and R
3. Low quality level schools - U, C, J, and T.

If the placement of all schools on three quality levels on the basis of five measurements is compared with the placement of Group II Schools on the basis of six measurements, then the following statements can be made:

Schools E, F, and L are high quality level schools in both respects

School Q is a median quality level school with respect to the entire sample but is a high quality level school with respect to Group II

Schools R, V, and X are median quality level schools in both ratings

School O is a low quality level school with respect to all schools but is a median quality level school with respect to Group II

Schools C, J, T, and U are low quality level schools in both respects

Two schools - Q and O - are in a higher quality level with respect to Group II than they are with respect to all schools.

Table XXIII is introduced at this point to show the rank difference coefficients of correlation between mean chronological age of graduates and the other variables which have been developed. Since there are only twelve measures with ten degrees of freedom, the rank difference coefficient of correlation must be 0.600 in order to be statistically significant at the five per cent level of confidence and must be 0.737 to be statistically significant at the one per cent level.

TABLE XXIII

RANK DIFFERENCE COEFFICIENTS OF CORRELATION BETWEEN MEAN CHRONOLOGICAL AGE OF GRADUATES AND SELECTED VARIABLES

Variable	Rank difference coefficient of correlation
Size of school	0.093
Certification ratio	-0.767**
Pupil-teacher ratio	0.024
Rate of pupil transiency	0.617*
Mean pupil ability	-0.509
Mean pupil achievement in reading	-0.568

* statistically significant at the five per cent level

** statistically significant at the one per cent level

No statistically significant relationship exists between the size of the school and mean chronological age of graduates.

There is a negative relationship, statistically significant beyond the one per cent level of confidence, between the certification ratio and the mean chronological age of graduates.

No statistically significant relationship exists between the pupil-teacher ratio and mean chronological age of graduates.

There is a positive relationship, statistically significant at the five per cent level of confidence, between the rate of pupil transiency and the mean chronological age of graduates.

The rank difference coefficient of correlation between mean pupil ability and mean chronological age of graduates, -0.509, is not statistically significant with a twelve school sample.

The rank difference coefficient of correlation between mean pupil achievement in reading and mean chronological age of graduates, -0.568, approaches the five per cent level of confidence which is 0.600.

Conclusions

Eight measured variables have been developed in this and the previous chapter. At least one of these, size of school as measured by mean true membership, seems to have little if any value as either a direct or indirect measure of desirability in a school. Size of school has a statistically significant relationship only with the pupil-teacher ratio.

The certification ratio is related in statistically significant ways to the following measures: (1) rate of pupil transiency, (2) mean pupil ability, (3) mean pupil achievement in reading, and (4) mean chronological age of graduates.

There are statistically significant relationships between the rate of pupil transiency and the following variables: (1) mean pupil ability, (2) mean pupil achievement in reading, and (3) mean chronological age of graduates.

The pupil-teacher ratio is not related in a statistically significant way to any measure other than the size of school.

Mean pupil ability is very highly correlated with mean pupil achievement in reading.

There are distinct differences between Group I and Group II schools in both

mean pupil ability and mean pupil achievement in reading. Group I surpasses Group II in both measures.

CHAPTER IV

INSTRUCTIONAL COSTS PER PUPIL

Instructional costs directly chargeable to the attendance unit can be classified as salary costs and costs other than salaries. Salary costs, in Chicago school administration, are kept in three separate accounts: principals salaries, teachers salaries and salaries of school clerks. Teachers salaries are kept in sub-accounts depending upon the type of educational work done by the teacher, such as: grades one to eight inclusive, kindergarten, educable mentally handicapped, social adjustment, deaf oral, sight saving, and other educational programs. Teachers of special subjects, such as: teacher-librarians, adjustment teachers, physical education teachers, home mechanics teachers, and others are all considered as teachers in the regular grades.

It is therefore necessary in this study to determine the total number of teachers in a school and then find the fractional part of general school costs which are directly chargeable to grades one to eight inclusive. For example, there are 24.90 teachers authorized in School A in grades one to eight inclusive, 1.85 authorized in kindergarten, and 1.00 in educable mentally handicapped. This gives a total of 27.75 authorized teaching positions in School A for the calendar year 1954. The per cent of general school costs in School A directly chargeable to the regular grades would be 24.90 divided by

27.75 and this quotient multiplied by 100. For School A, 89.73 per cent of general school costs are chargeable to grades one to eight inclusive. The other 10.27 per cent of general costs would be charged to kindergarten and educable mentally handicapped programs.

Principals Salary Costs Per Pupil

Principals salary costs per pupil for each school are shown in Table XXIV. The range is from a low of $4.85 in School J to a high of $15.93 in School E with an overall average of $9.33. Incidentally School J is the largest of all of the schools studied. Principals salary costs per pupil are very closely related to school size and also to the proportion of educational personnel assigned to other than the regular grades. The larger schools spend less on principals salaries per pupil than do the smaller schools. In School H, 94.74 per cent of general school costs are chargeable to grades one to eight inclusive. School H has a principals salary cost per pupil of $13.80. In School U, only 46.59 per cent of general costs are chargeable to grades one to eight. School U has a principals salary cost per pupil of $6.79.

Teachers Salary Costs Per Pupil

It is not necessary to make an allotment for teachers salary costs in grades one to eight inclusive inasmuch as all teachers, both assigned teachers and substitute teachers, are paid out of a single budget account which is separate from the budget accounts for all other educational programs. In order to get the teachers salary costs per pupil for the regular grades, the teachers salary cost for each school is divided by the mean true membership in grades one to eight. Teachers salary costs per pupil are shown in Table XXV.

TABLE XXIV

PRINCIPALS SALARY COSTS PER PUPIL IN GRADES ONE TO EIGHT INCLUSIVE FOR THE YEAR 1954

School	Principals Salary	Chargeable to grades one to eight incl.		Cost per Pupil
		Per cent	Amount	
A	8167.00	89.73	7328.25	8.78
B	6071.75	69.56	4223.51	8.64
D	8150.00	89.85	7322.78	13.25
G	8150.00	93.71	7637.36	7.25
H	7875.00	94.74	7460.78	13.80
I	8150.00	88.61	7221.72	12.90
K	8150.00	88.19	7187.48	9.27
M	8184.00	76.01	6220.66	6.08
N	8150.00	93.93	7655.30	9.87
P	8495.00	94.44	8022.68	10.58
S	6485.00	92.12	5973.98	6.04
W	8150.00	81.38	6632.47	6.77
Y	5304.42	88.48	4693.35	7.79
Z	8039.57	94.57	7604.63	11.59
C	6291.71	89.85	5653.14	10.35
E	8150.00	94.02	7662.63	15.93
F	6504.09	76.22	4957.42	13.68
J	8150.00	93.16	7593.54	4.85
L	8150.00	88.09	7179.34	7.00
O	6860.42	88.95	6102.34	12.95
Q	8150.00	88.95	7249.42	13.16
R	6667.01	93.66	6247.22	12.74
T	8150.00	93.94	7656.11	15.67
U	8619.75	46.59	4015.94	6.79
V	8129.00	66.08	5372.13	7.58
X	7063.50	79.27	5599.24	13.99
Total	198407.95		170472.42	
Mean	7631.08	85.92	6556.63	9.33

The range in the teachers salary cost per pupil is from a low of $129.04 in school J to a high of $182.97 in school F with an overall average of $151.54. It is only coincidental that School J is the largest school and that School F is the smallest school since the rank difference coefficient of correlation between school size and teachers salary cost per pupil, - 0.307, is not statistically significant. There are three factors which do have an important bearing on teachers salary costs per pupil: (1) certification ratio, (2) pupil-teacher ratio, and (3) average number of years of experience of teachers in the system. The certification ratio has a bearing on teachers salary costs per pupil because assigned teachers are paid more than substitutes are paid. The pupil-teacher ratio is also important since costs will be lower as the number of pupils for which each teacher is responsible increases. The average number of years of experience has a bearing because of the ten year salary schedule for elementary teachers with a maximum of $2,250 more than the beginning salary.

Clerks Salary Costs Per Pupil

School clerks in Chicago are civil service employees and are paid from different budget accounts than are instructional employees. The provision for sick leave is not chargeable to the individual school but is paid from a general account. The maximum amount that can be charged against the individual school is the budgetary allotment. If this budgeted appropriation is not expended, it is charged against the individual school and transferred to another account. This will explain the uniformity of school clerks salaries. Since clerks salaries are chargeable against the entire school, it is necessary to make an allocation of the fractional part which can be considered as directly

TABLE XXV

TEACHERS SALARY COSTS PER PUPIL IN GRADES ONE TO EIGHT INCLUSIVE

FOR 1954

School	Teachers Salaries	Cost Per Pupil
A	120263.52	144.08
B	80139.77	163.95
D	80094.89	144.94
G	155278.85	147.49
H	85545.33	158.18
I	84858.72	151.53
K	103578.44	133.55
M	170837.62	166.78
N	103950.50	134.08
P	119392.77	157.43
S	157634.25	159.53
W	148044.13	151.10
Y	88335.83	146.64
Z	109021.13	166.11
C	78923.19	144.55
E	79122.01	164.52
F	66289.57	182.97
J	201818.35	129.04
L	173695.03	169.46
O	70177.99	148.90
Q	81043.08	147.11
R	73693.46	150.31
T	74068.82	151.78
U	833365.45	140.89
V	109681.84	154.76
X	69517.13	173.71
Total	2768383.67	
Mean	106476.30	151.54

chargeable to grades one to eight inclusive. This allocation is the same as for principals salaries. Clerks salary costs per pupil are shown in Table XXVI.

The range in clerks salary costs per pupil is from a low of $3.58 in School G to a high of $8.04 in School P with an overall average of $4.83. The median clerks salary cost per pupil is $4.88. Clerks salary costs per pupil are related inversely to school size as measured by mean true membership. The smaller schools expend more on clerks salary costs per pupil than do the large schools.

Total Salary Costs Per Pupil

Total salary costs per pupil are shown in Table XXVII. The total salary cost is the sum of the principals, teachers and clerks salary costs per pupil. The range is from a low of $137.88 in School J to a high of $203.70 in School F with an overall average of $165.70.

TABLE XXVI

CLERKS SALARY COSTS PER PUPIL FOR ALL SCHOOLS

School	Clerks salaries	Chargeable to grades one to eight		Cost Per Pupil
		Percentage	Amount	
A	3350.00	89.73	3005.96	3.60
B	3350.00	69.56	2330.26	4.77
D	3350.00	89.85	3009.98	5.45
G	4020.00	93.71	3767.14	3.58
H	2865.00	94.74	2714.30	5.02
I	3350.00	88.61	2968.44	5.30
K	3350.00	88.19	2954.36	3.81
M	4995.00	76.01	3796.70	3.71
N	3350.00	93.93	3146.66	4.06
P	6460.00	94.44	6100.82	8.04
S	4965.00	92.12	4573.76	4.63
W	4690.00	81.38	3816.72	3.90
Y	3350.00	88.48	2964.08	4.92
Z	3350.00	94.57	3168.76	4.83
C	3350.00	89.85	3009.98	5.51
E	3550.00	94.02	3149.67	6.55
F	3550.00	76.22	2553.37	7.05
J	6700.00	93.16	6241.72	3.99
L	4690.00	88.09	4131.42	4.03
O	3550.00	88.95	2979.92	6.32
Q	2865.00	88.95	2548.42	4.63
R	3550.00	93.66	3137.61	6.40
T	3550.00	93.94	3146.99	6.45
U	6700.00	46.59	3121.53	5.28
V	5025.00	66.08	3320.53	4.68
X	3350.00	79.27	2655.54	6.64
Total	104225.00		88314.80	
Mean	4008.65	84.73	3396.71	4.83

TABLE XXVII

TOTAL SALARY COSTS PER PUPIL FOR ALL SCHOOLS

School	Total Salary Cost Per Pupil	School	Total Salary Cost Per Pupil
A	$152.86	Z	$182.53
B	177.36	C	160.41
D	163.64	E	187.00
G	158.32	F	203.70
H	177.00	J	137.88
I	169.73	L	180.49
K	146.63	O	168.17
M	176.67	Q	164.90
N	148.01	R	169.45
P	176.05	T	173.92
S	170.19	U	152.96
W	162.17	V	167.02
Y	159.35	X	194.34
		Mean	$165.70

The ratios between high and low per pupil salary costs are presented in Table XXVIII. The highest ratio appears in the principals salary cost and the lowest ratio appears in the teachers salary cost.

