THE UNIVERSITY OF ALBERTA

AN ANALYSIS OF THE VARIATIONS AMONG UNIT COSTS OF THE SCHOOLS OF THE COST ANALYSIS RESEARCH PROJECT

BY

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ABSTRACT

The purpose of this study was to determine what variations in cost were evident among the schools of the sample included in the cost analysis studies which were completed as part of the Unit Cost Analysis Research Project. The sample was composed of 69 schools, of which 12 were from urban School Districts, 21 were from School Divisions, and 36 were from Counties.

Analyses were based on the total sample of schools, and classifications of the schools according to rural and urban, the type of jurisdiction (District, Division, County), type of school by grade range, and enrollment intervals.

Two dimensions of expenditures were examined: (1) The traditional function-object classifications of expenditures in aggregate classifications; and, (2) performance or program classifications of expenditures. In the latter dimension, two categories of programs were analyzed, grade programs, and curricular or instructional programs. In the program dimension, only Direct Salary or Direct Instructional costs were analyzed.

Four statistics, descriptive of the cost distributions were selected. These included measures of central location, the arithmetic mean, and the median, and measures of scatter or dispersion, the range and standard deviation. In addition, the cost distributions of the aggregate function-object classification for the total sample were converted to standard score units.

The raw data for the cost variables were obtained from the cost studies, and the individual researchers. The data were then subjected

to computer analysis to obtain the selected statistics.

The mean total expenditure per pupil for the sample was $720.86. The means ranged from $439.39 to $1,120.16, with a standard deviation of $166.21. The magnitude of mean costs per pupil tended to follow the variations in enrollments and salaries, with higher per pupil costs associated with high enrollments and average salaries.

The direct salaries classification was the highest of all cost classifications, with pupil transportation and plant operation the next most costly, although considerably below the former category.

Costs in schools tended to be higher in urban areas than in rural areas in all classifications. The most notable exception was the pupil Transportation category where the per pupil expenditures for rural schools, were well above the cost in urban schools. Rural schools tended to display less variability in per pupil costs than urban schools.

Senior high schools were the most costly in terms of per pupil expenditures, while elementary schools were least costly.

The per pupil direct instructional expenditures tended to increase as grades rose, elementary grades having the lowest costs, and senior high grades the highest costs. The costs of grade programs tended to be higher in rural schools than in urban schools. Schools that were exclusively elementary, junior and senior high schools generally had the lowest grade program costs.

Language Arts was the most costly curricular program in the classifications of schools, and along with Social Sciences, Mathematics, Sciences, Physical Education, and Fine Arts, formed a core of highest cost programs. Vocational Education was a high cost program in urban schools.

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Chapter I

STATEMENT OF THE PROBLEM AND ITS SIGNIFICANCE

This chapter is divided into five sections. The first section deals with the background to the study, and a description of the unit-cost analysis model developed and used by the Research Project. Section two contains the statement of the problem, as well as the sub-problems related to this study.

Section three includes the definition of terms used in this study. Only those terms not defined in later chapters are included in this section. The fourth section deals with the significance of the problem. Included within this section are topics related to the importance of this particular study. Section five summarizes the first chapter and outlines succeeding chapters.

I. INTRODUCTION

The rapid rise in the cost of education has become of concern to the public and to governments at all levels. The Report of the Minister's Committee on School Finance (1969) was an expression of such concern in that it addressed itself to the problems of control and disbursement of resources for financing education in Alberta. Central to this concern has been the question of the most effective and efficient use of the limited resources available to education. Wilkinson (1967: 28) states:

> In the past twenty or twenty-five years we have moved from a position of general apathy about public spending for education

> to one of alarm and confusion: alarm about the apparent size of expenditures necessary and confusion about whether we can afford it, and what priorities different types of education should have to one another and relative to other calls on the public purse.

The foregoing suggests that analysis of costs may be required if public and government concern about educational expenditures is to be satisfied.

Background of the Study

As a result of government concern with rising cost of education and allocation of resources for educational services, in February, 1969, the Honorable R.C. Clark, then the Minister of Education, announced the appointment of a committee to undertake a study of the Foundation Program. The Committee's report, handed down on October 1, 1969, recommended that (1969: 52):

> . . . research in selected jurisdictions be undertaken to identify programs currently in existence, to discover their purposes and to establish the resources that school authorities are allocating to each of these.

Subsequently, Order-in-Council 1918/69, dated October 14, 1969, was issued which authorized the engagement of Dr. P.J. Atherton, of the Department of Educational Administration, University of Alberta, to carry out research in selected jurisdictions relative to activities such as:

(a) Identifying and defining programs currently in existence in typical jurisdictions;

(b) Identifying the financial, human, and material resources allocated to the achievement of these programs;

(c) Establishing the costs of programs in various types of school organization and determining the optimum conditions for

economical administration;

(d) Developing forms and procedures for the processing of data to introduce program budgeting;

(e) Undertaking the training of selected personnel from local jurisdictions to administer program budgeting procedures;

(f) Establishing a pilot project in program analysis and budgeting;

(g) Recommending procedures for the institution of program analysis and budgeting throughout the total provincial school system.

A group of researchers under the guidance of Dr. P.J. Atherton, selected a number of school jurisdictions in Alberta as a basis for the Research Project. The frame of reference of the researchers was in the field of program budgeting. The majority of the studies in the selected jurisdictions, however, were addressed to the first three activities recommended by the Minister's Committee. The area of program budgeting was more specifically included in the Duke (1970) study. A separate project was begun in 1971 by the Department of Education, Province of Alberta, which concerned itself with the last four activities recommended by the Committee, those having to do with program accounting and budgeting.

As a result of the Research Project, data were produced which described the expenditures for the school jurisdictions and for the schools within these systems on a function-object format and to a more limited extent, on a program format. It is this latter aspect, unit-costing on a program format, that the greatest variation occurred among the studies. The efforts of the researchers involved in the study produced a range of data that enabled comparisons of resource allocation patterns among the jurisdictions included in the Research

Project.

The Research Project

The design of the Research Project was to select a number of school jurisdictions representative of Alberta school districts and to subject each district to the process of unit-cost analysis based on the model developed by Myroon (1969). Upon selection of the typical jurisdictions, graduate students in the Department of Educational Administration, University of Alberta conducted studies in each of the selected jurisdictions.

Selection of the jurisdictions. The selection of the school jurisdictions to be included in the research project was based on a sampling project conducted by M.E. Eurchuk (1969), in consultation with Dr. P.J. Atherton.

The Eurchuk project was designed to determine a simple classification system for school jurisdictions, the variables relevant to the educational process, a unit of measurement enabling comparison of school jurisdictions, the ranks of the school jurisdictions within the classifications, and the final selection of districts representative of the school jurisdictions in Alberta. The researchers assumed that it was possible to derive a representative sample of Alberta school jurisdictions, that the variables selected were of major importance to the educational process, that all the major variables were included, that the variables could be utilized to rank jurisdictions in a meaningful way, and that differences in geographical locale would not give rise to additional variables.

The project sample was delimited to school jurisdictions within

School Divisions, Urban School Districts, and Counties. These classifications represented the three major classifications of school districts in Alberta, and comprised 92.5 per cent of the total Alberta school population for the 1967 - 1968 School Year. The remaining seventy-three administrative units comprised 7.5 per cent of the total school population. Urban districts were further sub-classified as Public School Districts and Roman Catholic School Districts.

Comparisons were conducted on a per pupil basis. The figures for comparison were determined by dividing the enrollment of each jurisdiction into each of the variables selected for comparison. The project employed total school population, equalized assessment, supplementary requisitions, total expenditures, number of personnel, and total acreage as the bases for comparisons among the jurisdictions. Equalized assessment was included as an indication of the relative wealth of each of the districts. Supplementary requisitions were assumed to be an indicator of the relative activeness of the respective boards given that more active boards would require more funds in addition to those already supplied by the School Foundation Grants. The number of personnel resulted in a staff student ratio; administrative and classroom personnel were included in this variable. Total acreage was used as an indicator of population density. In certain cases only estimates of area were available as Divisional boundaries were not coterminous with municipal boundaries. Total population was treated as a separate variable because of the wide range in enrollments.

Each variable for a jurisdiction was assigned a rank number according to its position relative to other districts in the classification. Assessment per pupil, supplementary requisition per pupil,

expenditures per pupil and total school population were ranked from highest to lowest. Staff-student ratio and density (acreage per pupil) were ranked from lowest ot highest. The intention was to allot the lowest number to the variable least likely to have negative effects on the educational process. The individual rankings for each jurisdiction were totalled and a final rank was assigned on the basis of these totals. The districts in each classification were then listed in order of their final ranking.

Selection of the school jurisdictions for participation in the research project was made on the basis of the ranking of the districts in the three classifications and according to a number of non-quantitative considerations. In respect to the latter category, the jurisdictions selected were to be of relative geographic proximity to Edmonton, and at least one small school district was considered in each classification. Selection was also based on representation from different levels on the variable scale, and representation of a wide range in the individual variables within each classification.

The final ranking for the County and Division Classifications was divided into approximate thirds representative of high, medium, and low categories. Within each of the high and low categories, one jurisdiction was selected which approximated the mean of the total of variables for the category, two jurisdictions were selected from the medium category for each classification. Two Urban Public School Districts were selected, reflecting the preponderance of school population in these types of Urban Districts; one of the jurisdictions was large, while the other was small. One Urban Separate School District was selected.

The jurisdictions selected, considered to be representative of

Alberta school districts in the Division, District, and County classifications, were: Edson School Division No. 12; Stony Plain School Division No. 23; Peace River School Division No. 10; Lac La Biche School Division No. 51; Lacombe County No. 14; Grande Prairie County No. 1; Mountain View County No. 17; Thorhild County No. 7; Edmonton Public School District No. 7; Grande Prairie School District No. 2357; and Wetaskiwin Roman Catholic Separate School District No. 15.

The cost analysis studies. The completed studies included all but two of the jurisdictions selected in the sampling project, Edson School Division No. 12, and Stony Plain School Division No. 23. Each of the studies was concerned with the basic problem, "What were the operational expenditures of a given school system for the school year 1969-70?" To varying degrees, the studies were designed to ascertain the total educational costs per pupil for the school system, for each school in the system, for each program in the system, for each program in each school of the system, the direct instructional costs for each curricular course offered in each school, and the per pupil costs of curricular programs by grade.

The greatest consistency among the studies in reporting expenditures was in the conventional function-object classification of expenditures, both at the system and school level. To varying degrees the studies related expenditures to programs, either curricular or grade. The most consistent data were reported in the allocation of direct instructional expenditures (salaries) to programs. One study (Duke, 1970) reported expenditures on a program budget format. This study attempted to integrate the conventional function-object approach of reporting

expenditures with curricular and non-curricular programs, or mission-oriented activities (Duke, 1970: 3).

With the exception of the Duke study, which was based on a sample of schools in the Edmonton Public School District, the studies reported the expenditures for the whole school system for one complete school year. In the latter studies, all the schools in the school systems were included in the analyses. In the Duke study, the sample included 25 schools. However, data with respect to the expenditures per school were reported only for the 5 high schools in the sample. The data for the remaining 20 elementary and junior high schools were not available.

The final sample of schools included in the study numbered 69. These schools represented a broad range of types of schools, ranging from schools that were exclusively elementary, junior high, and senior high schools, to schools which represented various combinations of these classifications. In addition, a broad range of enrollments was included in the sample. The lack of data on the complete urban sample, and the exclusion of two school jurisdictions selected in the sampling project prevented generalizations to the total Alberta school population.

The Cost Analysis Model

This part of Section I includes a discussion of cost analyses in general, and a description of the cost analysis model applied in the studies.

Cost Analysis--A General Discussion.

Unit cost analysis is described by Fowlkes and Hansen (1952: 471) as:

> . . . the process of studying the total costs of public

> education for a given community, state, or area for a given year; trends in total school costs; the costs of specific services or subjects, e.g., transportation or English; the costs of education by grades or levels, e.g., elementary school costs, secondary school costs; costs of non-attendance; costs and tax-paying ability; costs and size of school; reasons for increased costs; reasons for decreased costs; need for increased costs and need for decreased costs.

Knezevich and Fowlkes (1960: 153) add the output dimension to cost analysis in terms of measuring "how much was accomplished at a given price." Hull (1961: 732) suggests that cost analysis attempts "to allocate measurable costs to predetermined units for a given period of time."

For the purposes of the studies completed as part of the Research Project, unit cost analysis referred to (Myroon, 1969: 3):

> . . . the detailed determination of designated educational expenditures for specific functions, activities, services or performances, the conversion of these expenditures into unit costs on a pupil enrollment basis, and the examination and analysis of the resultant per pupil unit costs.

The cost analysis model. Fundamental to the value of unit cost analyses is the development of a model which is uniform in terminology, definitions, proration procedures, choice of unit and areas to be costed, and in the classification of expenditures. With some variation in format, the studies of the Research Project utilized the model developed by Myroon (1969). The elements, or stages, of the model, with some elaboration, are listed below.

(1) Development of uniform terminology. Essential to the interpretation of the studies was consistency in terminology. Uniform interpretations were developed for terms such as unit cost analysis, expenditure, direct expenditure, indirect expenditures, function-object classifications, and grade divisions, to mention a number of terms.

(2) Establishment of an adequate accounting system. Basic to the value of cost studies is the existence of an adequate accounting system. Knezevich (1960: 153) states, "It would be extremely difficult, if not impossible, to meaningful unit cost analysis without designing an accounting system to satisfy such purposes." The accounting system utilized by the studies possessed two dimensions, (1) function-object classifications of expenditures, and, (2) performance-based program classifications of expenditures. The function-object classification of expenditures used in the studies were adapted from the Reason and White (1957: 27-35) system for classification of expenditures. This dimension of the model's accounting system defined "function" as the kind of educational activity involved; "object" refered to the specific item purchased. A third element "character" was also defined, interpreted as the nature of the payment as a fiscal transaction. However, the term "function-object" was used to encompass the same ideas. A more complete delineation of the elements of the function-object classification system is included in Chapter 2.