TABLE XXVIII

RATIO BETWEEN HIGH AND LOW IN SALARY COST PER PUPIL ITEMS

Salary Item	High	Low	Ratio between high and low
Principals Salary	$ 15.93	$ 4.85	3.28 to 1
Teachers Salary	182.97	129.04	1.42 to 1
Clerks Salary	8.04	3.58	2.25 to 1
Total Salary	203.70	137.88	1.48 to 1

The comparative rankings of all schools in the four salary cost items are shown in Table XXIX. In all cases, the rankings have been made in a descending order, so that a rank of one represents the highest expenditure and a rank of twenty-six represents the lowest expenditure on a per pupil basis. A close correspondence between the teachers salary cost and total salary cost can be noted in this table.

Rank difference coefficients of correlation between the per pupil salary cost items and measures which have been developed in previous chapters are shown in Table XXX.

Negative ralationships, statistically significant above the one per cent level of confidence, exist between the mean true membership in grades one to eight and the following measures: (1) principals salary cost per pupil, (2) clerks salary cost per pupil, and (3) total salary cost per pupil. The relationship between size of school and teachers salary cost per pupil is not

TABLE XXIX

COMPARATIVE RANKING OF ALL SCHOOLS IN SALARY COST PER PUPIL

FOR GRADES 1 - 8 INCLUSIVE

School	Principal salary cost per pupil	Teacher salary cost per pupil	Clerk salary cost per pupil	Total salary cost per pupil
A	16	22	25	22
B	17	7	15	6
C	13	21	8	19
D	6	20	9	17
E	1	6	4	3
F	5	1	2	1
G	20	17	26	21
H	4	9	12	7
I	9	13	10	12
J	26	26	21	26
K	15	25	23	25
L	21	3	20	5
M	24	4	24	8
N	14	24	19	24
O	8	16	7	14
P	12	10	1	9
Q	7	18	17.5	16
R	10	15	6	13
S	25	8	17.5	11
T	2	12	5	10
U	22	23	11	23
V	19	11	16	15
W	23	14	22	18
X	3	2	3	2
Y	18	19	13	20
Z	11	5	14	4

statistically significant. Relatively large schools cost less for total salary costs per pupil than do small schools, however, size of school does not seem to be an important factor in the teachers salary costs per pupil.

Positive relationships, statistically significant beyond the one per cent level of confidence, exist between the certification ratio and two measures - (1) teachers salary cost per pupil and (2) total salary cost per pupil. Regularly assigned teachers receive a higher salary than do substitute teachers.

Negative relationships, statistically significant beyond the one per cent level of confidence, exist between the pupil-teacher ratio and all four salary cost items per pupil. Schools with relatively high pupil-teacher ratios cost less per pupil than do schools with relatively low pupil-teacher ratios.

The rate of pupil transiency is not related in any statistically significant way to any of the salary cost per pupil items.

Positive relationships, statistically significant beyond the one per cent level of confidence, exist between the principals salary cost per pupil and two other salary cost items - (1) clerks salary cost per pupil and (2) total salary costs per pupil.

The rank difference coefficient of correlation between teachers salary costs per pupil and total salary costs per pupil is 0.957. With this number of cases, a rank difference coefficient of correlation of 0.516 would be statistically significant at the one per cent level of confidence.

A positive relationship, statistically significant at the one per cent level of confidence, exists between the clerks salary cost per pupil and total

TABLE XXX

RANK DIFFERENCE COEFFICIENTS OF CORRELATION BETWEEN SELECTED VARIABLES

	Principals Salary Cost Per Pupil	Teachers Salary Cost Per Pupil	Clerks Salary Cost Per Pupil	Total Salary Cost Per Pupil
Mean True Membership in grades 1 - 8	-0.892**	-0.307	-0.861**	-0.520**
Certification Ratio	0.166	0.645**	-0.030	0.554**
Pupil-teacher Ratio	-0.550**	-0.683**	-0.740**	-0.777**
Rate of Pupil Transiency	0.010	-0.342	0.283	-0.098
Mean Pupil Ability	-0.102	0.314	-0.288	0.208
Mean Pupil Achievement in Reading	0.073	0.328	-0.058	0.256
Mean Pupil Achievement in Arithmetic	0.331	0.091	0.232	0.175
Principals Salary Cost Per Pupil		0.312	0.757**	0.519**
Teachers Salary Cost Per Pupil			0.336	0.957**
Clerks Salary Cost Per Pupil				0.529**

* statistically significant at or beyond the five per cent level of confidence but at less than the one per cent level

** statistically significant at or beyond the one per cent level of confidence

salary costs per pupil.

The size of the school determines to a large extent the amount spent for principals and clerks salaries per pupil, but size of school is not an important factor in the expenditures for teachers salaries per pupil. The principal and the clerk both have certain management functions not directly related to instruction. The teachers salary cost is probably the best single criterion for judging the amount spent on personal services directly for instruction. The teachers salary cost per pupil is very closely related to total salary costs per pupil as shown in Table XXXI, which shows the difference in rank between the two measures. The greatest difference in rank is four which occurs four times. In seven cases, there is no difference in rank. The maximum difference possible in rank with this size sample is twenty-five which could occur twice.

The elementary school teachers salary schedule in effect during the calendar year 1954 for teachers with a B. A. degree is shown in the appendix. Substitute teachers were paid the minimum salary of $3400 per year or $17 per day for each day that they worked. Teachers with more than nine years of experience were paid $5650 or at the rate of $28.25 per day. Regularly assigned teachers were also allowed certain sick leave privileges so that the actual amount expended on a particular teaching position may have been as much as $288.20 more than the maximum salary listed. It is apparent that schools with a high certification ratio will have higher teachers salary costs per pupil than will schools with a relatively low certification ratio. The average number of years of experience of the teachers in a particular school will also have an important bearing on teachers salary costs per pupil.

TABLE XXXI

COMPARATIVE RANKING OF SCHOOLS IN TEACHER SALARY COSTS PER PUPIL AND TOTAL SALARY COSTS PER PUPIL

School	Teachers salary	Total salary cost	Difference in rank
A	22	22	none
B	7	6	1
C	21	19	2
D	20	17	3
E	6	3	3
F	1	1	none
G	17	21	4
H	9	7	2
I	13	12	1
J	26	26	none
K	25	25	none
L	3	5	2
M	4	8	4
N	24	24	none
O	16	14	2
P	10	9	1
Q	18	16	2
R	15	13	2
S	8	11	3
T	12	10	2
U	23	23	none
V	11	15	4
W	14	18	4
X	2	2	none
Y	19	20	1
Z	5	4	1

Teachers Salary Costs Per Authorized Teaching Position

The teachers salary cost per authorized teaching position is obtained by dividing the total teachers salary cost in grades one to eight for a particular school by the number of teachers authorized for that school in grades one to eight. The range in teachers salary cost per authorized teaching position is from a low of $4331.27 with an indicated number of years of experience of three for School N to a high of $5338.68 with an indicated whole number of years of experience of seven for School M. The overall average is $4813.58 with an indicated number of years of experience of five. Teachers salary costs per authorized teaching position are shown in Table XXXII.

The teachers salary cost per pupil and the teachers salary cost per authorized teaching position are not equivalent measures. An important factor in the teachers salary cost per pupil is the pupil-teacher ratio, in the case of the teachers salary cost per authorized teaching position the pupil-teacher ratio is not an important factor. For example - four schools which have pupil-teacher ratios less than the average for all schools - have teacher salary costs per pupil which are above average and have teachers salary costs per authorized teaching position which are below average. There are four schools which have pupil-teacher ratios greater than the average for all schools. In these four schools the teachers salary cost per pupil is below average but the teachers salary cost per authorized teaching position is above average. Nine schools are among the highest thirteen schools in both the teachers salary cost per pupil and the salary cost per authorized teaching position. Nine schools are also among the lowest thirteen schools in both the teachers salary cost per pupil and the teachers salary cost per authorized teaching position. The schools

TABLE XXXII

TEACHERS SALARY COST PER AUTHORIZED TEACHING POSITION GRADES 1 - 8

School	Teachers salaries Gr. 1-8	Teachers salary cost per auth. teaching position	Indicated average whole years of experience	Rank of school in teachers Sal. cost per authorized position
A	120263.52	4829.98	5	11
B	80139.77	5008.94	6	6
C	78923.19	4458.94	4	24
D	80094.89	4739.34	5	17
E	79133.01	4795.94	5	12
F	66289.57	5303.17	7	2
G	155279.85	4961.02	6	7
H	85545.33	4752.52	5	16
I	84858.72	4849.07	5	9
J	201818.35	4358.93	3	25
K	103578.44	4624.04	4	19
L	173695.03	5279.48	7	3
M	170837.62	5338.68	7	1
N	103950.50	4331.27	3	26
O	70177.99	4586.80	4	21
P	119392.77	4682.07	4	18
Q	81043.08	4795.45	5	13
R	73693.46	4754.42	5	15
S	157634.25	5185.34	7	5
T	74068.82	4778.63	5	14
U	83365.45	4482.01	4	23
V	109681.84	4896.51	5	8
W	148044.13	4838.04	5	10
X	69517.13	4543.60	4	22
Y	88335.83	4600.82	4	20
Z	109021.13	5191.48	7	4
Total	2768383.67			
Mean	106476.30	4813.58	5	

high and low in the two teachers salary cost items are shown in Table XXXIII.

If it is assumed that the teachers salary cost per pupil is the best cost item indicative of quality within a school, then there are six quality factors which have been developed for all schools. The schools can be selected and listed as follows:

1. Thirteen schools ranking lowest in certification ratio
2. Thirteen schools ranking highest in rate of pupil transiency
3. Thirteen schools ranking highest in pupil-teacher ratio
4. Thirteen schools ranking lowest in mean pupil ability
5. Thirteen schools ranking lowest in mean pupil achievement in reading
6. Thirteen schools ranking lowest in teachers salary cost per pupil

Three schools - J, K, and U - appear in all six listings.

Two schools - C and O - appear five times.

Five schools - A, T, W, Q, and R - occur four times.

Seven schools - B, D, N, P, Y, X, and V - occur three times.

Three schools - H, G, and S - appear twice.

Three schools - L, I, and M - appear only once.

Three schools - E, F, and Z - do not appear in any listing.

On the basis of six measures, the schools can be placed in three quality levels as follows:

1. High quality level schools - E, F, Z, L, I, M, H, G, and S
2. Median quality level schools - B, D, N, P, Y, X, and V
3. Low quality level schools - A, T, W, Q, R, C, O, J, K, and U.

When this placement is compared with the placement of the schools on three quality levels on the basis of five measurements, the following statements can

TABLE XXXIII

SCHOOLS HIGH AND LOW IN TEACHERS SALARY COSTS

Highest thirteen schools		Lowest thirteen schools	
Salary cost per pupil	Salary cost per authorized teaching position	Salary cost per pupil	Salary cost per authorized teaching position
B	A	A	C
E	B	C	D
F	E	D	H
H	F	G	J
I	G	J	K
L	I	K	M
M	L	N	O
P	M	O	P
S	Q	Q	R
T	S	R	T
V	V	U	U
X	W	W	X
Z	Z	Y	Y

be made:

Schools E, F, Z, L, G, I, and M are high quality level schools in both placements

Schools H and S are median quality level schools on the basis of five measures but are high quality level schools on the basis of six measurements

Schools B, D, N, P, Y, X, and V are median quality level schools in both ratings

Schools A, W, Q, and R are median quality level schools on the basis of five measures but are low quality level schools on the basis of six measurements

Schools C, O, T, J, K, and U are low quality level schools in both classifications.

Costs Per Pupil Other Than Salaries.

The basic allotment for instructional materials in the elementary schools of Chicago during the calendar year 1954 was $4.00 per pupil enrolled in the school not including kindergarten but including all special students. This entire amount was appropriated for the educational program in grades one to eight inclusive. This instructional materials account is broken down into three sub-accounts: (1) textbooks; (2) maps, globes, and charts; and (3) library. The textbook account includes all work materials and tests as well as textbooks. The library account is limited to books and periodicals used in the school library.

The United States Office of Education in its Biennial Surveys considers only two sub-accounts - Textbooks, which includes maps, globes, and charts and library. For the purposes of this study, the account listings of the Office of

Education are used.

The cost of telephone service, supplies, and other expenses are called "Supplies and Other". Some of these, such as telephone service and supplies used in the school office are charged against the school as a whole and an apportionment must be made as was done with principals and clerks salaries. Others are charged against a certain purpose and it is not necessary to apportion costs. Costs per pupil other than salaries are shown in Table XXXIV.

It is often assumed that costs other than salaries are quite uniform throughout the system. In the schools studied, this is not the case. For textbooks, the range is from a low of $2.88 for School T to a high of $6.16 for School U with an average cost per pupil in all schools of $3.30. The ratio between the high and the low is 2.14 to 1. The greatest variation is found in expenditures for school libraries with a low of 18 cents per pupil in School U to a high of $1.04 in School M with an overall average of 79 cents. The ratio between high and low expenditure for library purposes per pupil is 5.78 to 1. For supplies and other the range in cost per pupil is from a low of $1.68 in School J to a high of $3.90 in School U with an overall average of $2.51 and a ratio between high and low of 2.32 to 1. For total non-salary costs, the range is from a low of $5.12 in School J to a high of $10.24 in School U with an overall average of $6.60 and a ratio between high and low of two to one.

Total instructional costs per pupil are shown in Table XXXV. School J is the lowest with a total cost per pupil of $143.00 and School F is the highest with a total cost per pupil of $209.93. The average of the total cost per pupil for all schools is $172.30. The ratio between the highest and the lowest total cost per pupil is 1.47 to 1. This is approximately the same as the ratio

TABLE XXXIV

COSTS PER PUPIL OTHER THAN SALARIES FOR ALL SCHOOLS

Schools	Textbooks	Library	Supplies and other	Total
A	3.18	0.58	2.35	6.11
B	3.43	0.84	2.60	6.87
D	2.95	0.83	2.24	6.02
G	3.13	0.78	2.08	5.99
H	3.19	0.80	2.81	6.80
I	3.35	0.64	2.36	6.35
K	3.45	0.61	2.38	6.44
M	3.26	1.04	3.10	7.40
N	3.02	1.00	2.43	6.45
P	3.13	0.87	2.77	6.77
S	3.16	0.81	2.63	6.60
W	3.24	0.89	2.64	6.77
Y	3.51	0.63	2.61	6.75
Z	3.28	0.84	2.54	6.66
C	3.02	0.82	2.53	6.37
E	3.26	0.81	2.92	6.99
F	3.39	0.83	2.01	6.23
J	2.75	0.69	1.68	5.12
L	3.20	1.01	2.55	6.76
O	2.96	0.60	1.96	5.52
Q	3.19	0.91	2.96	7.06
R	3.28	0.82	2.68	6.78
T	2.88	0.81	2.73	6.42
U	6.16	0.18	3.90	10.24
V	3.57	1.01	2.51	7.09
X	4.46	0.51	2.30	7.27
Mean	3.30	0.79	2.51	6.60

existing between high and low in both teacher salary costs per pupil and total salary costs per pupil. Costs other than salaries represent, in nearly every instance, less than four per cent of the total instructional costs per pupil at the attendance unit level. Salary costs per pupil other than teachers salary costs per pupil average less than ten percent of the total instructional costs per pupil at the attendance unit level. In other words, more than eighty-five per cent of the instructional costs at the attendance unit level are for the payment of teachers salaries.

The comparative rankings of all schools in non-salary costs per pupil and in total costs per pupil including salary costs are shown in Table XXXVI.

The principals salary cost per pupil is not related in a statistically significant way to any of the non-salary cost items per pupil. The principals salary cost per pupil does show a positive relationship, significant statistically between the five per cent and one per cent levels of confidence, to the total cost per pupil. The relationship between principals salary cost per pupil and total salary costs per pupil was also positive but was significant at the one per cent level of confidence. With respect to total instructional costs per pupil at the attendance unit level, the principals salary cost per pupil is not as significant as when the costs per pupil are limited to salaries only.

The teachers salary cost per pupil is not related in any statistically significant way to any of the non-salary costs per pupil. The rank difference coefficient of correlation between teachers salary costs per pupil and total costs per pupil - 0.962 - is significant statistically beyond the one per cent level of confidence which is 0.516.

TABLE XXXV

SUMMARY OF TOTAL INSTRUCTIONAL COSTS PER PUPIL IN ALL SCHOOLS

School	Salaries	Other Costs	Total
A	158.86	6.11	158.97
B	177.36	6.87	184.23
D	163.64	6.02	169.66
G	158.32	5.99	164.31
H	177.00	6.80	183.80
I	169.73	6.35	176.08
K	146.63	6.44	153.07
M	176.67	7.40	184.07
N	148.01	6.45	154.46
P	176.05	6.77	182.82
S	170.19	6.60	176.79
W	162.17	6.77	168.94
Y	159.35	6.75	166.10
Z	182.53	6.66	189.15
C	160.41	6.37	166.78
E	187.00	6.99	193.99
F	203.70	6.23	209.93
J	137.88	5.12	143.00
L	180.49	6.76	187.25
O	168.17	5.52	173.69
Q	164.90	7.06	171.96
R	169.45	6.78	176.23
T	173.92	6.42	180.34
U	152.96	10.24	163.20
V	167.02	7.09	174.11
X	194.34	7.27	201.61
Mean	165.70	6.60	172.30

The clerks salary cost per pupil is not related in any statistically significant manner to any of the non-salary cost per pupil items, it is, however, related to the total cost per pupil positively and significantly in a statistical manner at the one per cent level of confidence.

No statistically significant relationship exist between the total salary cost per pupil and any of the non-salary cost per pupil items. The rank difference coefficient of correlation between the total salary cost per pupil and the total cost per pupil - 0.998 - is statistically significant beyond the one per cent level of confidence.

The textbook cost per pupil is not related in statistically significant ways to any of the following measures: (1) library cost per pupil, (2) cost per pupil for supplies and other, and (3) total cost per pupil. There is a relationship, statistically significant at the one per cent level of confidence, between the textbook cost per pupil and the total non-salary cost per pupil.

No statistically significant relationships exist between the library cost per pupil and any other cost per pupil items.

A positive relationship, statistically significant between the five per cent and one per cent levels, exists between the costs for supplies and other per pupil and the total non-salary cost per pupil.

The rank difference coefficient of correlation between the total non-salary costs per pupil and the total cost - 0.397 - approaches the five per cent level of confidence which is 0.404 with this particular data.

The close correspondence between the teachers salary cost per pupil, total salary costs per pupil, and total costs per pupil is shown in Table XXXVIII. School R ranks fifteenth in teachers salary costs per pupil, thirteenth in total

TABLE XXXVI

COMPARATIVE RANKING OF ALL SCHOOLS IN NON-SALARY COSTS PER PUPIL

School	Textbook	Library	Supplies and other	Total non-salary	Total (a)
A	17	24	20	22	23
B	6	8.5	12	7	6
C	21.5	10.5	15	19	19
D	24	12.5	22	23	17
E	11.5	15	4	6	3
F	7	12.5	24	21	1
G	19.5	18	23	24	21
H	15.5	17	5	8	8
I	8	20	19	20	15
J	26	19	26	26	26
K	5	22	18	17	25
L	14	2.5	13	12	5
M	11.5	1	2	2	7
N	21.5	4	17	16	24
O	23	23	25	25	15
P	19.5	7	6	10.5	9
Q	15.5	5	3	5	16
R	9.5	10.5	8	9	12
S	18	15	10	15	11
T	25	15	7	18	10
U	1	26	1	1	22
V	3	2.5	16	4	14
W	13	6	9	10.5	18
X	2	25	21	3	2
Y	4	21	11	13	20
Z	9.5	8.5	14	14	4

a includes salary costs

TABLE XXXVII

RANK DIFFERENCE COEFFICIENTS OF CORRELATION BETWEEN COST PER PUPIL FACTORS

	Textbooks	Library	Supplies and other	Total non-salary	Total
Principals salary	-0.001	-0.083	0.041	0.057	0.499*
Teachers salary	0.315	0.329	0.203	0.377	0.962**
Clerks Salary	0.075	-0.150	0.083	0.103	0.516**
Total salary	0.260	0.245	0.224	0.370	0.998**
Textbook		-0.112	0.211	0.519*	0.276
Library			0.325	0.310	0.286
Supplies and other				0.754**	0.240
Total non-salary					0.397

* Statistically significant at or beyond the five per cent level of confidence but not at the one per cent level

** Statistically significant at or beyond the one per cent level of confidence

salary costs per pupil, and twelfth in total costs per pupil. School V ranks eleventh in teachers salary costs per pupil, fifteenth in total salary cost per pupil and fourteenth in total costs per pupil.

Summary

The following cost factors have been developed in this chapter:

1. Principals salary cost per pupil
2. Teachers salary cost per pupil
3. Clerks salary cost per pupil
4. Total salary cost per pupil
5. Textbook cost per pupil
6. Library cost per pupil
7. Cost for supplies and other per pupil
8. Total non-salary cost per pupil
9. Total cost per pupil
10. Teachers salary cost per authorized teaching position.

Principals and clerks salary cost per pupil are dependent to a large extent upon the size of the school in an inverse way - as the school becomes larger, the expenditures for principals and clerks salaries per pupil tends to decrease. These two cost items are usually less than ten per cent of the total salary costs per pupil.

The teachers salary cost per pupil is independent of the size of the school - except as the pupil-teacher ratio is dependent upon the size of the school. This cost item accounts for, in most cases, over ninety per cent of the total salary costs per pupil.

TABLE XXXVIII

RANKING OF SELECTED SCHOOLS IN CERTAIN COST PER PUPIL ITEMS

13 schools high in teacher salary cost per pupil	13 schools high in total salary cost per pupil	13 schools high in total cost per pupil
B	B	B
E	E	E
F	F	F
H	H	H
I	I	I
L	L	L
M	M	M
P	P	P
S	R	R
T	S	S
V	T	T
X	X	X
Z	Z	Z

The non-salary cost per pupil items do not seem to be related in any statistically significant way to any of the salary cost per pupil items or even among themselves.

The teachers salary cost per pupil can be assumed to be the best single cost factor indicative of quality. It can also be assumed that the teachers salary is entirely for instructional purposes, this is not true of either the principals or clerks salaries since both have certain management functions not related to instruction.

CHAPTER V

RELATION OF TEACHERS SALARY COST PER PUPIL TO SELECTED SCHOOL VARIABLES

Teachers salary costs represent the largest single item in educational expenditures at the attendance unit level. There are very high rank difference coefficients of correlation between the teachers salary costs per pupil and two items - (1) total salary costs per pupil and (2) total instructional costs per pupil. For the purposes of this study, it is justifiable to use the teachers salary costs per pupil as the best single measure of educational expenditure. This measure is not dependent upon school size as are the principals salary cost per pupil and the clerks salary costs per pupil. This measure is not affected by large numbers of special education students as are the non-salary costs per pupil. Woodham[1] used teachers salary costs as the cost per pupil in his cost-quality survey of Florida high schools.

A variation of the method used by Powell[2] can be used in this study. The thirteen schools ranking highest in teachers salary expenditures per pupil can

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[1] Woodham p 126.

[2] Powell pp 7 and 8 and 26 - 28 incl.

for convenience be referred to as Group A and the thirteen schools ranking lowest in teachers salary cost per pupil can be referred to as Group B. A further subdivision can be made by taking the six highest schools in Group A as Sub-group 1 and the lowest seven schools in Group A as Sub-group 2. The highest seven schools in Group B will be Sub-group 3 and the lowest six schools in Group B will be Sub-group 4.

These four sub-groups can also be referred to respectively as:

1. High expenditure level schools
2. Above average expenditure level schools
3. Below average expenditure level schools
4. Low expenditure level schools.

The following variables have been selected for comparison with the per pupil expenditure for teachers salaries:

1. Teachers salary cost per authorised teaching position
2. Certification ratio
3. Number of assigned teachers per thousand pupils in mean true membership in grades one to eight inclusive
4. Pupil-teacher ratio
5. Rate of pupil transiency
6. Mean pupil ability
7. Mean pupil achievement in reading
8. Mean pupil achievement in arithmetic
9. Mean Chronological Age of Graduates
10. Per pupil expenditures for library purposes.