The other dimension of the accounting system developed for the model was the "performance-based" program classification of expenditures. Critics of conventional accounting systems have suggested that as ". . . school programs have become complex and varied . . . the single dimension accounting system, even with its amendments and additions, is hopelessly inadequate (Lindman, 1968: 66)." The design of program or performance classifications for expenditures is intended to correlate traditional accounting systems with the objectives of education. This type of an expenditure format which integrates conventional and program oriented classifications of expenditures is broadly defined

as a Program Budget format (Benton and Tenzer, 1969: 30).

The program classifications of expenditures utilized by the studies followed the guidelines suggested by Barro (1969: 30) and Hartley (1968: 160-166). These classifications included school programs, or subjects, types of students, and grade levels. A further elaboration of these classifications is included in Chapter 2.

(3) Determination of the accounting bases: cash or accrual. Expenditures under an accrual basis are recorded as incurred, when the services have been rendered or the goods are received. Cash accounting is defined as expenditures and revenues entered only when payment has been made or has been received. Most of the school jurisdictions included in the Project used a cash system as a basis for accounting. In these instances a modified cash-accrual system was adopted to achieve greater accuracy in determining expenditures.

(4) Determination of the time period for which the per-pupil expenditure figure is to be computed. The studies computed per-pupil costs on an annual basis, for the school year 1969-70.

(5) Determination of the appropriate pupil unit. Three per-pupil units of measurement suggested for determining expenditures (DBS, 1966:67): (1) enrollment as of a specified date; (2) average daily attendance; and, (3) average daily enrollment. As data with respect to the latter two measures were not available, most of the studies used enrollment as of specified date. In the case of semestered schools, the average of December enrollments and late January or early February enrollments was utilized.

(6) Determination of the areas to be included in a per unit expenditure figure. The areas to be included in a per unit expenditure

figure in the studies were based on the selected function-object classifications and the program classifications. These are more completely described in Chapter 2.

(7) Determination of the proration basis to be used to allocate expenditures to schools and areas. Careful proration of expenditures is considered essential to meaningful cost analysis. (Knezevich and Fowlkes, 1960: 162) The fundamental purpose of proration is to allocate segments of a single cost to different accounts on the basis of the value the expenditure provides to each account. Knezevich and Fowlkes (1960: 130-138) suggested seven methods of proration: (1) time, (2) average daily membership, (3) time-floor area, (4) hour consumption, (5) number of pupils, (6) mileage, and (7) quantities consumed. In addition to the methods suggested above, expenditures were allocated on the basis of dollar volume. Considerable uniformity existed in the proration procedures among the studies. Where differences occurred, the variation was due to an emphasis on practicality, validity, and accuracy at the expense of uniformity.

(8) Determination of the actual or accrued costs. Expenditures for the analyses were obtained through examination of the jurisdictions' ledger sheets, payroll sheets, and invoices. The salaries and related benefits of all personnel were prorated to the appropriate classifications. The expenditure data for the Edmonton study were obtained through the computer runs of the jurisdiction's information system, and the general ledger.

(9) Estimation of the chosen per pupil costs. Upon proration of the expenditures to the various accounts, calculations were necessary to determine the appropriate unit costs. In most cases, computer

facilities were utilized for this stage. Where time or facilities were not available, many of the researchers resorted to the use of calculators.

(10) Findings and analysis. The final stage in the cost analysis model was extrapolation and analysis of the findings. The studies included in the Research Project were restricted to examination of the findings of one study. The researchers uniformly recommended the comparative analysis of the results of the several studies.

II. THE PROBLEM

The major problem of this study was: What variations were evident among the unit costs of the schools of the sample of Alberta school jurisdictions included in the Cost Analysis Research Project conducted at the University of Alberta in 1969-70?

Unit costs were expressed in terms of eight selected function-object classifications of expenditure as well as total expenditure, twelve grade programs, and ten curricular programs, one type-of-student, program and one non-curricular program. The schools in the sample were classified for analysis by total sample, as urban and rural, as schools from School Divisions, School Districts, and Counties, by type of school according to grade range, and by enrollment intervals.

Sub-Problems

(1) What variations in enrollments, number of teachers, and pupil-teacher ratios were evident among the schools of the total sample, and between the schools of districts, divisions, and counties?

(2) What variations in average teachers' salaries, qualifications and experience, were evident among the schools of the total

sample, and between the schools of districts, divisions, and counties?

(3) What variations in the unit costs of total expenditure, and the function-object expenditure classifications were evident among the schools of the total sample, and between the schools of districts, and divisions, and counties?

(4) What variations in the unit costs of direct instructional expenditures for grade programs were evident among the schools of the total sample, and between the schools of districts, divisions, and counties?

(5) What variations in the unit costs of direct instructional expenditures for curricular, and selected non-curricular programs were evident among the schools of the total sample, and between the schools of districts, divisions, and counties?

iii. SIGNIFICANCE OF THE PROBLEM

In its report, the Minister's Committee on School Finance, (1969: 51-57) expressed a number of concerns related to expenditures on education:

(1) What resources should the province be providing to local jurisdictions to assist them in dealing with unique problems?

(2) What variations among local jurisdictions should dictate variations in the formula for disbursing funds?

(3) What human, physical, and financial resources are being utilized in the schools of Alberta?

(4) What variations exist in resource allocation to programs relative to other programs in a system, among schools at different levels, among jurisdictions, and on a provincial basis?

(5) What variations in costs are evident among jurisdictions?

(6) How can the Province obtain greater insight into the operation of particular programs for which it may be providing millions of dollars?

(7) Are small schools inimical to the equalization of educational opportunity?

The study of data produced by the cost analysis has a number of values for assisting decision-makers at all levels in education in addressing themselves to these problems. Hill and Mattox (1967: 506) suggest that:

> School . . . officials use information about the relationships between costs and achievements. Only with such information may objectives be pursued more effectively and efficiently. The allocation of scarce resources may be decided in terms of the expected benefits; the effectiveness of the decision may be assessed in terms of its results. . . . Today, school . . . officials do not have enough information to make and check the effectiveness and efficiency of their plans.

Fowlkes and Hansen (1952: 472) suggest that cost analysis data may assist in the securing of maximum educational opportunity and a reasonable guarantee of operating efficiency. Vaizey (1967: 11) indicates that within the context of limited resources, the making of choices is facilitated by assessment of the cost situation. Mort, Reusser, and Polley (1960) conclude that, "The knowledge of the cost of an element in the school program is a factor in the determination of the policy that is adopted for its management."

Myroon (1969: 7-8) summarized the value of analyzing cost data, when he suggested that the data could assist in:

> 1. achieving an operating efficiency which results in optimal quality, benefit and opportunity being attained from limited resources,
> 2. establishing an adequate . . . educational program,

3. determining the adequacy or inadequacy of school revenues and expenditures,
4. meaningfully informing concerned persons about educational expenditures,
5. evaluating the competence of school business management.

This study attempted to contribute to the knowledge of decision-makers by:

(1) by comparing costs in a variety of types of schools;

(2) by assessing the variation in school factors which may have an influence on costs;

(3) by applying measures which better enable interpretation of variations among schools in cost and non-cost terms.

IV. DEFINITION OF TERMS

This section does not include all the terms which are defined in this study. The remainder of the terms have been defined in the sections of the chapters where they are most appropriate.

Research Project: refers to the unit cost analysis studies conducted at the University of Alberta in 1969-70. The Project was under the supervision of Dr. P.J. Atherton of the Department of Educational Administration.

This Study: refers to the study conducted by this investigator and reported in this thesis.

Cost: refers to the amount of money or money's worth incurred for any object, activity, or service. It is used synonymously with expenditure.

Program Budgeting: refers to a framework for agency-wide

systems analysis based on a program budget format that integrates conventonal budgets with the programs or services of the organization.

Unit Cost Analysis Studies: the cost studies completed by the various researchers, as part of the Research Project.

Sampling Project: the classification and sampling of Alberta school jurisdictions for the purpose of selecting typical school jurisdictions for unit cost analysis. The sampling project was completed by M.E. Eurchuk.

Operational Expenditures: refers to the total of all expenditures made during a given period of time, excluding expenditures for capital outlay and debt service.

Research Project Sample: includes the school jurisdictions where unit cost analysis studies were completed. The final sample included two school divisions, four counties, and three urban school districts.

Cost Analysis Model: refers to the model developed by Myroon and applied by the various researchers in the Research Project.

Salary: the total amount regularly paid to an employed individual, before deductions, for personal services rendered while on the payroll of the employer.

Urban: in this study refers to school jurisdictions in cities. In this instance, the three School Districts were from urban areas.

Rural: in this study is defined as school districts outside of

city districts. In this case, the classification includes School Divisions and Counties.

Qualifications: refers to the number of years of training of teachers recognized for salary purposes.

Experience: the number of years for salary purposes for which a teacher has been teaching. Most salary contracts stipulate a maximum of ten to twelve years.

Formula: refers to the Foundation Grant Formula utilized in Alberta for determination of the level of support or disbursement of funds to school jurisdictions.

Grade Divisions: the groupings of the grades from one to twelve according to Division I (Grades 1 - 3), Division 2 (Grades 4 - 6), Division 3 (Grades 7 - 9), and Division 4 (Grades 10 - 12).

Grade Range: refers to the range of grades offered by a school. The most common classifications of schools by grade range are: elementary (Grades 1 - 6), junior high (Grades 7 - 9), senior high (Grades 10 - 12), elementary-junior high (Grades 1 - 9), junior-senior high (Grades 7 - 12), Grades 1 - 12 schools, and Grades 1 - 8 schools. Other combinations such as Grades 1 - 11 are also found in Alberta, but less commonly than the former types.

Implementary Expenditures: those costs which cannot be directly assigned to a subject or curricular program, e.g., plant operation expenditures cannot be directly charged to a program without use of proration techniques (Duke, 1970: 8).

Classroom Units: are defined for Grades 1 - 6 as the number of pupils enrolled in schools in the school authority divided by 26; where the remainder is less than 26 but more than 13, one half of a classroom unit is added to the total; for Grades 7 - 9, the total is multiplied by 1.2; for Grades 10 - 12, the total is multiplied by 1.8 (School Foundation Fund Regulations, Order in Council 671/72: 3 - 4).

Measures of Central Tendency: used in this study to refer to measures of central location. The measures of central tendency used in this study were the arithmetic mean and the median.

V. SUMMARY OF CHAPTER I

Public and government concern with the increase in educational expenditures has produced a demand for analysis of costs in a manner that enables decision-makers to more completely assess the efficient use of limited resources. The cost analysis Research Project was designed to compile data which could permit decision-makers to make more meaningful decisions in the allocation of scarce resources.

Among the concerns expressed about resource allocation is a concern with the equity of services available to students from different jurisdictions and the basis of provincial support for these services. Central to decision-making relative to these concerns is a knowledge of the variations in resources being applied to school jurisdictions and in the product of the educational system.

The problem of this thesis was to determine what variations were evident among the unit costs of the schools of the sample of Alberta school jurisdictions included in the cost analysis Research

Project completed at the University of Alberta in 1971.

Succeeding Chapters

Chapter 2 deals with the research design of this study, including the methodological framework, and the delineation of the study. Chapter 3 outlines the sources of the data, procedures for data collection, and the treatment of the data. Chapter 4 contains the analysis of the data. Chapter 5 includes the summary of findings, conclusions, and the implications. Included in the appendices are the primary data used in this study, as well as additional data related to the study.

Chapter 2

THE RESEARCH DESIGN

In Chapter I it was suggested that among the uses of cost data were (1) comparisons of costs within a school system, and (2) comparisons of a system's costs with those of other systems. This study is of the latter type, that is, analyses of data were conducted on the basis of comparisons among systems rather than within a system.

This chapter contains five sections. Section one contains a description of the selection of the school rather than the school system is the basis for comparison of unit costs. Section two deals with the determination of the expenditure classifications for analysis. Section three contains the selection and definition of the performance or program classifications of expenditures. Section four deals with selection and determination of the statistics descriptive of the data. The fifth section contains the delineation of the study. Included in this section are the assumptions, delimitations and limitations of this study.

I. SELECTION OF THE BASIS FOR COMPARISON: SYSTEMS OR SCHOOLS AND SCHOOL CLASSIFICATIONS

This section contains two parts. Part one deals with the selection of the level, system or school, for analysis. Part two deals with the classification of schools for purposes of comparison of costs.

Selection of System or School Level

One of the uses of unit cost analyses is to compare the data from one or a number of systems with the data from other systems. Fundamental to this type of comparative analysis is the selection of the basis for comparison. The trend in the classification of expenditures has been to include, along with the "function-character-object" classification, classification of expenditure by performance, and by location. This combination of classifications tends towards a Program Budget framework for classifying expenditures.

The cost analysis studies conducted at the University of Alberta in 1969, utilized with some variation, a program budget format in cost analyzing the expenditures of the selected jurisdictions. That is, the studies utilized a cost structure in which an attempt was made to relate the allocation of resources (inputs) to programs or activities (outputs), according to the location of the expenditure.

However, not all of the studies carried forward the extent of the cost analysis process to the same level. Only at the location, or school level, were elements of a program budget cost structure evident in all the studies. Even in this instance, however, the only reasonable basis for comparisons were according to the function-object classifications, and direct instructional expenditures by grade, and program. Indirect and implementary expenditures were not consistently available by grade and program throughout the sample.

The aforementioned criteria formed the essential conditions for selection of individual schools as the basis for comparing costs. In addition, selection of the school facilitated analyses of the function-object and performance-based classifications of expenditures according

to the type of school by grade organization and by enrollment levels.