Sub-group 1 consists of the following schools in order of rank - F, X, L,

M, Z, and E. The teachers salary cost per pupil in School F is $182.97 and in School E it is $164.52 with an average of $109.37 for the sub-group. Characteristics of the schools in this sub-group with respect to the ten comparison variables are shown in Table XXXIX.

Sub-group 2 consists of the following schools in order of rank - B, S, H, P, V, T, and I. The teachers salary cost per pupil in School B is $163.95 and in School I it is $151.53 with an average for the sub-group of $156.92. Characteristics of the schools in this sub-group with respect to the ten comparison variables are shown in Table XL.

Sub-group 3 consists of the following schools in order of rank - W, R, O, G, Q, Y, and D. The teachers salary cost per pupil in School W is $151.10, in School D it is $144.94, and the average for the sub-group is $148.22. Data with regard to the comparison variables are shown in Table XLI.

Sub-group 4 consists of the following schools in order of rank - C, A, U, N, K, and J. The teachers salary cost per pupil in School C is $144.55, in School J it is $129.04, and the average for the sub-group is $136.00. Data with respect to the comparison variables are shown in Table XLII.

Sub-group mean values for the teachers salary cost per pupil and for the ten comparison variables are shown in Table XLIII. The mean values in Sub-group 1 exceed the mean values in Sub-group 2 in the following variables: (1) teachers salary cost per authorised teaching position, (2) certification ratio, (3) number of assigned teachers per thousand pupils in mean true membership, (4) mean pupil ability, (5) mean pupil achievement in reading, (6) mean pupil achievement in arithmetic, and (7) expenditures for library purposes per pupil. The mean values in Sub-group 2 exceed the mean values in Sub-group 1 in the

TABLE XXXIX

CHARACTERISTICS OF HIGH EXPENDITURE LEVEL SCHOOLS IN SELECTED VARIABLES IN GRADES 1 - 8

Schools	Teachers salary cost per pupil	Teachers salary cost per authorized teaching	Certification ratio	Assigned teachers per thousand pupils	Pupil-teacher ratio	Rate of pupil transiency (a)	Mean pupil ability	Mean pupil achievement in reading	Mean pupil achievement in arithmetic	Mean chronological age of graduates	Library cost per pupil
F	$182.97	$5303.17	99.20	34.23	28.98	38.78	108.35	9.52		13.90	0.83
X	172.71	4543.60	92.81	35.48	26.16	93.21	94.05	7.80		14.34	0.51
L	169.46	5279.48	98.48	31.51	31.16	14.85	98.07	8.65		14.24	1.01
M	166.78	5338.68	95.00	29.70	31.99	29.28	111.76	9.04	8.44		1.04
Z	166.11	5191.48	95.24	30.47	31.25	38.72	107.01	8.64	7.96		0.84
E	164.52	4795.94	92.73	31.81	29.15	32.43	102.92	9.00		13.73	0.81

(a) rate of pupil transiency is figured on total mean true membership in a school

TABLE XL

CHARACTERISTICS OF ABOVE AVERAGE EXPENDITURE LEVEL SCHOOLS IN SELECTED VARIABLES IN GRADES 1 - 8

Schools in order of rank	Teachers salary cost per pupil	Teachers salary cost per authorized teaching position	Certification ratio	Assigned teachers per thousand pupils	Pupil-teacher ratio	Rate of pupil transiency (a)	Mean Pupil ability	Mean pupil achievement in reading	Mean pupil achievement in arithmetic	Mean chronological age of graduates	Library cost per pupil
B	$163.95	$5008.74	78.75	25.78	30.55	56.02	104.85	7.95	8.20		0.84
S	159.52	5185.34	94.41	29.04	32.51	41.70	111.73	8.29	7.30		0.81
H	158.18	4752.52	93.33	31.06	30.04	39.95	97.32	8.00	7.94		0.80
P	157.43	4682.07	87.29	29.35	29.74	93.56	97.50	9.05	7.66		0.87
V	154.76	4896.51	89.46	28.28	31.64	42.80	95.46	7.62		14.34	1.01
T	151.78	4778.63	85.48	27.15	31.48	59.78	96.83	7.76		14.67	0.81
I	151.53	4849.07	89.71	28.03	32.00	28.93	101.83	9.16	8.19		0.64

(a) pupil transiency is figured on an all school basis

TABLE XLII

CHARACTERISTICS OF LOW EXPENDITURE LEVEL SCHOOLS IN SELECTED VARIABLES IN GRADES 1 - 8

Schools in order of rank	Teachers salary cost per pupil	Teachers salary cost per authorized teaching position	Certification ratio	Assigned teachers per thousand pupils	Pupil-teacher ratio	Rate of pupil transiency (a)	Mean pupil ability	Mean pupil achievement in reading	Mean pupil achievement in arithmetic	Mean chronological age of graduates	Library Cost Per Pupil
C	$144.55	$4458.94	67.80	21.98	30.85	67.81	93.91	7.30		14.90	0.82
A	144.08	4829.86	85.14	25.40	35.22	42.40	97.58	8.46	7.93		0.58
U	140.89	4482.01	60.22	18.93	31.81	87.17	92.78	6.69		14.40	0.18
N	134.08	4351.27	79.58	24.64	32.30	39.18	110.57	9.71	8.73		1.00
K	133.55	4624.04	79.91	23.08	34.62	78.53	93.57	7.05	6.76		0.61
J	129.04	4358.93	65.01	19.25	33.78	58.48	94.05	6.87		14.08	0.69

(a) Pupil Transiency is figured on an all school basis

TABLE XLII

CHARACTERISTICS OF LOW EXPENDITURE LEVEL SCHOOLS IN SELECTED VARIABLES IN GRADES 1 - 8

Schools in order of rank	Teachers salary cost per pupil	Teachers salary cost per authorized teaching position	Certification ratio	Assigned teachers per thousand pupils	Pupil-teacher ratio	Rate of pupil transiency (a)	Mean pupil ability	Mean pupil achievement in reading	Mean pupil achievement in arithmetic	Mean chrono-logical age of graduates	Library Cost Per Pupil
C	$144.55	$4458.94	67.80	21.98	30.85	67.81	93.91	7.30		14.90	0.82
A	144.08	4829.86	85.14	25.40	35.22	42.40	97.58	8.46	7.93		0.58
U	140.89	4482.01	60.22	18.93	31.81	87.17	92.78	6.69		14.40	0.18
N	134.08	4331.27	79.58	24.64	32.30	39.18	110.57	9.71	8.73		1.00
K	133.55	4624.04	79.91	23.08	34.62	78.53	93.57	7.95	6.76		0.61
J	129.04	4358.93	65.01	19.25	33.78	58.48	94.05	6.87		14.08	0.69

(a) Pupil Transiency is figured on an all school basis

following variables: (1) pupil-teacher ratio, (2) rate of pupil transiency, and (3) mean chronological age of graduates.

The mean values in Sub-group 2 exceed the mean values in Sub-group 3 in the following variables: (1) teachers salary cost per authorized teaching position, (2) certification ratio, (3) number of assigned teachers per thousand pupils in mean true membership, (4) rate of pupil transiency, (5) mean chronological age of graduates, and (6) per pupil expenditures for library purposes. The mean values in Sub-group 3 exceed the mean values in Sub-group 2 in the following variables: (1) pupil-teacher ratio, (2) mean pupil ability, (3) mean pupil achievement in reading, and (4) mean pupil achievement in arithmetic.

The mean values in Sub-group 3 exceed the mean values in Sub-group 4 in the following variables: (1) teachers salary cost per authorized teaching position, (2) certification ratio, (3) number of assigned teachers per thousand pupils in mean true membership (4) mean pupil ability, (5) mean pupil achievement in reading, (6) mean pupil achievement in arithmetic, and (7) per pupil library expenditures. Sub-group 4 mean values exceed Sub-group 3 mean values in the following variables: (1) pupil-teacher ratio, (2) Rate of pupil transiency; and (3) mean chronological age of graduates.

If it is assumed that each of the sub-groups represents a sample from a larger population, then "t" ratios can be calculated to determine whether or not the differences between the sub-group mean values are statistically significant. The mean for teachers salary cost per pupil in Sub-group 4 is $136.00, in Sub-group 3 this value is $148.22, in Sub-group 2 it is $156.92, and in Sub-

TABLE XLIII

SUB-GROUP MEAN VALUES FOR SELECTED VARIABLES

Sub-group	Teachers salary cost per pupil	Teachers salary cost per authorized teaching position	Certification ratio	Assigned teachers per thousand pupils	Pupil-teacher ratio	Rate of pupil transiency (a)	Mean pupil ability	Mean pupil achievement in reading	Mean pupil achievement in arithmetic	Mean chronological age of graduates	Library cost per pupil
1	$169.37	$5134.36	95.78	31.58	30.33	35.01	104.78	8.82	8.24	14.06	0.90
2	156.92	4895.53	89.02	28.54	31.20	51.57	100.86	8.23	7.79	14.49	0.83
3	148.22	4781.49	87.95	27.26	32.26	49.66	102.64	8.61	7.96	14.15	0.79
4	136.00	4495.77	72.45	21.92	33.06	62.41	97.50	7.78	7.88	14.35	0.66

(a) Pupil transiency is figured on an all school basis

group 1 it is $169.37. The difference between the means for Sub-group 1 and Sub-group 2 is $12.45. The "t" ratio calculated for this difference is 14.82. With samples of the size represented by these two sub-groups, a "t" ratio of 2.58 would be statistically significant at the one per cent level of confidence. A "t" ratio as large as that calculated would almost certainly represent differences that could not exist by chance alone.

Statistically significant differences as measured by "t" ratios are shown in Table XLIV. In every variable, Sub-group 1 is superior to Sub-groups 2 and 4. In three variables - (1) mean pupil ability, (2) mean pupil achievement in reading, and (3) mean chronological age of graduates - the differences between Sub-groups 1 and 3 are not statistically significant at the one per cent level of confidence, Sub-group 1, however, is above Sub-group 3 in all three of these variables.

High level expenditure schools are superior to all other schools in at least seven of the ten comparison variables used, these differences are statistically significant beyond the one per cent level of confidence.

It appears that the schools in District Six which spend the most on teachers salaries per pupil are, on the whole, higher quality schools than are the schools with relatively low expenditures for teachers salaries per pupil.

TABLE XLIV

SUB-GROUP MEAN DIFFERENCES SIGNIFICANT AT OR BEYOND THE ONE PER CENT LEVEL OF CONFIDENCE AS MEASURED BY "t" RATIOS

Teachers salary cost per pupil	Teachers salary cost per authorized teaching position	Certification ratio	Assigned teachers per thousand pupils	Pupil-teacher ratio	Rate of pupil transiency (a)	Mean pupil ability	Mean pupil achievement in reading	Mean pupil achievement in arithmetic	Mean chronological age of graduates	Library cost per pupil
1 & 2	1 & 2	1 & 2	1 & 2	1 & 2	1 & 2	1 & 2	1 & 2	1 & 2	1 & 2	1 & 2
1 & 3	1 & 3	1 & 3	1 & 3	1 & 3	1 & 3	1 & 4	1 & 4	1 & 3	1 & 4	1 & 3
1 & 4	1 & 4	1 & 4	1 & 4	1 & 4	1 & 4	3 & 4	2 & 4	1 & 4	2 & 3 (b)	1 & 4
2 & 3	2 & 3	2 & 3	2 & 3	2 & 3	2 & 4					2 & 3
2 & 4	2 & 4	2 & 4	2 & 4	2 & 4	3 & 4					2 & 4
3 & 4	3 & 4	3 & 4	3 & 4	3 & 4	2 & 3 (b)					3 & 4

a Pupil transiency is figured on an all school basis

b Difference is significant but 2 is greater than 3

CHAPTER VI

SUMMARY AND CONCLUSIONS

Rank difference coefficients of correlation were calculated between twenty-six different measures. Many of these coefficients show that no relationship exists, or if a relationship does exist it is not significant at or beyond the one per cent level of confidence. Only those relationships which show statistical significance at or beyond the one per cent level of confidence are discussed in this chapter. These relationships are shown in Table XLV.

Summary

The size of the school, as measured by mean true membership in grades one to eight inclusive, is positively related only to the pupil-teacher ratio. There are negative relationships between the size of the school and the following cost items: (1) principals salary cost per pupil, (2) clerks salary cost per pupil, (3) total salary cost per pupil, (4) principals salary cost per authorized teaching position, and (5) clerks salary cost per authorized teaching position.

The relationship between size of school and pupil-teacher ratio can be explained on the basis of a larger proportion of teachers of special subjects

TABLE XLV

SUMMARY OF THE RELATIONSHIPS THAT ARE STATISTICALLY SIGNIFICANT AT OR BEYOND THE ONE PER CENT LEVEL OF CONFIDENCE BETWEEN THE TWENTY-SIX MEASURED FACTORS

Factor	Significant Positive Relationships	Significant Negative Relationships
Size of school as measured by mean true membership	Pupil-teacher ratio	Principals salary cost per pupil Clerks salary cost per pupil Total salary cost per pupil Principals salary cost per authorized teaching position Clerks salary cost per authorized teaching position
Certification ratio	Mean pupil achievement in reading Teachers salary cost per pupil Total salary cost per pupil Total cost per pupil Teachers salary cost per authorized teaching position Total salary cost per authorized teaching position Total cost per authorized teaching position	Mean chronological age of graduates
Pupil-teacher ratio	None	Principals salary cost per pupil Teachers salary cost per pupil Clerks salary cost per pupil Total salary cost per pupil Total cost per pupil Clerks salary cost per authorized teaching position
Rate of pupil transiency	None	Mean pupil ability Teachers salary cost per authorized teaching position Total cost per authorized teaching position

TABLE XLV (continued)

SUMMARY OF THE RELATIONSHIPS THAT ARE STATISTICALLY SIGNIFICANT AT OR BEYOND THE ONE PER CENT LEVEL OF CONFIDENCE BETWEEN THE TWENTY-SIX MEASURED VARIABLES

Factor	Significant Positive Relationships	Significant Negative Relationships
Mean pupil ability	Mean pupil achievement in reading	None
	Teachers salary cost per authorized teaching position	
Mean pupil achievement in reading	None	None
Mean pupil achievement in arithmetic	None	None
Mean chronological age of graduates	None	None
Principals salary cost per pupil	Clerks salary cost per pupil	None
	Total salary cost per pupil	
	Principals salary cost per authorized teaching position	
	Clerks salary cost per authorized teaching position	
Teachers salary cost per pupil	Total salary cost per pupil	None
	Total cost per pupil	
	Teachers salary cost per authorized teaching position	
	Total salary cost per authorized teaching position	
	Total cost per authorized teaching position	
Clerks salary cost per pupil	Total salary cost per pupil	None
	Total cost per pupil	
	Principals salary cost per authorized teaching position	
	Clerks salary cost per authorized teaching position	

TABLE XLV (continued)

SUMMARY OF THE RELATIONSHIPS THAT ARE STATISTICALLY SIGNIFICANT AT OR BEYOND THE ONE PER CENT LEVEL OF CONFIDENCE BETWEEN THE TWENTY-SIX MEASURED VARIABLES

Factor	Significant positive Relationships	Significant Negative Relationships
Total salary cost per pupil	Total cost per pupil	None
	Teachers salary cost per authorized teaching position	
	Total salary cost per authorized teaching position	
	Total cost per authorized teaching position	
Textbook cost per pupil	Per-pupil total non-salary costs	None
	Total non-salary cost per authorized teaching position	
Library cost per pupil	Library cost per authorized teaching position	None
Cost for supplies and other per pupil	Total per pupil non-salary cost	None
	Costs for supplies and other per authorized teaching position	
	Total non-salary cost per authorized teaching position	
Total non-salary cost per pupil	Costs for supplies and other per authorized teaching position	None
	Total non-salary cost per authorized teaching position	
Total cost per pupil	Teachers salary cost per authorized teaching position	None
	Total salary cost per authorized teaching position	
	Total cost per authorized teaching position	
Principals salary cost per authorized teaching position	Clerks salary cost per authorized teaching position	None

TABLE XLV (concluded)

SUMMARY OF THE RELATIONSHIPS THAT ARE STATISTICALLY SIGNIFICANT AT OR BEYOND THE ONE PER CENT LEVEL OF CONFIDENCE BETWEEN THE TWENTY-SIX MEASURED VARIABLES

Factor	Significant Positive Relationships	Significant Negative Relationships
Teachers salary cost per authorized teaching position	Total salary cost per authorized teaching position Total cost per authorized teaching position	None
Clerks salary cost per authorized teaching position	None	None
Total salary cost per authorized teaching position	Total cost per authorized teaching position	None
Textbook cost per authorized teaching position	Total non-salary cost per authorized teaching position	None
Library cost per authorized teaching position	None	None
Supplies and other costs per authorized teaching position	Total non-salary cost per authorized teaching position	None
Total non-salary costs per authorized teaching position	None	None

in the smaller schools than the proportion of teachers of special subjects in the larger schools.

The relationships between size of school and cost factors can be explained on the basis of a single salary schedule for principals during the calendar year 1954 and on the basis that the assignment of clerks is not directly proportional to the mean true membership of the schools.

Positive relationships exist between the certification ratio and the following variables: (1) mean pupil achievement in reading, (2) teachers salary cost per pupil, (3) total salary cost per pupil, (4) total cost per pupil, (5) teachers salary cost per authorized teaching position, (6) total salary cost per authorized teaching position, and (7) total cost per authorized teaching position. A negative relationship exists between the certification ratio and the chronological age of graduates.

The cost relationships are possibly due to the fact that regularly assigned teachers are paid higher salaries than substitutes are paid. On the basis of the schools studied, it seems as though regularly assigned teachers obtain better results in the teaching of reading than do substitute teachers. Apparently teachers tend to transfer out of schools which seem to have average students.

Negative relationships exist between the pupil-teacher ratio and the following variables: (1) principals salary cost per pupil, (2) teachers salary cost per pupil, (3) clerks salary cost per pupil, (4) total salary cost per pupil, (5) total cost per pupil, and (6) clerks salary cost per authorized teaching position.

The pupil-teacher ratio is significantly related to the size of the school.

As the school increases in size, certain costs tend to decrease on a per pupil basis and also on an authorized teaching position basis. The teachers salary cost per pupil is not related, significantly, to the size of the school, but is related to the pupil-teacher ratio. Larger pupil-teacher ratios result in lower teachers salary costs per pupil.

Negative relationships exist between the rate of pupil transiency and the following measures: (1) mean pupil ability, (2) teachers salary cost per authorized teaching position, and (3) total costs per authorized teaching position.

Pupils in high transiency schools tend to be lower in mean pupil ability than do pupils in schools with a low rate of pupil transiency. Pupil transiency tends to be highest in those schools which have the lowest average teachers salary. The more experienced teachers are not found in schools which have an unstable student population.

Positive relationships exist between mean pupil ability and: (1) mean pupil achievement in reading and (2) teachers salary cost per authorized teaching position.

Schools which are high in mean pupil ability also tend to be high in mean pupil achievement in reading. Such schools also tend to be high in average teachers salaries.

The principals salary cost per pupil is positively related to: (1) clerks salary cost per pupil, (2) total salary cost per pupil, (3) principals salary cost per authorized teaching position, and (4) clerks salary cost per authorized teaching position.

Several positive relationships exist between the teachers salary cost per pupil and: (1) total salary cost per pupil, (2) total cost per pupil, (3) teachers salary cost per authorized teaching position, (4) total salary cost per authorized teaching position, and (5) total cost per authorized teaching position.

The clerks salary cost per pupil is positively related to: (1) total salary costs per pupil, (2) total costs per pupil, (3) principals salary cost per authorized teaching position, and (4) clerks salary cost per authorized teaching position.

The total salary cost per pupil is positively related to: (1) total costs per pupil, (2) teachers salary cost per authorized teaching position, (3) total salary cost per authorized teaching position, and (4) total cost per authorized teaching position.

Positive relationships exist between the cost for textbooks per pupil and: (1) total non-salary costs per pupil, (2) textbook cost per authorized teaching position, and (3) total non-salary costs per authorized teaching position.

A positive relationship exists between the library cost per pupil and the library cost per authorized teaching position.

Positive relationships exist between the expenditure for supplies and other per pupil and : (1) total non-salary costs per pupil, (2) supplies and other costs per authorized teaching position, and (3) total non-salary costs per authorized teaching position.

Positive relationships exist between the total non-salary costs per pupil and: (1) supplies and other costs per authorized teaching position, and (2)

total non-salary costs per authorized teaching position.

Total costs per pupil are positively related to: (1) teachers salary costs per authorized teaching position, (2) total salary costs per authorized teaching position, and (3) total costs per authorized teaching position.

The principals salary cost per authorized teaching position is positively related only to the clerks salary cost per authorized teaching position.

The teachers salary cost per authorized teaching position is positively related to two measures: (1) total salary cost per authorized teaching position and (2) total cost per authorized teaching position.

The total salary cost per authorized teaching position is positively related only to the total cost per authorized teaching position.

The textbook expenditure per authorized teaching position is positively related only to the total non-salary cost per authorized teaching position.

The expenditure for supplies and other per authorized teaching position is positively related only to the total non-salary cost per authorized teaching position.

Conclusions

As a result of this investigation the following statements can be made with regard to the size of a school, at least for the schools studied:

1. School size is not an important factor in determining the quality of a school

2. Large schools have a higher pupil-teacher ratio than do small schools

3. Size of school is not related to teachers salary cost per pupil

4. Size of school is not related to teachers salary cost per authorized teaching position

5. Large schools expend less on principals and clerks salaries per pupil than do small schools.

With regard to the certification ratio the following statements can be made:

1. Regularly assigned teachers tend to be in those schools which have pupils of better than average ability

2. Teachers salary costs, both per pupil and per authorized teaching position, are highest in those schools which are highest in the proportion of assigned teachers

3. Mean pupil achievement in reading is highest in those schools which are highest in the proportion of regularly assigned teachers

4. Teachers salary costs per pupil are lowest in those schools which are highest in the pupil-teacher ratio.

Two statements can be made with regard to pupil transiency:

1. Mean pupil ability is lowest in those schools which are highest in the rate of pupil transiency

2. The teachers salary cost per authorized teaching position is lowest in those schools which are highest in the rate of pupil transiency - this would seem to indicate that experienced teachers do not stay in schools which have an unstable student population.

Two statements can be made with regard to mean pupil ability:

1. Mean pupil achievement in reading is highest in those schools which are

highest in mean pupil ability

2. The teachers salary cost per authorized teaching position is highest in those schools which are highest in mean pupil ability - this would indicate that experienced teachers tend to transfer to those schools where the ability of the pupils is above average.

When Powell's method of comparison is used, the cost-quality relationships between varying expenditure levels show up more clearly than when rank difference coefficients of correlation are used.

When the schools are divided into four sub-groups on the basis of per pupil teachers salary costs, the high expenditure level schools surpassed the schools in the other three sub-groups in every one of the measures used. Thirty "t" ratios were calculated for the differences of the means of the high expenditure level schools and the means of the other three sub-groups. Twenty-seven of these differences were statistically significant beyond the one per cent level of confidence.

It is felt that presumptive evidence has been presented in this study to indicate that the schools which spend the most get the best educational returns.

Recommendations

The pupil-teacher ratio in the large schools should be brought into line with the pupil-teacher ratio in the small schools, wherever possible.

In order to provide comparable service and instruction, where facilities are available, the assignment of teachers of special subjects should be in

direct proportion to the total mean true membership of the school.

All authorized teaching positions, insofar as possible, should be filled with regularly assigned teachers.

An in-school longevity bonus payment should be paid to teachers in those schools with a high rate of pupil transiency.