Classification of Schools

The unit cost analysis studies provided data by school according to a number of dimensions. On the basis of the sampling project, the schools within the studies were identified as either County schools, schools from School Divisions, or as schools from urban School Districts. Aggregation of the data of schools from counties and school divisions enabled analyses to be conducted on the basis of rural and urban classifications.

The schools could also be categorized according to two other dimensions: (1) Type of school according to the range of grades offered; and (2) classification according to enrollment levels, i.e., size of school. In regard to the first dimension, the diversity of types of school, elementary, junior high, senior high, etc., enabled analysis to be conducted in terms of the costs associated with different levels. Figure 1 outlines the classification of schools according to the type of school dimension.

The second dimension, categorization of schools by enrollment levels, provided a basis for comparing school costs according to size of school. In order to classify the schools according to size, it was necessary to rank the schools in terms of enrollment. However, the range of enrollments was such that classification of the schools according to enrollment intervals was essential to obtain comparability of size. Conventions regarding intervals suggested that a number of intervals between 10 and 20 should cover the total range of observations (Ferguson, 1966: 28). Accordingly, the difference between the

Type of School	Grade Range
Elementary	1 - 6
Junior High	7 - 9
Senior High	10 - 12
Elementary-Junior High	1 - 9
Junior-Senior High	7 - 12
1 - 8	1 - 8
1 - 12	1 - 12
Other	varies[a]

[a] For a further breakdown for this study see Table 38

Figure 1

Type of School By Grade Range

highest and lowest enrollments was calculated, and a range for the enrollment interval was selected. The current Classroom Unit (CRU) utilizes a unit of 26 pupils; on this basis, a school that enrolled approximately 200 students would have 8 Classroom Units (CRU's). On the basis of this standard and conventions regarding the number of intervals (Ferguson, 1966: 29), an enrollment interval range of 200 was selected. Division of the range of enrollments by 200 produced 13 intervals, ranging from 0 to 2599 (2431 ÷ 200 = 12.15 = 13 intervals). Conventions regarding the start of the intervals (Ferguson, 1966: 28), state that each interval begin with a multiple of the size of the interval. In this case, with an interval of 200, each interval began with a multiple of 200, i.e., 200, 400, 600, etc. The enrollment intervals, as well as the number of schools, grade range, and range of staff complement in each interval are delineated in Table 1.

II. DETERMINATION OF THE AREAS AND UNIT WITHIN SCHOOLS FOR ANALYSIS

A Program Budget format includes two basic components: (1) The function-object classification of expenditures; and (2) the program or performance-based classification. This section deals with a selection and definition of the elements of the function-object classification of expenditures for the purposes of this study. Included in this section is a description of the maximum function-object classification system used in the cost analysis studies.

Selection and Definition of Function-Object Classifications

The cost analysis studies utilized a modified function-object classification of expenditures adapted from Reason and White (1957: 27-35). Figure 2 summarizes the system used by the studies as one basis for analyzing expenditures.

For the most part, the studies adopted a modification of the illustrated classification in order to maintain uniformity in classification of expenditures. Series 300 (Attendance Services), Series 400 (Health Services), and Series 1100 (Community Services) were excluded from the classification as they were not considered applicable to the studies. Series 900 (Food Services), and Series 1000 (Student Body Activities) were excluded from all but the Edmonton study. In addition, the Edmonton study was the only one to use Series 1300 (Debt Services From Current Funds). However, the Thorhild and Wetaskiwin studies used an equivalent category of expenditure as Series 400, (Capital Out Of Current Revenue). Series 1400 (Outgoing Transfer Accounts) was excluded from 4 of the studies.

The final selection of the series for this study included Series 100 (Administration), Series 200, (Instruction), Series 500 (Pupil Transportation), Series 600 (Plant Operation), Series 700 (Plant Maintenance), and Series 800 (Fixed Charges).

The level of detail to which the analysis could extend within each series was restricted by the variations which occurred from study to study within each series. For example, within Series 220 (Indirect Salaries), the Edmonton study included salaries for Department Heads, and also Audio-visual and Television personnel; the Peace River study included the Supervisor of Elementary Instruction, and the

Expenditure Accounts	
Series	100 ADMINISTRATION
	110 Salaries
	(a) Academic
	(b) Support
	120 Expenses
	200 INSTRUCTION
	210 Direct Salaries
	220 Indirect Salaries
	(a) Administration
	(b) Department Heads
	(c) Librarian
	(d) Guidance Counsellor
	(e) Substitutes
	(f) Other Instructional Staff
	i) Interns
	ii) Audio-Visual and Television
	(g) Bursaries, Loans, Sabbaticals
	(h) Clerical
	(i) Coordinators
	230 Direct and Indirect Expenditures
	(a) Library Equipment and Supplies
	(b) Textbooks
	(c) Audio-Visual and Equipment and Supplies
	(d) Instructional Supplies and Equipment
	(e) Correspondence Courses
	(f) Other
	300 ATTENDANCE SERVICES
	310 Salaries
	320 Expenses
	400 HEALTH SERVICES
	410 Salaries
	420 Expenses
	500 PUPIL TRANSPORTATION
	510 Salaries
	520 Other
	(a) Contract Buses
	(b) Allowances

Figure 2

Function-Object Classifications of Expenditures
Used in the Cost Analysis Studies*

Series	600	PLANT OPERATION
		610 Salaries
		620 Utilities
		(a) Fuel
		(b) Light and Power
		(c) Telephones
		(d) Water
		630 Supplies
		(a) Custodial
		640 Central Office
		650 Other
	700	PLANT MAINTENANCE
		710 Salaries
		720 Repair and Replacement of General Equipment and Furniture
		740 Other
	800	FIXED CHARGES
	900	FOOD SERVICES
		910 Salaries
		920 Other
	1000	STUDENT BODY ACTIVITIES
	1100	COMMUNITY SERVICES
	1300	DEBT SERVICE FROM CURRENT FUNDS
	1400	OUTGOING TRANSFER ACCOUNTS

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

Figure 2 (concluded)

Grande Prairie School District study included coordinators. In Series 500 (Pupil Transportation), the sub-series included Daily Costs in the Lacombe - Mountain View study, Co-Curricular transportation in the Grande Prairie School District study, and 510 (Salaries) in the Edmonton study.

As a result of these differences, only in Series 200 (Instruction) were levels other than the first level of accounts included in the analysis. Within Series 200, only second level accounts were included. At this level, sufficient aggregation of expenditures had occurred to permit meaningful analysis. In addition, each of the studies included this level of information for each sub-series. The final selection of the series for analysis is illustrated in Figure 3.

100 Administration. This category included all the functions which have to do with the general regulation, direction, and control of system-wide activities. Included are expenditures for salaries and expenditures for the school board or committee, and central office staff.

200 Instruction. This series included expenditures associated directly with, or in support of, the teaching of students or the improvement of teaching quality. Total salaries, or prorated portions of salaries, of all resident personnel, including teachers, administrators, guidance counsellors, technical personnel, substitute, part-time, and temporary teachers, interns, and clerical personnel, were contained in this classification. In addition, the costs of supplies, equipment, and materials associated with the programs of instruction are included.

210 Direct salaries. "Direct Salaries" included the total

Expenditure Accounts		
Series	100	ADMINISTRATION
	200	INSTRUCTION
		210 Direct Salaries
		220 Indirect Salaries
		230 Direct and Indirect Expenditures
	500	PUPIL TRANSPORTATION
	600	PLANT OPERATION
	700	PLANT MAINTENANCE
	800	FIXED CHARGES

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

Figure 3

Selected Function-Object Classifications for this Study

salaries, or prorated portions of salaries, of all personnel who rendered direct instructional services to students. The total salaries of full-time, temporary, and part-time teachers, as well as the prorated portion of building administrators', counsellors', consultants', librarians', consultants', technical personnel and department heads' salaries, were included in this classification.

220 Indirect salaries. The "Indirect Salaries" category included the salaries or prorated portions of salaries of personnel who are only indirectly concerned with instructional activities. Among the personnel whose salaries were included in this classification are building administrators, counsellors, interns, substitutes, librarians, consultants, supervisors, and school clerical personnel.

230 Direct and indirect expenditures. This series included all expenditures incurred for instructional activities, or the improvement of the quality of instruction, either directly or indirectly. This included expenditures for textbooks, school library books, supplies and book repairs, audio-visual materials, supplies utilized in the instructional process (such as paper, pencils, test tubes, chemicals, balls, bats, and stencils), equipment other than that considered capital outlay, correspondence courses supplies, and other instruction-related expenditures which could not readily be allocated to another expenditure category.

500 Pupil transportation. This category was concerned with the transportation of students between home and school, or on trips of a curricular or co-curricular nature. Included were salaries for

supervisors, drivers, mechanics, clerks, and others, expenditures for contracted services, grants in lieu of transportation, replacement of vehicles, insurance, maintenance and operation of vehicles and buildings, and others.

600 Plant operation. This classification included those activities associated with keeping the plant open and ready for use. It included activities such as heating, cleaning, disinfecting, lighting, power, communications, water, sewage, caring for grounds, moving furniture, operation of trucks, and other activities repeated regularly on a daily, weekly, monthly, or seasonal basis. Repair and replacement of equipment and facilities were excluded. Included were the salaries of plant engineers, custodians, and other similar personnel, utilities such as water, sewage, telephones, heat, and electricity, custodial supplies, expenditures associated with the operation of the central office of the district, operation of school vehicles, employee in-service, and express, cartage, and freight expenses. The expenditures were associated with school plants, central office, warehouses, garages (excluding pupil-transportation garages), maintenance shops, teacherages, dormitories, and other such buildings.

700 Plant maintenance. "Plant Maintenance" consisted of those activities concerned with maintaining the grounds, buildings and equipment in a condition approximating the original state, either through repair or replacement. Expenditures associated with this category included salaries for carpenters, painters, electricians, groundskeepers, and other similar personnel, expenses for the replacement of instructional equipment such as desks, chairs, typewriters, projectors, trucks,

business machines, etc., expenses associated with equipment for "administration," "attendance," and "health services," and other expenditures related to materials and equipment associated with the care and upkeep of grounds, buildings, and equipment. Expenses for contracted services for "Plant Maintenance" were included in this category.

800 Fixed charges. Included under "Fixed Charges" were those expenses which, because they were of a generally recurrent nature, are not readily allocable to other expenditure accounts. The category included expenditures such as employee insurance, property insurance, liability insurance, and rent or tax on land and buildings.

III. SELECTION AND DEFINITION OF THE PERFORMANCE OR PROGRAM CLASSIFICATIONS OF EXPENDITURES

A program budget format for analyzing unit costs utilizes, in addition to the function-object classification of expenditures or conventional accounting format, a performance based or program classification of expenditures (Duke, 1970: 29-30). This section of the chapter contains four parts. The first part deals with the selection of the program classifications to be used as a basis for analyzing the costs of the schools in sample. The second part contains a definition of the programs of the dimensions selected. The third part deals with determination of the elements of the function-object classification of expenditures to be included in the program classification of expenditures. The fourth part deals with selection of the appropriate pupil unit for expression of unit costs for the classifications.

Selection of the Program Classifications

The cost analysis studies, with some variation, utilized three dimensions of programs: (1) Grade, (2) Curricular, and (3) Type of student.

Grade dimension. The program categories according to grade included Grades 1 - 12. Unit costs were expressed in terms of individual grade level, Grades 1, 2, 3, etc., and by grade division, Division I (Grades 1 - 3), Division II (Grades 4 - 6), Division III (Grades 7 - 9), and Division IV (Grades 10 - 12). However, analyses based on this latter classification were rendered difficult because not all of the studies presented data relative to grade divisions by school. Consequently, the grade dimension selected was the single grade level.

Curricular dimension. Two categories of the curricular dimension were utilized in the studies. The first category included designation of program cost by individual subject or course, for example, Grade 4 Spelling, or Mathematics 10. For the most part only "direct instructional" costs were allocated at this level. The second category in the curricular dimension was represented by an aggregation of subjects into curricular programs. For example, the Social Sciences program included, at the elementary school level, the courses Enterprise, Social Studies, and Health; at the Senior High school level, the Science program included, among other courses, Biology 10, Chemistry 20, Physics 30, and Science 11. In all, 12 programs were selected to be included in this study, 10 of which were curricular based, one was type of student based, and one was non-curricular. The voluminous number of individual courses precluded analysis of costs at the course level. As

a result, the curricular dimension selected for this study was the program or "course cluster" level. The 12 "curricular" programs selected are illustrated in Figure 4. The breakdown of curricular programs by course and grade level is contained in Tables 51 to 53, Appendix F.

Type of student dimension. Within the context of various instructional levels, a variety of types of students were discernible according to the nature of special types of courses or program routes which they required. For example, at the elementary school level, opportunity classes, and remedial courses were often necessary to compensate for the slower learning capabilities of some students. At the senior high school level, different student-program routes were frequently identified which lead a student to a graduate diploma according to identifiable academic, general, or business/technical disciplines.

Various types of students according to special classes or courses were identified in the cost analysis studies. At the elementary and junior high school levels, this dimension of program was most uniformly identified by a special class, such as an opportunity room, or a remedial course. Most of the studies which included Grades 1 - 9 instruction identified this dimension. At the senior high school level, the identification of types of students other than regular was less uniform. Some of the studies identified students by student-program route, while others identified remedial or special class programs. Because of the lack of uniformity throughout the studies in identifying student-program routes at the senior high school level, this category of type of student was not included in this study. The only category included was the special course or class definition.

Programs
(1) Language Arts
(2) Social Sciences
(3) Mathematics
(4) Science
(5) Physical Education
(6) Fine Arts
(7) Second Languages
(8) Home Economics
(9) Industrial Arts
(10) Vocational Education
(11) Special Classes
(12) Non-Instruction

Figure 4

Selected Instructional Programs

In addition to the curricular programs, and the one category of type of student dimension, one program of non-curricular orientation, "Non-instruction" was included. The majority of schools included this dimension of program definition.