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APPKNDIX

TABLE XLVI

COSTS PER PUPIL - GRADES 1-8

	MTM	Principal's Salaries	Cost Per Pupil	Teachers' Salaries	Cost Per Pupil	Clerks' Salaries	Cost Per Pupil	Textbooks	Cost Per Pupil	School Librarie	Cost Per Pupil	Supplies and other Cost	Cost Per Pupil	Total Cost Per Pupil
A	834.70	7,330.00	8.78	120,263.52	140.87	3,006.00	3.60	2,655.75	3.18	480.46	0.58	1,962.85	2.35	159.36
B	488.80	4,224.00	8.64	80,139.77	139.55	2,334.00	4.78	1,674.25	3.43	411.76	0.84	1,272.91	2.60	159.84
C	546.00	5,653.00	10.35	78,923.19	144.55	3,010.00	5.51	1,649.89	3.02	448.46	0.82	1,383.37	2.53	166.78
D	552.60	7,322.78	13.25	80,094.89	144.94	3,009.98	5.45	1,627.82	2.95	460.08	0.83	1,235.38	2.24	170.60
E	481.00	7,662.00	15.92	79,133.01	164.52	3,150.00	6.55	1,566.53	3.26	391.57	0.81	1,415.95	2.92	193.98
F	362.30	4,957.00	13.69	66,289.57	182.97	2,554.00	7.05	1,226.24	3.39	299.15	0.83	728.73	2.01	209.94
G	1,052.80	7,638.00	7.25	155,279.85	144.14	3,767.00	3.58	3,295.11	3.13	825.28	0.78	2,192.89	2.08	160.96
H	540.80	7,461.00	13.80	85,545.33	158.18	2,714.00	5.02	1,727.75	3.19	430.36	0.80	1,521.40	2.81	183.80
I	560.00	7,221.00	12.90	84,858.72	151.53	2,968.00	5.30	1,878.48	3.35	361.21	0.64	1,322.85	2.36	176.08
J	1,564.00	7,592.00	4.85	201,818.35	129.04	6,242.00	3.99	4,295.76	2.75	1,076.00	0.69	2,620.64	1.68	143.00
K	775.60	7,187.00	9.27	103,578.44	133.55	2,954.00	3.81	2,676.76	3.45	471.25	0.61	1,844.89	2.38	153.07
L	1,025.00	7,178.00	7.00	173,695.03	169.46	4,132.00	4.03	3,280.44	3.20	1,032.31	1.01	2,617.37	2.55	187.25
M	1,023.70	6,221.00	6.08	170,837.62	166.89	3,797.00	3.71	3,343.04	3.26	1,059.62	1.04	3,174.70	3.10	184.08
N	775.30	7,656.00	9.87	103.950.50	134.08	3,147.00	4.06	2,340.47	3.02	772.34	1.00	1,883.11	2.43	154.46
O	471.30	6,102.00	12.95	70,171.99	148.89	2,980.00	6.32	1,393.25	2.96	283.85	0.60	922.83	1.96	173.68
P	758.40	8,023.00	10.58	119,392.27	157.43	6,101.00	8.04	2,372.99	3.13	661.75	0.87	2,103.61	2.77	182.82
Q	550.90	7,249.00	13.16	81,043.08	147.11	2,548.00	4.62	1,757.06	3.19	499.06	0.91	1,635.23	2.96	171.95
R	490.30	6,244.00	12.74	73,693.46	150.30	3,137.00	6.40	1,605.91	3.28	460.00	0.82	1,314.22	2.68	176.22
S	988.20	5,974.00	6.05	157,634.25	159.52	4,574.00	4.63	3,125.75	3.16	779.99	0.81	2,603.11	2.63	176.80
T	488.00	7,656.00	15.69	74,068.82	151.78	3,147.00	6.45	1,403.11	2.88	396.00	0.81	1,330.43	2.73	180.34
U	591.70	4,016.00	6.79	83,365.45	140.89	3,122.00	5.28	3,645.22	6.16	105.87	0.18	2,312.62	3.90	163.20
V	708.70	5,372.00	7.58	109,681.84	154.76	3,320.00	4.68	2,533.53	3.57	713.15	1.01	1,781.14	2.51	174.11
W	979.80	6,633.00	6.77	148.044.13	151.09	3,818.00	3.90	3,175.37	3.24	872.89	0.89	2,587.13	2.64	168.53
X	400.20	5,600.00	13.99	69,517.13	173.70	2,656.00	6.64	1,787.26	4.46	203.95	0.51	919.64	2.30	201.60
Y	602.40	4,693.00	7.79	88,335.83	146.64	2,964.00	4.92	2,115.03	3.51	378.25	0.63	1,578.12	2.61	166.10
Z	656.30	7,605.00	11.59	109,021.13	166.11	3,169.00	4.83	2,153.91	3.28	550.00	0.84	1,668.23	2.54	189.19

TABLE XLVII

COSTS PER PUPIL - KINDERGARTEN

	MTM	Principal's Salary	Cost Per Pupil	Teachers' Salaries	Cost Per Pupil	Clerks' Salaries	Cost Per Pupil	Supplies & Other Costs	Cost Per Pupil	Total Cost Per Pupil
A	118.00	546.00	4.63	6,838.00	57.95	223.00	1.89	166.70	1.41	65.88
B	73.60	264.00	3.59	5,578.13	75.79	146.00	1.98	115.59	1.57	82.93
C	56.50	319.00	5.65	3,785.88	67.01	170.00	3.00	90.35	1.60	77.26
D	65.60	455.00	6.94	4,576.00	69.76	187.00	2.95	136.70	2.08	81.63
E	76.10	488.00	6.41	5,682.50	74.67	200.00	2.63	109.04	1.45	85.16
F	51.60	397.00	7.69	4,475.00	86.72	204.00	3.95	66.08	1.28	99.64
G	134.60	512.00	3.80	11,329.50	84.17	253.00	1.88	180.74	1.34	91.19
H	66.60	414.00	6.22	4,876.00	73.21	151.00	2.27	97.16	1.46	83.16
I	70.30	516.00	7.34	5,067.50	72.08	212.00	3.02	122.36	1.74	84.18
J	233.90	476.00	2.04	10,448.50	44.67	391.00	1.67	163.17	0.70	49.08
K	77.20	321.00	4.16	5,602.00	72.56	132.00	1.71	140.64	1.82	80.25
L	131.20	447.00	3.41	10.546.90	80.40	257.00	1.96	184.69	1.41	87.18
M	148.40	408.00	2.75	11,463.00	77.24	249.00	1.68	202.08	1.36	83.03
N	99.40	494.00	4.97	5,481.25	55.14	203.00	2.04	186.80	1.88	64.03
O	48.20	399.00	8.28	4,067.00	84.38	195.00	4.04	95.55	1.98	98.68
P	88.80	472.00	5.32	6,883.50	77.52	359.00	4.04	161.99	1.82	88.70
Q	68.20	429.00	6.29	5,466.00	80.15	151.00	2.21	111.68	1.64	90.29
R	59.20	423.00	7.14	5,759.00	97.28	213.00	3.60	97.42	1.65	109.67
S	113.60	314.00	2.76	7,135.81	69.10	241.00	2.12	173.76	1.53	75.51
T	58.40	494.00	8.46	3,505.00	60.02	203.00	3.48	70.31	1.20	73.16
U	95.70	324.00	9.34	3,606.50	37.68	252.00	2.63	128.73	1.34	50.99
V	105.10	360.00	3.42	6,952.50	66.15	222.00	2.11	165.30	1.57	73.25
W	145.60	433.00	2.97	9,577.64	65.78	249.00	1.71	188.85	1.30	71.76
X	48.00	365.00	7.60	3,521.75	73.70	173.00	3.60	28.40	0.59	85.
Y	91.90	367.00	3.99	7,204.12	78.39	332.00	3.61	140.72	1.53	
Z	80.70	434.00	5.38	5,178.50	64.17	181.00	2.24	82.57	1.02	

TABLE XLVIII
COSTS PER PUPIL - TRAINABLE MENTALLY HANDICAPPED

	MTM	Principal's Salary	Cost Per Pupil	Teachers' Salaries	Cost Per Pupil	Clerks' Salaries	Cost Per Pupil	Textbooks	Cost Per Pupil	Supplies & Other Costs	Cost Per Pupil	Total Cost Per Pupil
W	30.30	433.00	14.29	7,918.90	237.36	249.00	8.22	202.81	6.69	267.70	8.83	275.39

TABLE XLIX
COSTS PER PUPIL - EDUCABLE MENTALLY HANDICAPPED

A	12.70	294.00	23.15	2,980.25	234.66	121.00	9.53	59.42	4.68	88.02	6.93	278.95
B	66.50	1,056.00	15.87	17,255.00	259.47	583.00	8.77	297.34	4.47	661.05	9.94	298.52
C	15.90	319.00	22.95	5,517.00	396.91	170.00	12.23	59.88	4.31	69.61	5.01	441.41
F	48.50	1,150.00	23.71	12,303.00	233.67	592.00	12.21	200.01	4.12	558.65	11.52	305.23
I	15.00	413.00	27.53	3,043.00	202.87	170.00	11.33	59.55	3.97	71.89	4.79	250.49
J	15.60 *	82.00	10.45	2,057.00	263.72	67.00	8.59	56.75	7.28	65.85	8.44	298.48
K	31.80	642.00	20.19	11,098.00	348.99	264.00	8.30	159.48	5.02	587.10	18.46	400.96
L	42.80	523.00	12.22	12,246.75	286.14	301.00	7.03	[illegible]139.67	3.73	656.15	16.35	325.45
O	11.44 **	[illegible]359[illegible].00	34.87	3,119.50	302.98	175.00	17.00	56.81	5.46	44.53	4.32	364.63
Q	16.60	472.00	28.43	4,459.00	268.61	166.00	10.00	59.57	3.59	90.89	5.48	316.11
S	15.70	197.00	12.55	5,500.00	350.32	150.00	9.55	60.00	3.82	80.13	5.10	381.34
U	286.90	4,280.00	14.92	72,016.63	251.02	3,326.00	11.59	[illegible]3,241.19	4.35	[illegible],212.56	11.12	293.00
V	132.60	1,918.00	14.46	36,879.00	278.12	1,186.00	8.94	595.21	4.49	[illegible],577.16	12.01	318.02
W	15.30	217.00	14.18	2,819.00	184.25	125.00	8.17	59.34	3.88	76.97	5.03	215.51
X	36.00	1,098.00	30.50	10,624.50	295.13	521.00	14.56	156.24	4.34	270.56	7.52	352.05
Y	15.60	244.00	15.64	5,517.00	353.65	154.00	9.87	58.23	3.73	68.12	4.37	387.26

* 5 Months Only

** 9 Months Only

TABLE L

COSTS PER PUPIL - PRIMARY SOCIAL ADJUSTMENT (TRUANT)

	MTM	Principal's Salary	Cost Per Pupil	Teachers' Salaries	Cost Per Pupil	Clerks' Salaries	Cost Per Pupil	Textbooks	Cost Per Pupil	Supplies and other Costs	Cost Per Pupil	Total Cost Per Pupil
B	26.80	528.00	19.70	10,475.00	390.86	291.00	10.86	160.00	5.97	217.51	8.12	435.51

TABLE LI

COSTS PER PUPIL - DEAF

M	59.50	1,555.00	26.14	40,086.89	673.71	949.00	15.95	353.28	5.92	726.63	12.21	733.93

TABLE LII

COSTS PER PUPIL - SIGHT SAVING

V	19.40	479.00	24.69	10,429.38	537.60	297.00	15.15	151.10	7.81	179.85	9.27	594.52
W	20.90	433.00	20.72	10,764.00	515.02	249.00	11.91	159.65	7.64	116.91	5.59	560.88

TABLE LIII

FREQUENCY DISTRIBUTION OF PUPIL ABILITY FOR JANUARY 1954 GRADUATES OF GROUP I SCHOOLS

Interval	Schools														
	A	B	D	G	H	I	K	M	N	P	S	W	Y	Z	Total
160-164															0
155-159															0
150-154									1				1		2
145-149			1	1								1	2		5
140-144			1	7			1		2		1			2	14
135-139			1	1			1	1			1	1			6
130-134				4	1			3				2	3	1	14
125-129			2	1			1		3		6	2			15
120-124			2	1	1	1		1			4	1	2	2	15
115-119		2	2	2	2			3	5		3	1	1		21
110-114	1		1	4	2	2		1	2	1	5	2	2	7	28
105-109	3		1	2	1				4		3	3		3	20
100-104	1	1		4	2	2	2	5	3	2			1	1	24
95-99	1	1			4		1	3		1	5	2	2	5	25
90-94	3	1	1		2	2	2	3	1	2	2	1		2	22
85-89	3		1	2		3	2	1	4	1			1	2	20
80-84	9			2		3	2		1	2		1	2	2	24
75-79	2		3	1	3		1					2	1		13
70-74	1	2		1			1			1	1	1			8
65-69	1				1	1						1			4
60-64	3	1							1	1			1		7
Total	28	8	16	33	18	14	15	21	27	11	39	21	19	27	287
Mean	85.36	91.88	113.13	117.04	101.94	93.93	96.84	109.17	109.54	87.04	113.54	107.5[illegible]	111.71	106.94	105.20

TABLE LIV

FREQUENCY DISTRIBUTION OF PUPIL ABILITY FOR JUNE 1954 GRADUATES OF GROUP I SCHOOLS

INTERVAL	SCHOOLS A	B	D	O	H	I	K	M	N	P	S	W	Y	Z	TOTAL
160-164									1						1
155-159									1						1
150-154				1					1						2
145-149		2	1	3					1					1	8
140-144				1	1		1		1	1	1	2			8
135-139		1	2	1	1		1	9					1		16
130-134	1	1		1	2	1		4	4	2	1	1		7	25
125-129	3	2		3		1		5	1		4	3			22
120-124	8	2	1	1		2	1	7	3		4	9	1	1	41
115-119	3		3	3	1	2	1	7	3	1	3	1	1		32
110-114	1	1	1	4		1		7	6	10	7	5	2	4	49
105-109	5	1	2	3	4	3	4	5	4	4	2	7	3	2	49
100-104	4	3	3	8		6	5	8	4	7	3	6	3	3	63
95-99	3	4	4	6	5	8	5	5	5		5	11	4	8	73
90-94		3	4	4	8	2	5	4	2	3	4	5	3	4	51
85-89	3		2	5	1	2	2	1	3	2	2	3	1	1	28
80-84	2	1			2	1	5	1		4		10	4	2	32
75-79	2		1	1	4	2	4	1		1		6			22
70-74				1	3		3	2	2			4		1	16
65-69					2		2			3		1		1	9
60-64		1			1		2	1	1	2			1		9
TOTAL	35	22	24	46	36	31	41	67	43	40	36	77	25	34	557
MEAN	108.07	109.32	104.58	108.70	95.00	102.18	92.01	112.42	111.34	99.62	110.28	100.62	96.10	107.06	104.56

TABLE LV

SUMMARY OF FREQUENCY DISTRIBUTION OF PUPIL ABILITY FOR GROUP I

Interval	Graduates of semester ending		Total
	January 1954	June 1954	
160-164		1	1
155-159		1	1
150-154	2	2	4
145-149	5	8	13
140-144	14	8	22
135-139	6	16	22
130-134	14	25	39
125-129	15	22	37
120-124	15	41	56
115-119	21	32	53
110-114	28	49	77
105-109	20	49	69
100-104	24	63	87
95- 99	25	73	98
90- 94	22	51	73
85- 89	20	28	48
80- 84	24	32	56
75- 79	13	22	35
70- 74	8	16	24
65- 69	4	9	13
60- 64	7	9	16
Total	287	557	844
Mean	105.20	104.56	104.72

TABLE LVI

FREQUENCY DISTRIBUTION OF PUPIL ABILITY FOR JUNE 1954 GRADUATES OF GROUP II SCHOOLS

INTERVAL	SCHOOLS												
	C	E	F	J	L	O	Q	R	T	U	V	X	TOTAL
145-149			1										1
140-144		2											2
135-139		1					2						3
130-134		1					1				1		3
125-129			2				1	1			1		5
120-124		1	3				2		1	1		2	10
115-119		2	2	1		1		2	1	1		3	13
110-114		2	5	3	3		3	1		1	2		20
105-109	1	7	4	4	6	5	6	2	3	1	6	4	49
100-104	5	5	4	4	9	4	3	3	1		4	1	43
95-99	2	3	4	10	13	3	5	2	7	3	3	2	57
90-94	2	3	1	10	7	6	3	5	8	2	6		53
85-89	3		1	8	9		2	4	3	8	5	1	44
80-84	5	1	1	8	1	2		6		5	7	1	37
75-79	2	2	1	5			3	4		4		3	24
70-74	1	2		4	2	1	1	2				1	14
65-69							2	3	1			1	7
60-64								1					1
TOTAL	21	32	29	57	50	22	34	36	25	26	35	19	386
MEAN	90.60	104.84	108.19	91.80	96.70	97.73	101.47	89.44	96.70	90.77	97.22	98.29	96.71

TABLE LVII

FREQUENCY DISTRIBUTION OF PUPIL ABILITY FOR JANUARY 1955 GRADUATES OF GROUP II SCHOOLS

Interval	Schools												
	C	E	F	J	L	O	Q	R	T	U	V	X	Total
150-154		1											1
145-149													
140-144	1	1	2										4
135-139					2								2
130-134	1			1	2						1		5
125-129	1				2			1					4
120-124	1			2			2	1	1				7
115-119	1	1	2	1	2				1				8
110-114	2		1	2	3	1		2	2				13
105-109	1	2	2	7		1	2	3	2				20
100-104	1	1	1	4	1	2	4	3	1	1	1	1	21
95-99	1			2	9	1	4	1	5	3	6		32
90-94	4	3	2	7		2	1	1	2		4	1	27
85-89	3	3	1	6	5	7	3	3	1	5	3	4	44
80-84	3	1	1	5	1	1	1	3	2	2	2	1	21
75-79		3		3		1	1		3		1	2	14
70-74	4				3	2		1		1	1	1	13
65-69	1				1			1					3
60-64								1					1
Total	25	26	12	40	31	18	18	21	20	10	19	10	240
Mean	96.50	99.06	108.75	96.50	101.70	90.28	98.61	95.60	97.00	90.50	93.08	85.50	96.78

TABLE LVIII

SUMMARY OF FREQUENCY DISTRIBUTION OF PUPIL ABILITY FOR GROUP II

Interval	Graduates of semester ending		Total
	June 1954	January 1955	
150-154		1	1
145-149	1		1
140-144	2	4	6
135-139	3	2	5
130-134	3	5	8
125-129	5	4	9
120-124	10	7	17
115-119	13	8	21
110-114	20	13	33
105-109	49	20	69
100-104	43	21	64
95- 99	57	32	89
90- 94	53	27	80
85- 89	44	44	88
80- 84	37	21	58
75- 79	24	14	36
70- 74	14	13	27
65- 69	7	3	10
60- 64	1	1	2
Total	386	240	626
Mean	96.71	96.78	96.74

IX

R JANUARY 1954 GRADUATES OF GROUP I SCHOOLS

P	S	W	Y	Z	Total
			3		7
	1	1		1	14
	1		2	1	10
1	1	1	1		5
1			1	1	15
	2	1			14
1	2	2	1		15
	1	1		2	16
3	1	3	2	2	22
	2		3	6	23
	5	3	1	6	41
	4		1	1	13
1	3	4		1	29
	1	2		1	13
1	2		1		17
1	1	3	2	4	17
1				1	7
1	1				4
	1		1		2
					1
					2
.	29	21	19	27	287
3.48	8.15	8.46	8.50	8.38	8.72

TABLE LIX

FREQUENCY DISTRIBUTION OF READING GRADE SCORES FOR JANUARY 1954 GRADUATES OF GROUP I SCHOOLS

Interval	Schools														
	A	B	D	G	H	I	K	M	N	P	S	W	Y	Z	Total
13.0-13.4	2					1			1				3		7
12.5-12.9			2	7				2			1	1		1	14
12.0-12.4	1	1	1	1				1	1		1		2	1	10
11.5-11.9								1		1	1	1	1		5
11.0-11.4	4			3				1	4	1			1	1	15
10.5-10.9	1	1		4		1		1	3		2	1			14
10.0-10.4				2	1	2			4	1	2	2	1		15
9.5- 9.9	2		2	3	1	1	1	2			1	1		2	16
9.0- 9.4	1		1	2	2	2		2	1	3	1	3	2	2	22
8.5- 8.9	1		2		4		1	2	2		2		3	6	23
8.0- 8.4	3		1	2	6	4	1	5	4		5	3	1	6	41
7.5- 7.9	1	1		1			2	1	1		4		1	1	13
7.0- 7.4	4	1	1	4	1		4	3	2	1	3	4		1	29
6.5- 6.9	1		3	1		1	3				1	2		1	13
6.0- 6.4	2	1	2		3	1	1		3	1	2		1		17
5.5- 5.9	2	1		2					1	1	1	3	2	4	17
5.0- 5.4	1		1	1		1	1			1				1	7
4.5- 4.9	1	1								1	1				4
4.0- 4.4											1		1		2
3.5- 3.9		1													1
3.0- 3.4	1						1								2
Total	28	8	16	33	18	14	15	21	27	11	29	21	19	27	287
Mean	8.48	7.31	8.59	9.86	8.17	9.11	7.08	9.34	9.34	8.48	8.15	8.46	8.50	8.38	8.72

TABLE LX

FREQUENCY DISTRIBUTION OF READING GRADE SCORES FOR JUNE 1954 GRADUATES OF GROUP I SCHOOLS

Interval	Schools														
	A	B	D	G	H	I	K	M	N	P	S	W	Y	Z	Total
13.0-13.4	2			9		2			5	4		4			26
12.5-12.9	1		3	1				5			1	3		2	16
12.0-12.4				5				4	4	2	1	1	1		18
11.5-11.9	1			1		1			3		1		1		8
11.0-11.4				3				4	2	2		3	2	2	18
10.5-10.9	2		1	1	1		1	4	2	2	1	3		2	20
10.0-10.4	2	2	1	2	2	3	1	3	6	4	2	5	2	4	39
9.5- 9.9	3	4			1	2	1	7	3	2	3	3	3		32
9.0- 9.4	5	3	2	4	2	9	4	5	3	5	1	11	1	3	58
8.5- 8.9	2	1	4	1	6	7	3	1	1	3	2	4		5	40
8.0- 8.4	6	2	6	5	8	2	4	10	5	3	4	15	3	4	76
7.5- 7.9	2	3	2	4	2	3	2	5	5		7	7	3	5	50
7.0- 7.4	1	3	1	2	7	1	2	9	2	3	4	7	3	2	47
6.5- 6.9	3		1	1	1		7	2		3	4	4	1	3	30
6.0- 6.4	2	2	1	3	2		4	2		2	2	2	1	2	25
5.5- 5.9	1	1		2	2	1	3	2	1	2	3	4	3		25
5.0- 5.4	2		1	2	1	1	2	2	1	1					13
4.5- 4.9			1		1		3			2			1		8
4.0- 4.4		1		1			4	1				1			8
Total	35	22	24	46	36	31	41	67	43	40	36	77	25	34	557
Mean	8.36	8.24	8.67	9.70	7.92	9.20	7.03	8.94	9.94	9.00	8.22	8.[illegible]	8.41	8.84	8.75

TABLE LXI

SUMMARY OF READING GRADE SCORES FOR GROUP I

Interval	Semester ending		Total
	January 1954	June 1954	
13.0-13.4	7	26	33
12.5-12.9	14	16	30
12.0-12.4	10	18	28
11.5-11.9	5	8	13
11.0-11.4	15	18	33
10.5-10.9	14	20	34
10.0-10.4	15	39	54
9.5- 9.9	16	32	48
9.0- 9.4	22	58	80
8.5- 8.9	23	40	63
8.0- 8.4	41	76	117
7.5- 7.9	13	50	63
7.0- 7.4	29	47	76
6.5- 6.9	13	25	38
6.0- 6.4	17	30	47
5.5- 5.9	17	25	42
5.0- 5.4	7	13	20
4.5- 4.9	4	8	12
4.0- 4.4	2	8	10
3.5- 3.9	1		1
3.0- 3.4	2		2
Total	287	557	844
Mean	8.72	8.75	8.74