Allocation of Function-Object Classification of Expenditures to Program Classifications

The cost structure of a program budget format links function-object classifications with program categories. Ideally, all expenditure inputs should be allocated to the program categories in order to obtain a description of the resource utilization by program.

In the cost analysis studies, the most uniformity in allocation or proration of function-object expenditures to programs was in the category of "Direct Salaries" or direct instructional costs. While some of the studies allocated "Indirect" and "Implementary" expenditures to programs, insufficient uniformity existed to enable these classifications by program by school to be compared. For this reason, only "Direct Salaries" or direct instructional expenditures were utilized as a basis for comparing program costs among the schools in the sample.

The technique used for prorating "Direct Salaries" to programs was the Faculty Workload Survey. This technique used instructional time devoted to courses or activities within a program as a basis for prorating direct instructional salaries to programs. While the number of courses in programs varied from school to school, consistency in including particular courses in programs produced uniformity in cost allocations.

Selection of the Per Pupil Units for Expression of Unit Costs

Enrollment as of a specified date was used by most of the studies as a basis for determining an appropriate pupil unit for computing unit costs. This method was modified somewhat in the Edmonton study where enrollments were determined by averaging enrollments as of December 31, 1969 and February 28, 1970. Two types of enrollments were used by the studies, grade enrollments and subject enrollments. The grade enrollments were aggregated to produce school enrollments.

The unit costs reported in the studies were determined by a variety of per pupil dimensions. Unit costs by aggregate expenditure classifications by school were reported in terms of total school enrollment. The unit costs by grade classification were expressed by grade enrollment. Unit costs by curricular programs were expressed either according to the number of pupils enrolled in the course, by the number of pupils enrolled in the program per grade, or by the number of students enrolled in the school. At the subject or course level, unit costs were most commonly expressed in terms of the number of students enrolled in the course.

At the program level, where courses were clustered, the resultant number of students represented a duplication of some or many individual pupils. For example, in one junior-senior high school (Grades 7 - 9), there were 289 pupils enrolled, and 400 pupils enrolled in the courses that made up the language arts program. In order to obtain comparability on a school basis, total school enrollment was selected as the basis for reporting unit costs in the program areas. While this dimension of enrollment tended to reduce the per pupil cost in some

programs, it had the advantages of eliminating the duplication of students within programs, and of providing a uniform basis on which to compare program costs. In addition, for some of the studies, data were not available on the number of pupils enrolled per program exclusive of the duplication of individuals.

IV. DETERMINATION OF PARAMETERS DESCRIPTIVE OF THE DATA

The variables selected for investigation in this study produced distributions of expenditures and other data which permitted analysis of the similarities and differences among the schools and among groups of schools. Yamane (1967: 36) states that if we can identify adequate characteristics that characterize distributions, we may use these characteristics to explain the performance of the individuals, instead of the distribution itself.

Two types of parameters were selected as the basis for analyses in this study:

(1) Measures of central location; and,

(2) Measures of dispersion or variation.

Measures of Central Location

Yamane (1967: 36) describes measures of central location as "central points of a frequency distribution that will characterize the distribution." Ferguson (1966: 45) describes measures of central location as averages. Ferguson (1966: 45) further states:

> In general, an average is a central reference value which is usually close to the point of greatest concentration of the measurements and may in some sense be thought to typify the

> whole set. For certain purposes a particular measurement may be viewed as above or below the average. Averages in common use in . . . education are the arithmetic mean and median. . . . By far the most important and widely used measure of central location is the arithmetic mean.

The arithmetic mean or "mean" as it is used in this study, was one of the measures of central location used in this study. The mean is the sum of all the observations divided by the number of observations.

Yamane (1967: 47) states that one "characteristic of the mean is that it is affected by all the values. In particular, it is affected by extreme values." He goes on to state (1967: 47):

> In such cases where the frequency distribution is skewed and has extreme values, a measure of central location called a "median" is in more cases more suitable.

As many of the distributions in this study were characterized by skewness, the median, and the mean, were selected as a measure of central lcoation. The median is "a point on a scale such that half the observations fall above it, and half below it (Ferguson, 1966: 54).

Measures of Dispersion of Variation

Measures of central location, such as the mean and median, help to locate the distribution. However, Yamane (1967: 59) suggests that:

> . . . it could have been that all the [values of the distribution] were just about equal, or that some were very low and others were very high. In the first case, the scatter of the variable . . . would be small, and in the second case, the scatter would be large.

The scatter pattern within distributions is called "dispersion" in statistics (Yamane, 1967: 59).

Ferguson (1966: 62) states that:

> Among the possible measures used to describe . . . variation, are the range, the mean deviation, and the standard deviation. The most important of these is the standard deviation.

The measures of variation or dispersion selected for this study were the range and the standard deviation.

Range. The range is "the difference between the maximum value and the minimum value of the data (Yamane, 1967: 59). Given two variables whose means are approximately the same, it is possible to determine by examination of the range to ascertain whether one variable is more widely dispersed than the other. However, the range does not indicate if the values are uniformly dispersed (Yamane, 1967: 60).

Standard Deviation. Yamane (1967: 62) defines "deviation" as the difference between a value and the mean of a distribution. However, in the analysis of deviations, the calculation of the "variance" produces a statistic in squared units (Yamane, 1967: 62-63). Ferguson (1966: 66) states:

> For many purposes it is desirable to use a measure of vatiation which is not in squared units, but is in units of the original measurements themselves. We obtain this result by taking the square root of the variance which is called the sample "standard deviation."

Ferguson (1966: 75) suggests that the "standard deviation is a more stable or accurate estimate of the population parameter than other measures of variation." In addition, as a measure descriptive of a distribution, Yamane (1967: 72) observed that "the smaller the standard deviation, the smaller the scatter (dispersion), and the larger the standard deviation, the larger the scatter (dispersion)."

Standard Scores. One of the limitations in comparing data from different distributions is the difference in individual values. One of the techniques used to obtain comparability of observations is to convert individual values to "standard scores." Ferguson describes the "standard score," as, a deviation from the mean divided by the standard deviation . . ." The effect is to produce a distribution of values with a mean of zero and unit standard deviation (Ferguson: 73). In effect, we are using the standard deviation as the unit of measurement (Ferguson: 73).

V. DELINEATION OF THE STUDY

This section contains three parts, the assumptions, delimitations, and limitations of this study.

Assumptions

The value of this study is, in part, based on the validity and accuracy of the data collected in the unit cost analysis studies. The general assumptions of this study were that:

(1) Standards for determining and reporting unit costs in the studies were uniform;

(2) The various unit costs estimated for each school were valid factors for comparisons among schools;

(4) The statistics selected as descriptive of the data were valid factors for comparisons among the distributions.

Delimitations

This study was delimited to:

(1) Data reported by the cost analysis studies of the Research Project, which were completed at the inception of this study.

(2) Data relative to the expenditures in schools included in the studies for the school year 1969-1970.

(3) Non-cost data related to the schools in the studies.

(4) Expenditures for administration, instruction, pupil transportation, plant operation, plant maintenance, and fixed charges.

(5) Direct instructional expenditures for grade and instructional programs.

(6) Cost figures, not cost-utility, cost-effectiveness, or cost-benefit analysis.

(7) The analysis of descriptive data, indicating differences, including the means, medians, ranges, standard deviations, and standard scores of the distributions.

Limitations

Hull (1961: 372-75) suggested, among other limitations, four limitations to the uses of unit-cost studies:

(1) The use of cost analyses may suggest that cost is the most important element in education.

(2) Charging all expenditures to instruction may obscure and distort real instructional costs.

(3) Cost analysis data may lead to incorrect interpretation, abuse, and the establishment of inappropriate relationships.

(4) The availability of cost data may lead to excessive desire to reduce costs.

(5) The tabular data represent average costs per pupil calculated according to the total enrollment of the school and not according to the course or program enrollment.

(6) While the data allow generalization to types of school authority such as Districts, Divisions, and Counties, they do not allow generalization to all schools.

The unit cost analysis studies reported two limitations:

(1) The data for the studies were idiosyncratic, and therefore appropriate only for the year and areas in which the studies were conducted.

(2) The studies were limited by the accuracy of the data and information supplied, and by the researchers' abilities to prorate and interpret the data.

Chapter 3

DATA SOURCES, COLLECTION, AND TREATMENT

This chapter contains three sections. Section one deals with the source of the raw data for this study. Section two contains the procedures for collection of the data for this study. In section three the procedures for treatment of the data are reported.

I. DATA SOURCES

The sources of the data were the unit-cost analysis studies completed as part of the Research Project. Nine studies in all were completed as part of the Project. Six of the unit-cost analysis studies were completed as part of the requirements for the degree of Master of Education by graduate students in the Department of Educational Administration, University of Alberta. With the exception of the Treleaven study, which analyzed two jurisdictions, each of the aforementioned studies contained an analysis of one school jurisdiction. One study (Duke, 1970) was completed, as part of the requirements for the degree of Doctor of Philosophy, in the Department of Educational Administration, University of Alberta. The remaining two analyses were conducted under contract with Dr. P.J. Atherton, University of Alberta, by G.B. Hawley.

In general, the sources of the data were the tables of the studies. However, in some cases it was necessary to consult with the

researcher of a study or to examine the data used in a study in order to obtain the necessary information.

II. COLLECTION OF THE DATA

The collection of unit costs for the function-object expenditure classifications was simplified in that each of the studies reported per pupil expenditures for the selected classifications by school. The collection of per pupil direct instructional expenditures by program classifications by school was rendered more difficult as not all the studies aggregated course costs to the program level.

In the instances where these aggregations were not accomplished, it was necessary to manually compute the program costs by school. This was accomplished by multiplying the per-pupil course cost by the number of students in the course. For costs by curricular program, the total cost for courses of a program in a school, computed by summing the individual course costs in the program, was divided by the number of students enrolled in the school, to produce a cost per student enrolled by program. For grade costs, the aggregate direct instructional cost of all courses in a grade, regardless of program, was computed by summing the costs of all courses. The sum of these costs was then divided by the number of students enrolled in the grade to produce a per pupil direct instructional cost per grade.

In addition to expenditure data, auxiliary data related to the schools were also obtained from the tables of the studies. This included statistics related to average teachers' salaries, qualifications and experience, the enrollments and number of teachers per school, and the grade range offered in the school.

III. TREATMENT OF THE DATA

The data collected from the unit cost analysis studies, were coded and punched on computer cards. A computer program developed by C. Prokop of the Department of Educational Administration, University of Alberta, was used to obtain the statistics selected as descriptive of the data. A total 39 variables were included in the analysis.

The computer program was designed to determine the number of schools, mean, median, range, and standard deviation of the distribution of each variable for the total sample. In addition, each distribution was converted to standard score form. The next step was to re-classify the schools as urban or rural and compute the number of schools, mean, median, range, and standard deviation for each variable by the classifications.

The third stage of the treatment of the data was to re-classify the schools by School District, School Division, or County, and compute the statistics for each variable by these classifications. A fourth step required the classification of the schools by type of school according to grade range, and computation of the selected parameters for each variable by these classifications.

The final step required classification of the schools by enrollment intervals. The mean, median, and range of selected function-object expenditures were computed for each of the enrollment frequencies containing schools. These computations were calculated manually, rather than as part of the computer analysis.

Where formulas were necessary, the following formulas were used as the basis for calculating the parameters descriptive of the data.

The formulas are adapted from Ferguson (1966: 45-73).

Arithmetic Mean

Where N equals the number of measurements in the distribution, $\bar{X}$ equals the arithmetic mean, and X_1, X_2, X_3, . . ., X_N represent the values, then,

$$\bar{X} = \frac{X_1 + X_2 + X_3 + \ldots + X_N}{N}$$

Standard Deviation

Where S equals the standard deviation, $(X-\bar{X})^2$ is a deviation from the mean squared, Σ equals the operation of addition, N equals the number of measurements, and $\sqrt{\ }$ is the symbol for square root, then,

$$S = \sqrt{\frac{\Sigma (X - \bar{X})^2}{N - 1}}$$

Standard Scores

Where $X - \bar{X}$ is a deviation from the mean, s equals the standard deviation, and Z equals a standard score, then,

$$Z = \frac{X - \bar{X}}{s}$$

The mean represents the average of the means of unit costs of the schools included in the sample. In the same fashion, the standard deviation is the deviation of the means of the unit costs from the mean.

Chapter 4

ANALYSIS AND FINDINGS

This chapter is divided into six sections relative to the analysis of the data pertaining to the schools included in this study. The analyses occur relative to the classifications of the schools according to the sample, urban, rural, Divisions, Districts, Counties, enrollment intervals, and grade ranges.

The first section deals with data relative to the distributions of the schools according to various school classifications. Section two contains an analysis of the enrollments, number of teachers, and pupil-teacher ratios. Section three analyzes the average salaries, qualifications, and experience of the teachers in the schools.

Per pupil expenditures by aggregate expenditures classifications are analyzed in section four. The fifth section contains an analysis of the per pupil direct instructional expenditures by grade programs. Section six deals with an analysis of the per pupil direct instructional expenditures by curricular programs.

I. DATA PERTAINING TO THE DISTRIBUTIONS OF THE SCHOOLS ACCORDING TO THE SCHOOL CLASSIFICATIONS

This section is composed of three parts. Part one deals with data relative to the numbers of schools in each of the classifications of the sample. Part two deals with the number of schools offering grade and curricular programs according to the classifications. Part

three contains an analysis of data, related to the classification of schools by enrollment intervals.

Number of Schools By Classification

Tables 35 to 38, Appendix A, present data relative to the number of schools in the classifications of schools used in this study. The sample contained 69 schools, composed of 57 schools in rural areas, and 12 in urban School Districts. Of the 57 rural schools, 21 were from School Divisions, and 36 were from Counties. 14 of the schools in the sample were elementary (Grades 1 - 6) schools, 4 were junior high (Grades 7 - 9) schools, 9 were senior high (Grades 10 - 12) schools, 14 were combined elementary-junior high (Grades 1 - 9) schools, and 5 were combined juinor-senior high (Grades 7 - 12) schools. 7 of the schools offered Grades 1 - 8, and 11 offered Grades 1 - 12. Of the remaining 5 schools, 1 offered Grades 1 - 2, 2 offered Grades 1 - 11, 1 offered Grades 3 - 6, and 1 offered Grades 9 - 12.

Number of Schools By Programs

Tables 35 to 37, Appendix A, provide data with respect to the number of schools offering the grade and selected curricular programs in each of the classifications of schools.

Number of schools by grade programs. Of the 69 schools in the sample, Grade programs 1 to 6 inclusive were offered in 49 schools. 44 of these schools were from rural jurisdictions, while 5 were from urban dsitricts. 15 of the rural schools were from School Divisions, and 29 were from Counties. The Grade 7 program was offered in 43 of the sample schools, composed of 2 urban schools, and 41 rural schools. Of the

latter category, 12 schools were from School Divisions, and 29 were from Counties. 41 of the schools in the sample offered Grade 8, made up of 2 schools from urban School Districts, and 39 from rural jurisdictions; 12 of the rural schools were from School Divisions, and 27 were from Counties. Grade 9 was offered in 37 schools, of which 2 were from urban School Districts, and 35 were from rural areas; 9 of the rural schools were from Divisions, and 26 were from Counties. Grade 10 and 11 programs were offered in 28 of the sample schools, composed of 6 urban schools, and 22 rural schools; 7 rural schools were from Divisions, while 15 were form Counties. Of the 26 schools offering the Grade 12 program, 20 schools were from rural areas while 6 were from urban School Districts; 6 of the rural schools were from Divisions, while 14 were from Counties.

Curricular programs. All of the schools in the sample offered a basic core of programs which included Language Arts, Social Sciences, Mathematics, Sciences, Phisical Education, and Fine Arts, with one exception, a senior high school, which did not offer the Fine Arts program. The Second Languages program was offered in 38 schools, including 9 urban schools and 29 rural schools. Relatively few of the elementary and elementary-junior high schools offered this program, none of the Grades 1 - 8 schools, and 3 of the "other" types. The remaining types of schools all offered Second Languages.

Home Economics was offered in 21 rural schools and 7 urban schools. Most of the junior high, senior high, and junior-senior high schools offered Home Economics; 6 of the 11 Grades 1 - 12 schools offered the program. The program was offered in few of the other

categories of schools, and not at all in elementary schools. Similar patterns were evident in the offering of the Industrial Arts program; 24 of the schools offered this program composed of 17 rural schools and 7 urban schools. The Vocational Education program was offered in 30 of the sample schools, of which 24 were rural and 6 urban. With the exception of one senior high school, all junior and senior high schools offered this program. In contrast to the Home Economics and Industrial Arts programs, all the Grades 1 - 12 schools offered Vocational Education.

Special classes were offered in 21 schools, of which 16 were rural schools and 5 urban schools. This program was offered in elementary schools to a greater extent than in any other type of school. Non-instructional activities were identified in 56 of the 69 schools of the sample; 51 of the 57 rural schools identified Non-instructional while only 5 of the 12 urban schools included Non-instruction as an activity. The majority of the elementary, elementary-junior high, Grades 1 - 12, and junior-senior high schools included this program, as did all the schools in the "Other" category. Relatively few of the other types of schools identified Non-instruction as a cost factor.

Schools by Enrollment Intervals

Table 1 provides data with respect to schools classified by enrollment intervals. Although the distribution of schools by enrollment intervals was uni-modal, its dominant characteristic was the marked positive skewness. 64 of the 69 schools in the sample were located in the lowest four enrollment intervals (0 - 799). All of the schools in these intervals were within ± 1 standard deviation of the mean. The remaining five schools ranged among the seven highest intervals, with no more than 1 school per interval. There were no schools in four of the

Table I

NUMBER OF SCHOOLS, GRADE RANGE, NUMBER OF TEACHERS OR RANGE OF STAFF COMPLEMENT BY ENROLLMENT INTERVALS FOR THE TOTAL SAMPLE*

Enrollment Interval	No. of Schools in Interval	Grade Range	No. of Teachers or Range
2400 - 2599	1	10 - 12	148
2200 - 2399	1	10 - 12	134
2000 - 2199	1	10 - 12	90
1800 - 1999			
1600 - 1799			
1400 - 1599	1	10 - 12	75
1200 - 1399	1	10 - 12	68
1000 - 1199			
800 - 999			
600 - 799	8	1 - 12	26 - 48
400 - 599	14	1 - 12	19 - 35
200 - 399	22	1 - 12	10 - 21
0 - 199	20	1 - 11	2 - 10

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

enrollment intervals. The five schools whose enrollments were atypical of the majority of schools, virtually each interval contained at least one of each type of school according to grade range. No one of these intervals contained a preponderance of any single type of school.

No distinct patterns were evident in terms of the range of staff complements per enrollment interval. There was some overlap of the number of personnel among the lowest four intervals. Any overlap was accounted for by the idiosyncrasies of individual schools.

II. ANALYSIS OF ENROLLMENTS, NUMBER OF TEACHERS, AND PUPIL TEACHER RATIOS

Tables 2 to 5 present the data with respect to enrollment, number of teachers, and pupil-teacher ratios.

Enrollments

The averages for enrollments for all schools in the sample were 445.20 and 340 for the mean and median respectively. The wide variation between the mean and the median indicates a distribution of enrollments markedly skewed to the right. Table I, which categorizes the schools by enrollment intervals indicates that the atypical enrollments in five higher enrollment intervals were largely responsible for the skewness. Enrollments in the sample ranged from 33 to 2464, with a standard deviation of 468.61. 64 of the schools in the sample were included in the lowest four enrollment intervals. These schools were all with $\pm$1 standard deviation of the mean. The remaining 5 schools, all senior high schools in the large urban sample, were above +1 standard deviation in enrollments.

Table 2

MEAN AND MEDIAN ENROLLMENTS, NUMBER OF TEACHERS, AND, PUPIL-TEACHER RATIOS FOR SAMPLE, RURAL, URBAN, DIVISION, DISTRICT AND COUNTY CLASSIFICATIONS*

School Classification	Enrollment		Number of Teachers		Pupil-Teacher Ratio	
	Mean	Median	Mean	Median	Mean	Median
All Schools	445.20	340	23.04	18	19.70	20.00
Rural	318.33	287	16.04	15	19.77	20.00
Urban	1047.83	697	56.33	40	19.32	19.55
School Division	257.95	276	13.14	15	19.79	20.50
School District	1047.83	697	56.33	40	19.32	19.55
County	353.56	345	17.72	18.5	19.76	19.50

*Source: Tables 39 - 41 (Appendix B, pp. 154 - 160).

Table 3

RANGE AND STANDARD DEVIATION OF ENROLLMENTS, NUMBER OF TEACHERS, AND PUPIL-TEACHER RATIOS FOR SAMPLE, RURAL, URBAN, DIVISION, DISTRICT AND COUNTY CLASSIFICATIONS*

School Classification	Enrollment		Number of Teachers		Pupil-Teacher Ratio	
	Range	s	Range	s	Range	s
All Schools	33 - 2464	468.61	2 - 148	25.92	13.2 - 27.4	2.62
Rural	33 - 799	195.34	2 - 37	9.20	13.2 - 27.4	2.73
Urban	172 - 2464	826.83	9 - 148	47.53	16.6 - 22.5	2.10
School Division	33 - 654	157.14	2 - 26	7.26	13.2 - 25.2	3.26
School District	172 - 2464	826.83	9 - 148	47.53	16.6 - 22.5	2.10
County	78 - 799	208.52	4 - 37	9.86	14.8 - 27.4	2.42

*Source: Tables 39 - 41 (Appendix B, pp. 154 - 160).

Table 4

MEAN AND MEDIAN ENROLLMENTS, NUMBER OF TEACHERS, AND PUPIL-TEACHER RATIO BY TYPE OF SCHOOL*

	Enrollments		Number of Teachers		Pupil-Teacher Ratio	
Type of School	Mean	Median	Mean	Median	Mean	Median
Grades 1 - 6	374.36	342.5	17.00	16.5	21.35	21.5
Grades 7 - 9	444.50	397.5	23.25	20.0	19.42	19.65
Grades 10 - 12	1,260.33	1,205.0	70.44	68.0	17.18	16.6
Grades 1 - 9	182.21	156.0	8.93	8	19.87	20.2
Grades 7 - 12	399.00	341.0	22.40	20	17.56	17.4
Grades 1 - 8	132.00	89.0	6.29	4	20.80	21.0
Grades 1 - 12	461.91	426.0	23.55	23	19.45	19.9
Other	361.20	349.0	17.00	17	20.46	21.2

*Source: Tables 39 - 41 (Appendix B, pp. 154 - 160).

Table 5

RANGE AND STANDARD DEVIATION OF ENROLLMENTS, NUMBER OF TEACHERS, AND PUPIL-TEACHER RATIO BY TYPE OF SCHOOL*

Type of School	Enrollment		Number of Teachers		Pupil-Teacher Ratio	
	Range	s	Range	s	Range	s
Grades 1 - 6	33 - 767	217.97	2 - 35	8.83	16.5 - 27.4	2.57
Grades 7 - 9	340 - 643	135.41	17 - 36	8.62	17.9 - 20.5	1.13
Grades 10 - 12	250 - 2464	850.46	19 - 148	46.78	13.2 - 22.5	3.04
Grades 1 - 9	90 - 481	102.18	5 - 21	4.23	14.8 - 23.0	2.29
Grades 7 - 12	245 - 684	174.48	15 - 35	7.99	16.3 - 19.5	1.19
Grades 1 - 8	62 - 391	115.50	3 - 18	5.25	17.8 - 22.6	1.69
Grades 1 - 12	259 - 799	155.21	13 - 37	6.79	17.8 - 21.6	1.30
Others	147 - 654	187.70	10 - 26	6.12	14.7 - 25.2	4.06

*Source: Tables 39 - 41 (Appendix B, pp. 154 - 160).

The averages of enrollment for rural schools, in both School Divisions and Counties, were below the sample averages, while those for urban Districts were above. The exception was the County median which was slightly higher than the sample median. The averages of enrollments were lowest in School Divisions, and highest in urban Districts. The urban District averages varied considerably from the sample averages and from each other; the mean, 1047.83, was more than 300 greater than the median.

The distribution of enrollments in urban schools was more widely dispersed than in rural schools, in terms of both range and standard deviation. The least deviation, 157.14, was found in enrollments within School Divisions, while the largest variation from the mean, 826.83, was among the schools in urban Districts.

Average enrollments tended to be higher where schools offered junior and/or senior high school grades. The presence of elementary grades tended to bring average enrollments down. Senior high schools tended to have the highest enrollments, with Grades 1 - 12 schools, junior high schools, and junior-senior high schools following in that order. Senior high schools showed the widest variation in enrollments, with elementary schools ranked second. The remainder of types of schools displayed considerably less variation.

Number of Teachers

The distribution patterns of the numbers of teachers in the schools paralleled the patterns for enrollments. For the total sample, the averages were 23.04 and 18, for the mean and median respectively. The averages of enrollments in urban schools were above the sample

averages, while those for rural schools were generally below the sample. The lowest averages were among the schools of School Divisions. Only in the urban District classification was any significant skewness noticeable. As was the case with the sample distribution, the urban distribution was positively skewed.

The number of teachers in the schools of the sample ranged from 2 - 148, with a standard deviation of 25.92. As was the case with enrollments, the broadest dispersion and deviation was found among urban schools, while rural schools showed less variation.

As might be expected, the staff numbers for senior high schools was highest, with junior high schools and junior-senior high schools next in order. These types of schools also displayed the broadest dispersion of staff complements. The variation in enrollments in senior high schools was significantly greater than the sample deviation, while the remainder of the types of schools were condiderably less varied than the sample.

Pupil-Teacher Ratios

The mean pupil-teacher ratio for the sample was 19.70, while the median was 20.00. The ratios ranged from 13.2 to 27.4, with a standard deviation of 2.57. For all classifications of the schools, by urban, rural, or type of jurisdiction, the ratios were remarkably similar. However, rural schools were more variable in pupil-teacher ratios than urban schools, 13.2 - 27.4, as compared to 16.6 - 22.5. The greatest variation in terms of standard deviation was recorded in the School Division classification, while urban schools displayed the least deviation.

Variations in pupil-teacher ratios were more noticeable when the schools were organized according to grade range. The averages were highest in elementary schools and lowest in senior high schools; junior high schools tended to rank approximately in the middle. The ratios for the remainder of the types of schools fell in between the two extremes of elementary and senior high, with the presence of elementary grades pulling the ratios up, and junior or senior high grades pulling the ratios down. The greatest dispersion in pupil-teacher ratio was in the category of senior high schools, where the standard deviation was 3.04. Junior high schools showed the least variation in pupil-teacher ratios.

III. ANALYSIS OF AVERAGE SALARIES, QUALIFICATIONS AND EXPERIENCE OF TEACHERS

Tables 6 to 9 provide aggregated data with respect to the salaries, qualifications and experience of teachers in the schools included in this study.