UNE 1954 GRADUATES OF GROUP I SCHOOLS

R	T	U	V	X	Total
			2		7
					5
1	1				10
1			2	2	11
					5
	1		1		9
	3		2	2	21
1	2				19
3	2		1		16
1	2		3		19
3	3	3	3	2	48
3		2	5		31
4	2	3	6	2	49
1		2			15
5	2	7	4	1	46
.	3	5	2		29
.	1	3	3		19
2	1		1	2	15
3	1		1		8
	1				1
					3
3	25	26	35	1	386
.90	7.85	6.27	7.91	.93	7.88

TABLE LXII

FREQUENCY DISTRIBUTION OF READING GRADE SCORES FOR JUNE 1954 GRADUATES OF GROUP I SCHOOLS

Interval	Schools												
	C	E	F	J	L	O	Q	R	T	U	V	[illegible]	Total
13.0-13.4		2			1		2				2		7
12.5-12.9			5										5
12.0-12.4		2	4				2	1	1				10
11.5-11.9		2	2		1	1		1			2	[illegible]	11
11.0-11.4		2	1		2								5
10.5-10.9		3	2		1	1			1		1		9
10.0-10.4		4	1		4	3	2		3		2	[illegible]	21
9.5- 9.9	1	5	2	1	3	2	1	1	2			[illegible]	19
9.0- 9.4			1	1	3	1	2	3	2		1	[illegible]	16
8.5- 8.9	1			1	9	1		1	2		3	[illegible]	19
8.0- 8.4	6	4		4	14	2	4	3	3	3	3	[illegible]	48
7.5- 7.9	2	1	4	6	2	2	4	3		2	5		31
7.0- 7.4	6	2	1	6	5	3	9	4	2	3	6	[illegible]	49
6.5- 6.9		1	1	4		2	1	4		2			15
6.0- 6.4	3	1	1	13	2	3	4	5	2	7	4	[illegible]	46
5.5- 5.9	1	2	1	7	2		1	1	3	5	2	[illegible]	29
5.0- 5.4	1		1	8			1	1	1	3	3		19
4.5- 4.9		1	2	4	1		1	2	1		1	[illegible]	15
4.0- 4.4				2		1		3	1		1		8
3.5- 3.9									1				1
3.0- 3.4							3						3
Total	21	32	29	57	50	22	34	36	25	26	35	[illegible]	386
Mean	7.46	9.48	9.65	6.47	8.62	8.23	8.13	6.90	7.85	6.27	7.91	[illegible].93	7.88

TABLE LXIII

FREQUENCY DISTRIBUTION OF READING GRADE SCORES FOR JANUARY 1955 GRADUATES OF GROUP II SCHOOLS

Interval	Schools												Total
	C	E	F	J	L	O	Q	R	T	U	V		
13.0-13.4					3			3			1		7
12.5-12.9			1	1						1			3
12.0-12.4		1	1	1									3
11.5-11.9				1									1
11.0-11.4			1	1	1								3
10.5-10.9		1			1			4					6
10.0-10.4		3	2		2	3		1	2			1	14
9.5- 9.9	1	1	1		3	2	1	1	2				12
9.0- 9.4				2	3		4	2		1	1	1	14
8.5- 8.9	1			1	2	1	1					1	7
8.0- 8.4	4		3	3	3	1	2	1	4			2	23
7.5- 7.9	4	1		5	2	1	2	1	4	1	4		25
7.0- 7.4	5	2		3	4	2	4	1	1	2	5	1	30
6.5- 6.9	3	2	1	11	2	2			3	1		1	26
6.0- 6.4	2	3	2	4	3	2	3	2	1	1	1	1	25
5.5- 5.9	3	1		5	1	2		1	1		1	1	16
5.0- 5.4	2			1	1		2	2	2	3	2	1	14
4.5- 4.9		1		1		2		2			3		9
4.0- 4.4											1		1
3.5- 3.9							1						1
Total	25	16	12	40	31	18	18	21	20	10	19	10	240
Mean	7.17	8.03	9.21	7.46	8.69	7.58	8.53	8.70	7.70	7.30	6.88	7.55	7.82

TABLE LXIV

SUMMARY OF READING GRADE SCORES FOR GROUP II

Interval	Semester ending		Total
	June 1954	January 1955	
13.0-13.4	7	7	14
12.5-12.9	5	3	8
12.0-12.4	10	3	13
11.5-11.9	11	1	12
11.0-11.4	5	3	8
10.5-10.9	9	6	15
10.0-10.4	21	14	35
9.5- 9.9	19	12	31
9.0- 9.4	16	14	30
8.5- 8.9	19	7	26
8.0- 8.4	48	23	71
7.5- 7.9	31	25	56
7.0- 7.4	49	30	79
6.5- 6.9	15	26	41
6.0- 6.4	46	25	71
5.5- 5.9	29	16	45
5.0- 5.4	19	14	33
4.5- 4.9	15	9	24
4.0- 4.4	8	1	9
3.5- 3.9	1	1	2
3.0- 3.4	3		3
Total	386	240	626
Mean	7.88	7.82	7.86

SCORES FOR JANUARY 1954 GRADUATES

M	N	P	S	W	Y	Z	Total
							1
						1	3
3	14		3	1	5		41
2	4		2	1	4	3	37
4	4	2	5			2	33
11	4	2	7	8	5	8	78
1		5	5	9	3	10	55
	1				1	2	12
			2	1		1	7
		1	1		1		10
		1	2				4
			1				3
			1	1			3
21	27	11	29	21	19	27	287
8.13	8.71	7.20	7.40	7.42	8.12	7.66	7.83

TABLE LXV

FREQUENCY DISTRIBUTION OF ARITHMETIC GRADE SCORES FOR JANUARY 1954 GRADUATES

Interval	Schools														
	A	B	D	G	H	I	K	M	N	P	S	W	Y	Z	Total
10.0-10.4		1													1
9.5- 9.9			2											1	3
9.0- 9.4	3	2	2	4	1	1	2	3	14		3	1	5		41
8.5- 8.9	3	1	4	5	3	4	1	2	4		2	1	4	3	37
8.0- 8.4	4		3	3	3	2	1	4	4	2	5			2	33
7.5- 7.9	7		2	13	6	3	2	11	4	2	7	8	5	8	78
7.0- 7.4	4	1	3	5	5	3	1	1		5	5	9	3	10	55
6.5- 6.9	3	1		2		1	1		1				1	2	12
6.0- 6.4	1						2				2	1		1	7
5.5- 5.9	1	2					4			1	1		1		10
5.0- 5.4	1									1	2				4
4.5- 4.9	1			1							1				3
4.0- 4.5							1				1	1			3
Total	28	8	16	33	18	14	15	21	27	11	29	21	19	27	287
Mean	7.59	7.75	8.44	7.90	8.08	8.04	6.98	8.13	8.71	7.20	7.40	7.42	8.12	7.66	7.85

TABLE LXVI

FREQUENCY DISTRIBUTION OF ARITHMETIC GRADE SCORES FOR JUNE 1954 GRADUATES

Interval	School														
	A	B	D	G	H	I	K	M	N	P	S	W	Y	Z	Total
10.0-10.4			1												1
9.5- 9.9			4					20				2			26
9.0- 9.4	9	8	4	9	3	4		5	22	6		2	2	8	82
8.5- 8.9	5	3	6	7	4	10	1	8	9	5	1	6	3	3	71
8.0- 8.4	3	2	4	5	6	8	3	6	8	5		6	6	7	69
7.5- 7.9	12	6	4	9	15	7	7	14	1	11	11	29	10	11	147
7.0- 7.4	5	2	1	12	6		7	14	2	7	15	28	3	2	104
6.5- 6.9	1			1	2		9			2	6	3	1	3	28
6.0- 6.4				1			3			1		1			6
5.5- 5.9				1		2	5			1	1				10
5.0- 5.4		1		1			1		1	1	2				7
4.5- 4.9							3			1					4
4.0- 4.4							1								1
3.5- 3.9															
3.0- 3.4							1								1
Total	35	22	24	46	36	31	41	67	43	40	36	77	25	34	557
Mean	8.22	8.32	8.75	7.97	7.93	8.27	6.68	8.52	8.74	7.92	7.21	7.72	8.01	8.18	8.00

TABLE LXVII

FREQUENCY DISTRIBUTION OF CHRONOLOGICAL AGES OF JUNE 1954 GRADUATES

Interval	School												
	C	E	F	J	L	O	Q	R	T	U	V	X	Total
17.25-17.49	1												1
16.50-16.74				1							1		2
16.25-16.49						1							1
16.00-16.24	1			1				1	1	1			5
15.75-15.99				1					2	1			4
15.50-15.74	1	1	1			2		1	4		2		12
15.25-15.49	1				1		1	3	2	1	2	1	12
15.00-.524	2			1	3		1	3		3	4	1	18
14.75-.4.99	4	1	1	2	1	2			1				12
14.50-.1.74	3	1	3	2	5	1	1		3	3	4	3	29
14.25-14.49	1	2	4	3	4	4	3	2	5	3	2	2	35
14.00-14.24	3		6	6	12	5	4	5	4	2	4	2	53
13.75-13.99	3	2	3	9	16	1	2	5	2	4	5	4	56
13.50-13.74	1	4	2	11	7	2	4	5	1	2	8		47
13.25-13.49		8	3	7		4	5	6		4		2	39
13.00-13.24		8	2	6			7	3		1	2	1	30
12.75-12.99		3	2				6	2				1	14
12.50-12.74		2	1	5						1	1	1	11
12.25-12.49				2								1	3
12.00-12.24		1			1								2
Total	21	32	29	57	50	22	34	36	25	26	35	19	396
Mean	14.77	13.50	13.88	13.78	14.10	14.31	13.62	14.04	14.78	14.23	14.29	13.95	14.05

TABLE LXVIII

FREQUENCY DISTRIBUTION OF CHRONOLOGICAL AGES OF JANUARY 1955 GRADUATES

Interval	School												
	C	E	F	J	L	O	Q	R	T	U	V	X	Total
17.25-17.49	1												1
16.75-16.99										1			1
16.25-16.49	3			2		1			1		1	1	9
16.00-16.24	1			1		1							3
15.75-15.99	2				2	2			1			2	9
15.50-15.74	1			1	1	1				1			5
15.25-15.49	2		1	4	2	2			1			2	14
15.00-15.24	2	1		1	1	3	3	1	1	3	1		18
14.75-14.99	3		1	5	3		3	3	4		2	2	26
14.50-14.74	1	3	1	5	3	2	7	1	1	1	2		26
14.25-14.49	2	1	1	7	3	2	1	2	2	1	4	1	27
14.00-14.24	1	6	1	2	4	2	1	1	3	2	6	2	33
13.75-13.99	2	3	3	4	4	1	3	7	5		2		38
13.50-13.74	3	2	1	4	1						1		12
13.25-13.49			1	3	1	1		3	1	1			11
13.00-13.24	1							2					3
12.75-12.99			1										1
12.50-12.74			1	1									2
12.00-12.24								1					1
Totals	25	16	12	40	31	18	18	21	20	10	19	10	240
Mean	15.00	14.19	13.96	14.51	14.46	14.97	14.58	13.95	14.54	14.85	14.43	15.12	14.53

TABLE LXIX

ELEMENTARY TEACHERS WITH B.A. DEGREE SALARY

SCHEDULE IN EFFECT DURING THE CALENDAR YEAR 1954[1]

Steps	Salary Interval		Average number of years of experience indicated for teachers salary cost per authorized teaching position (a)
1	$3400-	$3649	less than 1
2	$3650 -	$3899	more than 1 but less than 2
3	$3900 -	$4149	more than 2 but less than 3
4	$4150 -	$4399	more than 3 but less than 4
5	$4400 -	$4649	more than 4 but less than 5
6	$4650 -	$4899	more than 5 but less than 6
7	$4900 -	$5149	more than 6 but less than 7
8	$5150 -	$5399	more than 7 but less than 8
9	$5400 -	$5649	more than 8 but less than 9
10	$5650		more than 9

a Assuming that experience beyong nine years is not counted

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[1] Facts and Figures, September 1954, p. 26

APPROVAL SHEET

The dissertation submitted by Ira Hobart Monell has been read and approved by five members of the Department of Education.

The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated, and that the dissertation is now given final approval with reference to content, form, and mechanical accuracy.

The dissertation is therefore accepted in partial fulfillment of the requirements for the Degree of Doctor of Education.

May 2, 1957
Date

J. Valenti
Signature of Adviser