Average Salaries

The averages for teachers' salaries in the schools in the sample were $8,000.94 and $7,551.00 for the mean and median respectively. Average salaries ranged from $6,255.00 to $10,515.00, with a standard deviation of $927.73. Both mean and median average salaries in urban school Districts were considerably above those of the sample, the median displaying the widest variation. The averages for rural schools were approximately the same as the sample averages, with the means below and the medians above. Variations among the classifications were more

Table 6

MEAN AND MEDIAN AVERAGE SALARY, QUALIFICATIONS, AND EXPERIENCE OF TEACHERS FOR SAMPLE, RURAL, URBAN, DIVISION, DISTRICT AND COUNTY CLASSIFICATIONS*

School Classification	Salary		Qualifications		Experience	
	Mean	Median	Mean	Median	Mean	Median
All Schools	$8000.94	$7551.00	2.93	2.90	8.51	7.80
Rural	7792.23	7672.00	2.79	2.80	9.05	8.50
Urban	8992.33	9012.50	3.59	3.65	5.92	5.85
School Division	7776.05	7775.00	2.53	2.40	13.14	7.30
School District	8992.33	9012.50	3.59	3.65	5.92	5.85
County	7801.66	7653.50	2.94	3.00	9.45	9.20

*Source: Tables 39 - 41 (Appendix B, pp. 154 - 160).

Table 7

RANGE AND STANDARD DEVIATION OF AVERAGE SALARY, QUALIFICATIONS, AND EXPERIENCE OF TEACHERS FOR SAMPLE, RURAL, URBAN, DIVISION, DISTRICT AND COUNTY CLASSIFICATIONS*

School Classification	Salary		Qualifications		Experience	
	Range	s	Range	s	Range	s
All Schools	$6,255.00 - 10,515.00	$ 927.73	1.2 - 4.9	0.81	4.8 - 16.4	2.56
Rural	$6,255.00 - 9,591.00	$ 746.99	1.2 - 4.2	0.70	5.0 - 16.4	2.47
Urban	$7,290.00 - 10,515.00	$1087.17	2.3 - 4.9	1.01	4.8 - 7.4	0.78
School Division	$6,412.00 - 9,093.00	$ 742.26	1.2 - 3.9	0.66	5.0 - 16.4	2.76
School District	$7,290.00 - 10,515.00	$1087.17	2.3 - 4.9	1.01	4.8 - 7.4	0.78
County	$6.255.00 - 9,591.00	$ 760.09	1.5 - 4.2	0.68	5.9 - 14.2	2.22

*Source: Tables 39 - 41 (Appendix B, pp. 154 - 160).

Table 8

MEAN AND MEDIAN AVERAGE SALARY, QUALIFICATIONS, AND EXPERIENCE OF TEACHERS BY TYPE OF SCHOOL*

	Salary		Qualifications		Experience	
Type of School	Mean	Median	Mean	Median	Mean	Median
Grades 1 - 6	$7623.43	$7572.00	2.36	2.35	8.75	7.35
Grades 7 - 9	7627.25	7672.00	2.90	3.1	5.90	6.2
Grades 10 - 12	9442.22	9774.00	4.3	4.3	6.97	6.2
Grades 1 - 9	7680.29	7653.50	2.46	2.35	8.93	9.0
Grades 7 - 12	8000.20	8290.00	3.62	3.6	7.50	6.2
Grades 1 - 8	7750.14	7775.00	2.59	2.8	8.43	7.8
Grades 1 - 12	7960.27	7921.00	3.11	3.1	9.54	9.8
Other	8101.80	7647.00	2.8	2.5	8.96	8.2

*Source: Tables 39 - 41 (Appendix B, pp. 154 - 160).

Table 9

RANGE AND STANDARD DEVIATION OF AVERAGE SALARY, QUALIFICATIONS, AND EXPERIENCE OF TEACHERS BY TYPE OF SCHOOL*

Type of School	Salary Range	Salary s	Qualifications Range	Qualifications s	Experience Range	Experience s
Grades 1 - 6	$6,882.00 - 8,990.00	$ 550.97	1.5 - 3.1	0.43	4.8 - 16.4	3.26
Grades 7 - 9	6,665.00 - 8,500.00	994.19	2.1 - 3.3	0.54	4.8 - 6.4	0.76
Grades 10 - 12	7,077.00 - 10,515.00	1024.85	3.6 - 4.9	0.42	5.1 - 11.2	1.99
Grades 1 - 9	6,921.00 - 8,531.00	512.17	1.5 - 3.4	0.59	5.0 - 14.2	2.69
Grades 7 - 12	6,255.00 - 9,012.00	1050.10	3.1 - 4.0	0.36	5.9 - 10.5	2.09
Grades 1 - 8	6,412.00 - 9,093.00	958.16	1.2 - 3.5	0.72	6.3 - 11.0	1.87
Grades 1 - 12	6,959.00 - 9,273.00	580.47	2.4 - 3.7	0.40	7.0 - 12.5	1.85
Other	7,358.00 - 9,591.00	910.45	2.2 - 4.1	0.77	5.5 - 12.1	2.65

*Source: Tables 39 - 41 (Appendix B, pp. 154 - 160).

noticeable in the dispersion patterns of salaries. The lowest and highest average salaries in urban districts were approximately $1,000.00 greater in each case than the low and high for rural schools, although the differences between minimums and maximums were approximately the same in both categories. However, considerable difference was evident in deviation from the mean, with the standard deviation for the urban classification $340.18 larger than the rural standard deviation of $746.99.

While urban teachers' average salaries appeared to be significantly higher and more variable than rural salaries, fewer distinct patterns were evident when the schools were grouped by grade range. Only in schools that were exclusively senior high schools were the averages significantly different than the averages for other types of schools. Elementary schools had the lowest mean and median salaries. The highest average salaries were for teachers in the senior high schools. The widest dispersion patterns in terms of standard deviation were found at the junior-senior high, and senior high school levels. The smallest variations were found in the elementary, and elementary-junior high types of schools, where the standard deviations were approximately half that of the highest values.

Average Qualifications

The mean years of training for teachers in all schools in the sample was 2.93 years, while the median was 2.90. Average qualifications per school ranged from 1.2 to 4.9 years, with a standard deviation of 0.81. Only the urban districts departed significantly from these patterns, in that the mean and median average qualifications were 3.59 and 3.65 respectively. While the difference between the low and high

average qualifications per school for urban schools was less than for the other classifications, this category of schools was the only one to exceed 1 year in terms of standard deviation. This suggests that, while the range of qualifications in schools in urban areas is not as extreme, particularly at the lower end of the distributions, it is not as closely grouped around the mean for the category.

As might be expected, the highest average qualifications were in senior high schools, with lowest in elementary schools. However, average qualifications for elementary schools were not significantly different than those in types of schools other than senior high schools, where the mean and median years of training were above 4 years. Only in junior-senior high schools and senior high schools, were the average qualifications per school higher than 3 years at the lower end of the range.

Average Experience

The mean and median average years of experience for teachers in the schools of the total sample were 8.51 and 7.80 respectively. The average years of teaching experience per school ranged from 4.8 to 16.4, with a standard deviation of 2.56. However, the reliability of these data was weakened because several studies recorded years of experience beyond those considered for salary purposes.

Under normal circumstances teacher qualifications and experience are related to salary levels. In this instance, however, the inconsistencies in experience date prevented any thorough exploration of this

relationship.

IV. ANALYSIS OF PER PUPIL EXPENDITURES BY AGGREGATE EXPENDITURE CLASSIFICATIONS

This section contains the analysis of per pupil expenditures by aggregate function-object expenditure classifications. Included in this section are analyses according to the total sample of schools, urban and rural categories, schools classified as District, Division, and County, the categories of schools according to grade range, and, the classification of schools by enrollment intervals.

Per Pupil Expenditures in Aggregate Expenditure Classifications for All Schools in the Sample

Tables 10 to 11 tabulate the data with respect to the statistics descriptive of the per pupil expenditures in aggregate expenditure classification for all schools in the sample. The distributions are reproduced in Tables 42 - 44, Appendix C.

The studies were not uniform in the selection of expenditure classifications for tabulation of the cost data. Several studies included "Outgoing Transfer Accounts," while two studies included "Capital From Current Revenue," and one study allocated "Debt Charges" to schools. However, only in the case of one classification, "Debt Charges," did the percentage of "Total Expenditure" assumed by the classifications omitted in this study, present a significant cost factor. Nevertheless, the expenditures reported for the "Total Expenditure" classification are assumed to be representative of the schools' total costs, and are compared on the basis of all classifications reported for each school in each study. The other classifications were readily identifiable in the

Table 10

MEAN AND MEDIAN PER PUPIL-ENROLLED EXPENDITURES BY AGGREGATE EXPENDITURE CATEGORIES FOR ALL SCHOOLS IN THE SAMPLE*

Expenditure Series	Sample	
	Mean	Median
100 Administration	$ 23.81	$ 24.56
200 Instruction		
200 a. Direct Salaries	392.96	385.42
200 b. Indirect Salaries	61.36	50.35
200 c. Direct and Indirect Expenditures	42.78	36.74
300 Pupil Transportation	88.21	87.95
400 Plant Operation	59.86	53.61
500 Plant Maintenance	25.52	25.33
800 Fixed Charges	14.57	11.79
Total Expenditure	$720.86	$707.72

*Source: Tables 42 - 44 (Appendix C, pp. 161 - 167).

Table 11

RANGE AND STANDARD DEVIATION OF PER PUPIL-ENROLLED EXPENDITURES BY AGGREGATE EXPENDITURE CATEGORIES FOR ALL SCHOOLS IN THE SAMPLE*

Expenditure Series	Sample Range	Sample s
100 Administration	$ 16.04 - 34.32	$ 6.61
200 Instruction		
200 a. Direct Salaries	277.82 - 589.38	68.27
200 b. Indirect Salaries	10.55 - 215.68	38.24
200 c. Direct and Indirect Expenditures	17.79 - 120.45	21.88
300 Pupil Transportation	0.10 - 310.20	57.96
400 Plant Operation	28.91 - 118.11	22.12
500 Plant Maintenance	4.21 - 92.64	12.95
800 Fixed Charges	0.86 - 76.37	18.14
Total Expenditure	$439.39 - 1120.16	$166.21

*Source: Tables 42 - 44 (Appendix C, pp. 161 - 167).

case of each school and were considered directly comparable.

Total expenditures. The mean "Total Expenditure" per pupil for all schools in the study was $720.86, while the median was $707.72. Per pupil costs ranged from $439.39 to $1,120.16, with a standard deviation of $166.21. The statistics indicate a positively skewed distribution of costs with considerable variation among the schools. According to Table 54, Appendix G, which tabulates the per pupil expenditures in standard score form, it was indicated that no schools were more than -1.69 standard score units below the mean, while four schools were more than +2.00 standard score units above the mean. Those schools at the lowest end of the range were all elementary schools, while all but one of the schools above +2.00 units above the mean could be classified as senior high schools; the other school was a junior high school. The range as well as the difference between the low and high values in standard score form for "Total Expenditures" per pupil as well as for the other classifications of expenditures are as follows:

	Low	High	Difference
Administration	-1.17	1.59	2.76
Direct Salaries	-1.69	2.88	4.57
Indirect Salaries	-1.33	4.04	5.37
Direct & Indirect Expenditures	-1.14	3.55	4.69
Pupil Transportation	-1.52	3.83	5.35
Plant Operation	-1.40	2.63	4.03
Plant Maintenance	-1.62	5.20	6.82
Fixed Charges	-0.67	3.41	4.17
Total Expenditure	-1.69	2.40	4.09

The lowest total expenditure per pupil was -1.69 standard score units below the mean while the highest was +2.40 units above the mean, for a range of 4.09 standard score units. In comparison, the low and

high scores for enrollment were -0.88 and +4.31, for a range of 5.19 standard score units. For average salaries, the low and high values were -1.88 and +2.71 respectively, for a range of 4.59 standard score units.

The strongest relationship among the three variables, "Total Expenditure," "Enrollment," and "Average Salary," was between total cost per pupil, and average salary. Schools with a total expenditures per pupil below the mean tended to have average salaries below the mean, while those with total expenditure above the mean tended to have average salaries above the mean. This was particularly true in cases where the values were at the extremes of the ranges. In addition, the distributions for these two variables were approximately the same in shape. As was the case with the patterns for total cost per pupil, elementary schools tended to have the lowest salaries, while senior high schools tended to have the highest average salaries.

No significant relationship appeared to exist between enrollments and the other two variables. Only in the case of the five urban senior high schools were enrollments consistently above the mean to the same extent as average salaries and total expenditure per pupil.

Expenditure classifications. The distributions of per pupil costs within each expenditure classification were relatively uniform with only minor degrees of skewness evident. The highest cost classification was "Direct Salaries" where the mean was $392.96. Expenditures in this classification ranged from $277.82 to $589.38 per pupil.

"Pupil Transportation" was the next highest cost classification with a mean and median per pupil expenditures of $88.21 and $87.95

respectively. Cost in this category ranged from $0.10 to $310.20 per pupil, with a standard deviation of $56.96.

"Indirect Salaries" and "Plant Operation" ranked in that order below transportation costs. However, the mean per pupil expenditures in classification were approximately the same, $61.36 for "Indirect Salaries," and $59.86 for "Plant Operation." Some degree of skewness was evident in both distributions. While the average costs were similar, per pupil costs in the two distributions were more variable in terms of dispersion patterns. The standard deviation for "Indirect Salaries" was $38.24 compared to $22.12 for "Plant Operation; the former category's high and low values were more extreme than those of "Plant Operation."

The "Direct and Indirect Expenditures" classification was next highest in cost per pupil, with a mean of $42.78 and a median of $36.74. The dispersion patterns in this category were similar to those of "Plant Operation," with a standard deviation of $21.88.

"Plant Maintenance" and "Administration" expenditures were similar, with means of $25.52 and $23.81 respectively. However, per pupil expenditures in the "Administration" classification were less variable than those for "Plant Maintenance" with a standard deviation of $6.61 compared to $12.95 for the latter category.

The lowest cost classification was "Fixed Charges" where the mean was $14.57 and the median was $11.79. Costs in this category ranged from $0.86 to $76.37, with a standard deviation of $18.14. On this basis, the classification appeared to demonstrate more variability than either "Administration" or "Plant Maintenance." However, the validity of this conclusion is reduced as a result of most studies

prorating fixed costs on an equal basis among the schools of a system.

While the classifications could be ranked in terms of magnitude of per pupil expenditures, in standard score form, the distributions were more directly comparable. The range of standard scores for the classifications was presented on page 71.

The positively skewed characteristic of the distributions was emphasized when the values were expressed in terms of standard scores. With the exception of the Fixed Charges classification, where the low value was less than one standard deviation below the mean, all the categories had a low value greater than one standard deviation below the mean. Above the mean, the classifications showed considerable variation. The highest scores were in the Plant Maintenance and Indirect Salaries categories, with Administration showing the least positive deviation. The most pronounced departure from a normal distribution was in the former two categories.

Plant Maintenance displayed the greatest variation in dispersion of scores, in comparison to its sixth ranked position in magnitude of per pupil expenditures. Direct salaries, which ranked first in magnitude of expenditures, ranked fifth in dispersion of values. Administration costs ranked last in variation of values about the mean and in dispersion patterns. The remainder of the classifications showed little variation in rank from their positions in terms of magnitude of expenditure.

Per Pupil Expenditures in Aggregate Expenditure Classifications for Schools Categorized as Urban or Rural

Tables 12 and 13 provide data with respect to the per pupil expenditures in the selected expenditure classifications for the

Table 12

MEAN AND MEDIAN PER PUPIL-ENROLLED EXPENDITURES BY AGGREGATE EXPENDITURE CATEGORIES FOR SCHOOLS IN URBAN AND RURAL CLASSIFICATIONS*

Expenditure Series	Urban		Rural	
	Mean	Median	Mean	Median
100 Administration	$ 28.51	$ 26.29	$ 22.81	$ 21.08
200 Instruction				
200 a. Direct Salaries	383.82	372.20	394.88	385.92
200 b. Indirect Salaries	103.29	104.11	52.53	48.56
200 c. Direct and Indirect Expenditure	61.35	64.38	38.87	36.10
300 Pupil Transportation	19.02	18.68	102.78	97.73
400 Plant Operation	64.15	61.07	58.95	53.61
500 Plant Maintenance	27.23	26.13	24.83	23.01
800 Fixed Charges	14.15	12.47	14.66	5.45
Total Expenditure	$750.29	$739.93	$714.66	$707.72

*Source: Tables 42 - 44 (Appendix C, pp. 161 - 167).

Table 13

RANGE AND STANDARD DEVIATION OF PER PUPIL-ENROLLED EXPENDITURES BY AGGREGATE EXPENDITURE CATEGORIES FOR SCHOOLS IN URBAN AND RURAL CLASSIFICATIONS*

Expenditure Series	Urban Range	Urban s	Rural Range	Rural s
100 Administration	$ 23.45 - 33.59	$ 4.53	$ 16.04 - 34.32	$ 6.58
200 Instruction				
200 a. Direct Salaries	277.82 - 422.69	69.56	290.02 - 589.38	68.47
200 b. Indirect Salaries	40.11 - 215.68	59.69	10.55 - 129.88	24.89
200 c. Direct and Indirect Expenditures	18.18 - 120.45	36.10	17.79 - 92.55	15.37
300 Pupil Transportation	0.10 - 37.86	18.56	17.95 - 310.20	52.63
400 Plant Operation	35.86 - 109.38	25.87	28.91 - 118.11	21.40
500 Plant Maintenance	4.21 - 47.15	11.07	7.65 - 92.64	13.37
800 Fixed Charges	6.87 - 17.64	3.44	0.86 - 76.37	19.92
Total Expenditure	$439.39 - 1120.16	$51.57	$477.79 - 1081.92	$144.53

*Source: Tables 42 - 44 (Appendix C, pp. 161 - 167).

schools classified as urban and rural.

The mean "Total Expenditure" per pupil in urban schools was $750.29, while the median was $739.93, indicating a positively, although only slightly, skewed distribution. The mean and median Total Expenditures per pupil for rural schools, $714.66 and $707.72 respectively, were slightly lower than for urban schools. The distribution of costs for rural schools was also positively skewed. In comparison to the sample averages, the mean and median total cost per pupil in urban schools were above those of the sample, while the mean for rural schools was below the sample mean. The rural and sample medians were identical. The range of Total Expenditures per pupil in urban schools was from $439.39 to $1,120.16, with a standard deviation of $51.57. Total Expenditures per pupil in rural schools ranged from $577.79 to $1,081.92, with a standard deviation of $144.53. Total Expenditures per pupil showed considerably greater variation among rural schools than among urban schools, although the high - low values were more extreme in urban schools. The range for urban schools was identical to that of the sample, whereas urban schools were less varied. In terms of standard deviation, the rural schools were much closer to the sample standard deviation, while the urban costs were less varied than the sample.

The mean expenditure per pupil for "Administration" in urban schools was $28.51, while the median was $26.29. The cost per pupil for this classification in rural schools was slightly lower than for urban schools, $22.81 and $21.08 for the mean and median respectively. The averages for urban schools were above those of the sample while for rural schools, the averages were below. Administrative expenditures per pupil in urban schools showed less variation than in rural schools, ranging

from $23.45 to $33.59, with a standard deviation of $4.53, compared to a range from $16.04 to $34.32, with a standard deviation of $6.58. The range for urban schools was less variable than the sample, while the rural schools' range was identical; the urban schools showed less deviation than rural schools in comparison to the sample standard deviation.

The mean and median cost per pupil for "Direct Salaries" in urban schools were $383.82 and $372.20 respectively. Costs per pupil in rural schools were slightly higher at $385.92 for the mean and median. The average for rural schools were slightly above the sample averages, while the averages for urban schools were below those of the sample. Per pupil expenditures for Direct Salaries in urban school ranged from $277.82 to $422.69 compared to $290.02 to $589.38 in rural schools. The two categories showed little difference in terms of deviation either between categories or compared to the sample standard deviation.

The mean and median expenditures for "Indirect Salaries" in urban schools were $103.29 and $104.11 respectively. In the same category in rural schools, the costs per pupil were approximately half that of the urban figures, $52.53 and $48.56 respectively. Average expenditures for indirect salaries in rural schools was somewhat lower in rural schools than the sample averages but considerably higher in urban schools. The variation in costs between the two classifications was further evidenced in terms of the dispersion of values. The standard deviation for urban schools was $59.69 while it was $24.89 for rural schools. Although below the standard deviation for the sample, the standard deviation for rural schools more closely approximated the parameters of the sample than the urban distribution. A characteristic of most urban schools, particularly the large senior high schools, is the

range and number of personnel other than teachers who contribute the instructional process in an indirect way. To a large extent this phenomena is most pronounced in urban schools, a factor which contributed to the disparity between urban and rural schools in the cost per pupil of Indirect Salaries.

The averages for "Direct and Indirect Expenditures" per pupil in urban schools, were almost double those in rural schools. The urban figures were considerably higher than the sample averages, while those for rural schools were lower but closer to the sample mean and median. Per pupil costs in this category were also more broadly dispersed among urban schools than among rural schools--the standard deviation for urban school was $36.10 compared to the rural figure of $15.37.

The per pupil costs for "Plant Operation" were relatively comparable between the urban and rural school classifications. The mean cost in urban schools was $64.15 compared to $58.95 for rural schools. Both averages approximated the mean for the sample. In terms of dispersion, the standard deviation for urban schools was larger, $25.87 against $21.40, while the range for rural schools was broader, $28.91 - $118.11 against $35.86 - $109.38.

As was the case with Plant Operation expenditures, the per pupil costs of "Plant Maintenance" showed little variation between categories. Neither classification showed any significant variation from the sample mean expenditure of $25.52, or the dispersion of values according to the sample deviation of $22.12.

The per pupil expenditures for "Fixed Charges" were similar for both categories of schools, although the rural median was lower than the urban value. Both categories' averages were almost identical to the

sample averages. However, the rural schools displayed more variation in values than urban schools, with a standard deviation of $19.92 for the former compared to $3.44 for urban schools. As was the case for the sample, the meaningfulness of this statistic is somewhat reduced because the fixed charges were prorated to schools on an equal basis.

Per Pupil Expenditures in Aggregate Expenditure Classifications for Schools Categorized by School Jurisdiction

Tables 14 and 15 provide data with respect to school jurisdictions.

School districts. Per pupil expenditures for schools in School Districts by aggregate expenditure classifications were identical to those for schools in the urban category. For the most part the relationships between the classifications of expenditures for schools in School Districts and those in the other two types of jurisdictions were the same as between urban and rural categories. The only appreciable differences were in the categories of "Plant Operation," "Plant Maintenance," and Fixed Charges," where the averages for expenditure were higher in School Divisions than in School Districts. The averages in urban areas were generally higher than in rural areas for these classifications.

School divisions and counties. The mean "Total Expenditure" per pupil for schools in School Divisions, $732.26, was higher than the mean, $704.39, for schools in Counties. The School Division mean also exceeded the sample mean, while the County mean was below the sample average. The medians for both categories were approximately the same as the sample median, $707.72. The dispersion of total cost per pupil in School Division schools was greater than in Counties, $177.27 compared to $123.17 in terms of standard deviation, as well as greater than the

Table 14

MEAN AND MEDIAN PER PUPIL-ENROLLED EXPENDITURES BY AGGREGATE EXPENDITURE CATEGORIES FOR SCHOOLS IN DIVISION, DISTRICT, AND COUNTY CLASSIFICATIONS*

Expenditure Series	Divisions		Districts		Counties	
	Mean	Median	Mean	Median	Mean	Median
100 Administration	$ 20.69	$ 16.64	$ 28.51	$ 26.29	$ 24.05	$ 21.79
200 Instruction						
200 a. Direct Salaries	391.09	391.55	383.82	372.20	397.09	385.67
200 b. Indirect Salaries	57.56	52.33	103.29	104.11	49.54	47.71
200 c. Direct and Indirect Expenditure	42.16	36.00	61.35	64.38	36.95	36.42
300 Pupil Transportation	109.19	107.49	19.02	18.68	99.03	96.98
400 Plant Operation	66.07	59.53	64.15	61.07	54.80	50.36
500 Plant Maintenance	30.12	28.55	27.23	26.13	21.75	21.59
800 Fixed Charges	17.47	20.00	14.15	12.47	13.02	3.42
Total Expenditure	$732.26	$707.72	$750.29	$739.93	$704.39	$706.04

*Source: Tables 42 - 44 (Appendix C, pp. 161 - 167).

Table 15

RANGE AND STANDARD DEVIATION OF PER PUPIL-ENROLLED EXPENDITURES BY AGGREGATE EXPENDITURE CATEGORIES FOR SCHOOLS IN DIVISION, DISTRICT AND COUNTY CLASSIFICATIONS*

Expenditure Series	Divisions		Districts	
	Range	s	Range	s
100 Administration	$ 16.64 - 29.19	$ 5.33	$ 23.45 - 33.59	$ 4.53
200 Instruction				
200 a. Direct Salaries	293.43 - 566.16	75.53	277.82 - 482.69	69.56
200 b. Indirect Salaries	17.31 - 129.88	27.61	40.11 - 215.68	59.69
200 c. Direct and Indirect Expenditures	17.79 - 92.55	21.03	18.18 - 120.45	36.10
300 Pupil Transportation	17.95 - 310.20	67.16	0.10 - 37.86	18.56
400 Plant Operation	32.18 - 118.11	24.17	35.86 - 109.38	25.87
500 Plant Maintenance	7.72 - 92.64	18.88	4.21 - 47.15	11.07
800 Fixed Charges	1.77 - 20.32	4.85	6.87 - 17.64	3.44
Total Expenditure	$551.54 - 1081.92	$177.27	$439.39 - 1120.16	$251.57

Table 15 (cont'd)

Expenditure Series	Counties Range	s
100 Administration	$ 16.04 - 34.32	$ 6.98
200 Instruction		
200 a. Direct Salaries	290.02 - 589.38	63.66
200 b. Indirect Salaries	10.55 - 116.05	23.04
200 c. Direct and Indirect Expenditures	18.84 - 69.36	10.72
300 Pupil Transportation	29.00 - 191.08	42.61
400 Plant Operation	28.91 - 111.18	18.74
500 Plant Maintenance	7.65 - 44.93	7.46
800 Fixed Charges	0.86 - 76.37	24.79
Total Expenditure	$477.49 - 1065.16	$123.17

*Source: Tables 42 - 44 (Appendix C, pp. 161 - 167).

sample standard deviation.

The averages of per pupil costs in the other classifications of expenditures showed little variation between the two categories of schools. Average costs in "Administration," and "Direct Salaries" tended to be higher in County schools, but in the remaining classifications, average costs tended to be higher in schools from School Divisions. However, none of the differences appeared significant.

The same characteristic was evident in the relationship between the per pupil costs of the schools in these two categories and the sample averages. The only noticeable variation was in the "Pupil Transportation" classification, where County schools' mean costs were approximately $11.00 per pupil higher than the sample, and Divisional schools' mean costs were approximately $20.00 per pupil higher.

While the averages of the classifications for the schools in the two categories of school jurisdictions were similar, some noticeable differences were evident in the dispersion patterns between the categories. The distributions were all slightly skewed, for the most part positively. With the exception of the "Administration" and "Fixed Charges" categories, schools in School Divisions were more varied in per pupil costs than schools in Counties. This characteristic was most noticeable in the "Pupil Transportation" classification, where the standard deviation for the School Division category was $67.16 compared to $42.61 in the County category. The standard deviation for "Plant Maintenance" in School Division schools was more than double the value for County schools, $18.88 compared to $7.46. Although the range for Counties exceeded that of School Divisions, the standard deviation of schools in the latter category exceeded the former by $11.87. Only in

the "Fixed Charges" classification were County schools more varied than the schools in School Divisions.

For the most part, schools in School Divisions displayed greater variation in per pupil costs according to aggregate expenditure classifications than the sample. County schools were generally less varied.

Per Pupil Expenditures by Aggregate Expenditure Classifications for Schools Classified by Grade Range

Tables 16 and 17 provide data with respect to schools classified by grade range. The highest mean "Total Expenditure" per pupil $999.63 was in senior high schools (Grades 10 - 12). The lowest cost type of school was the elementary (Grades 1 - 6) type where the mean cost was $578.66 per pupil. Junior high schools had a mean cost per pupil of $674.34. The remainder of the types of schools had mean "Total Expenditures" per pupil ranging from $674.59 to $768.13, slightly above the cost for junior high schools, but well below the mean cost for senior high schools. Both elementary and junior high schools were below the sample mean, the former more significantly, while the senior high schools' mean was significantly above the sample average. The means of total expenditure per pupil for the remaining types of schools were grouped well within ± 1 standard deviation of the sample mean. The greatest variation in per pupil total expenditures was in the "other" schools category. However, among the discrete types of schools, the greatest variation was among schools of the Grades 1 - 8 type, where the standard deviation was $168.99. The least variation was exhibited among junior high schools. Only the aforementioned Grades 1 - 8 category and the "other" category exceeded the sample standard deviation.

In the "Administration" classification, the mean per pupil costs

Table 16

MEAN AND MEDIAN PER PUPIL-ENROLLED EXPENDITURES BY AGGREGATE EXPENDITURE CATEGORIES FOR SCHOOLS CLASSIFIED BY GRADE RANGE*

Expenditure Series	School Type							
	Grades 1 - 6		Grades 7 - 9		Grades 10 - 12		Grades 1 - 9	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
100 Administration	$ 21.97	$ 21.79	$ 21.44	$ 21.46	$ 28.45	$ 33.49	$ 22.63	$ 22.21
200 Instruction								
200 a. Direct Salaries	336.09	319.13	366.35	362.53	478.82	468.11	382.76	368.28
200 b. Indirect Salaries	43.35	44.42	75.83	73.47	142.15	130.60	42.46	44.62
200 c. Direct and Indirect Expenditures	30.77	25.40	53.59	51.28	86.63	80.49	32.74	31.25
300 Pupil Transportation	61.64	52.85	72.36	86.20	70.48	37.86	118.13	117.21
400 Plant Operation	49.39	46.51	46.73	47.96	86.74	80.85	65.96	70.31
500 Plant Maintenance	22.25	17.72	24.99	21.64	29.14	26.30	24.79	25.96
800 Fixed Charges	11.55	12.47	11.69	12.94	15.76	17.46	16.00	4.62
Total Expenditure	$578.66	$557.52	$674.34	$673.39	$999.63	$1011.91	$708.49	$698.37

Table 16 (cont'd)

Expenditure Series	School Type							
	Grades 7 - 12		Grades 1 - 8		Grades 1 - 12		Other Types	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
100 Administration	$ 23.16	$ 18.74	$ 24.91	$ 29.91	$ 23.83	$ 22.22	$ 24.81	$ 26.50
200 Instruction								
200 a. Direct Salaries	441.40	438.16	381.53	382.42	404.90	401.13	388.75	347.63
200 b. Indirect Salaries	73.04	77.90	27.72	31.09	57.69	53.14	51.19	47.27
200 c. Direct and Indirect Expenditures	44.80	44.90	35.67	33.55	37.94	39.09	35.54	36.00
300 Pupil Transportation	92.21	98.79	119.39	97.08	80.45	86.91	92.85	92.67
400 Plant Operation	59.12	46.30	62.52	50.23	48.56	47.03	56.06	60.45
500 Plant Maintenance	25.06	28.78	33.03	28.15	21.52	18.84	25.67	26.22
800 Fixed Charges	6.40	3.45	19.42	18.09	13.04	3.43	24.01	11.79
Total Expenditure	$768.13	$720.98	$706.51	$683.10	$689.45	$712.30	$730.97	$674.59

*Source: Tables 42 - 44 (Appendix C, pp. 161 - 167).

Table 17

RANGE AND STANDARD DEVIATION OF PER PUPIL-ENROLLED EXPENDITURES BY AGGREGATE EXPENDITURE CATEGORIES FOR SCHOOLS CLASSIFIED BY GRADE RANGE*

Expenditure Series	School Type: Grades 1 - 6 Range	Grades 1 - 6 s	Grades 7 - 9 Range	Grades 7 - 9 s
100 Administration	$ 16.04 - 33.34	$ 5.93	$ 16.30 - 26.55	$ 5.75
200 Instruction				
200 a. Direct Salaries	277.82 - 468.18	55.10	348.81 - 391.55	20.60
200 b. Indirect Salaries	17.31 - 59.80	10.94	67.17 - 89.20	10.51
200 c. Direct and Indirect Expenditures	17.79 - 68.21	13.33	28.45 - 83.34	22.57
300 Pupil Transportation	0.37 - 184.34	53.83	0.10 - 116.95	54.18
400 Plant Operation	29.48 - 73.91	14.44	39.18 - 51.82	5.43
500 Plant Maintenance	9.52 - 52.63	12.39	20.39 - 36.30	7.60
800 Fixed Charges	0.86 - 20.00	7.10	0.87 - 20.00	7.95
Total Expenditure	$439.39 - 850.18	$114.80	$622.71 - 727.89	$51.29

Table 17 (cont'd)

Expenditure Series	School Type: Grades 10 - 12 Range	Grades 10 - 12 s	School Type: Grades 1 - 9 Range	Grades 1 - 9 s
100 Administration	$ 16.33 - 33.59	$ 7.27	$ 16.07 - 32.38	$ 5.64
200 Instruction				
200 a. Direct Salaries	357.26 - 589.38	74.04	296.25 - 480.06	55.59
200 b. Indirect Salaries	107.71 - 215.68	33.90	18.25 - 67.54	12.73
200 c. Direct and Indirect Expenditures	59.67 - 120.45	19.33	18.18 - 48.56	8.09
300 Pupil Transportation	30.22 - 184.99	56.86	7.15 - 191.08	59.14
400 Plant Operation	53.37 - 109.38	21.44	37.71 111.18	20.90
500 Plant Maintenance	14.42 - 47.15	9.55	4.21 - 51.94	10.58
800 Fixed Charges	0.87 - 20.32	6.01	0.87 - 76.37	25.66
Total Expenditure	$840.80 - 1120.16	$90.24	$523.73 - 892.18	$124.36

Table 17 (cont'd)

Expenditure Series	School Type: Grades 7 - 12 Range	Grades 7 - 12 s	Grades 1 - 8 Range	Grades 1 - 8 s
100 Administration	$ 16.25 - 32.12	$ 8.20	$ 16.33 - 34.32	$ 8.00
200 Instruction				
200 a. Direct Salaries	387.76 - 501.72	41.66	322.45 - 442.99	48.85
200 b. Indirect Salaries	38.33 - 98.35	22.22	10.55 - 35.18	8.56
200 c. Direct and Indirect Expenditures	38.33 - 56.89	7.59	18.84 - 68.70	15.72
300 Pupil Transportation	47.11 - 155.30	44.41	38.56 - 310.20	91.84
400 Plant Operation	37.72 - 106.42	27.53	35.92 - 118.11	27.98
500 Plant Maintenance	16.12 - 31.89	7.57	7.65 - 92.64	27.53
800 Fixed Charges	0.87 - 20.00	7.70	0.87 - 70.45	24.05
Total Expenditure	$712.40 - 892.23	$78.33	$563.43 - 1043.32	$168.99

Table 17 (cont'd)

Expenditure Series	School Type			
	Grades 1 - 12 Range	s	Other Range	s
100 Administration	$ 16.27 - 31.89	$ 6.92	$ 16.64 - 32.79	$ 6.10
200 Instruction				
200 a. Direct Salaries	357.29 - 454.30	36.83	318.35 - 513.11	82.36
200 b. Indirect Salaries	19.17 - 84.56	19.48	28.90 - 84.06	20.18
200 c. Direct and Indirect Expenditures	23.71 - 55.03	9.68	27.06 - 44.20	7.00
300 Pupil Transportation	17.95 - 128.86	38.80	51.42 - 129.34	28.16
400 Plant Operation	28.91 - 59.33	9.58	32.18 - 84.65	20.64
500 Plant Maintenance	11.63 - 39.69	8.24	7.72 - 44.93	13.77
800 Fixed Charges	0.87 - 73.99	21.37	4.82 - 73.85	28.39
Total Expenditure	$551.54 - 807.50	$ 77.23	$562.49 - 1065.16	$200.27

*Source: Tables 42 - 44 (Appendix C, pp. 161 - 167).

for all types of schools were similar to the sample mean, $23.21, less than ±1 standard deviation from the sample mean. The lowest per pupil costs were in elementary and junior high schools, while the highest mean per pupil expenditure, $28.45, was in the senior high school category. Junior-senior high schools (Grades 7 - 12) exhibited the greatest variation in per pupil costs in this classification, with a standard deviation of $8.20, while the least deviation was in the elementary, junior high, and elementary-junior high (Grades 1 - 9) categories.

Among the categories of schools, the means of per pupil costs of "Direct Salaries" ranged from $336.09 to $478.82. The highest per pupil expenditure was in senior high schools, while the lowest, $336.09, per pupil, was in elementary schools. With the exception of the senior high school mean, the means of the remaining categories were all within ±1 standard deviation of the sample mean. The senior high school mean was beyond +1 standard deviation of the sample average. While the "other" category showed the greatest variation in per pupil costs of "Direct Salaries," with a standard deviation of $82.36, of the discrete types of schools, senior high schools were the most varied, with a standard deviation of $74.04. The least variation, a standard deviation of $20.60, was in the junior high school category. The remaining types of schools all exhibited less variation than the sample.

The mean expenditure per pupil for "Indirect Salaries" was highest in senior high schools, $142.15, with the next highest category being junior high schools. The means of these two categories, as well as junior-senior high schools, were all above the sample mean. The remaining types of schools had means below the sample mean, with Grades 1 - 8 type schools, with a mean of $27.72, the lowest. Elementary

schools were well below the sample mean, with a mean per pupil expenditure of $43.35. The greatest variation in per pupil costs of "Indirect Salaries" was in the senior high school category, where the standard deviation was $33.90. The least variation was among schools in the elementary, Grades I - 8, and junior high school categories. All of the categories demonstrated less variation than the sample.

The lowest "Direct and Indirect Expenditures" per pupil were in elementary schools where the mean was $30.77. Senior high schools, with a mean of $86.63, were the most costly. Junior high schools had a mean per pupil cost of $53.59. Both of these latter types of schools were above the sample mean. The remaining types of schools tended to be similar to the mean of the sample. The greatest variation among schools in a category was among junior high schools. This was the only category to exceed the sample standard deviation. The least variation occurred among the schools in the elementary-junior high, junior-senior high, and "other" categories.

The dominant pattern in "Pupil Transportation" expenditures per pupil was the relatively higher costs associated with types of schools other than elementary, junior high, and senior high schools. This pattern was a result of the infrequency of these latter types of schools in rural jurisdictions, where the incidence of transportation costs was higher. The highest mean per pupil expenditure was for Grades I - 8 type schools, of which none were from urban School Districts. The comparatively wide range of costs for elementary, junior high and senior high schools results from the higher costs associated with rural schools as well as the lower costs for urban schools in these categories.

The highest mean expenditure per pupil for "Plant Operation" was

for senior high schools, $86.74. The lowest mean expenditure, $46.73 was in junior high schools. With the exception of elementary-junior high schools, the remainder of the categories were below the mean for the sample. Junior-senior high schools and Grades I - 8 schools displayed the greatest variation in costs for this category, while junior high schools, with a standard deviation of $5.43 displayed the least variation. The remainder of the categories did not differ significantly from the sample standard deviation of $22.12.

The mean expenditures per pupil for "Plant Maintenance" were similar to the sample mean, $25.52, in all categories. Only the mean for Grades I - 8 schools appeared to depart appreciably from this standard. However, the difference of $7.52 in this case was not considered significant given the relatively small number of schools in this category. The latter classification also displayed the widest variation among schools in per pupil costs. The remainder of the categories displayed relatively minor departures from the sample standard deviation.

Because the costs of "Fixed Charges" were allocated to schools on an equal basis within jurisdictions, analysis of the differences between types of schools was not considered appropriate.

Per Pupil Expenditures by Aggregate Expenditure Classifications for Schools Classified by Enrollment Intervals

Fowlkes and Hansen (1952: 47) suggest that one of the uses of cost analysis is to assess the relationship between "cost and size of school." This study, by categorizing schools according to enrollments, attempted to relate various cost factors to the size of schools. The determination of the number and size of the intervals was described more completely in Chapter 2, Research Design. Thirteen enrollment intervals

were selected, each 200 student units in size.

Table 18 contains the tabulation of the number of schools in each interval, as well as the average and range of per pupil costs of the aggregate expenditure classifications for each interval. The table indicates that the distribution of schools by enrollment intervals was bi-modal, and positively skewed. In addition, four intervals, including the intervals in the 1600 to 1999 range, did not contain schools. The lowest four intervals contained 64 of the 69 schools in the sample. Only one school was contained in any single interval above the lower four intervals.

The term "average" in this part of the analysis is synonymous with the arithmetic mean, obtained by summing the per pupil costs for each expenditure classification and dividing the obtained sum by the number of schools in the interval. The intervals are ranked from highest to lowest.

The data revealed few distinct patterns in the per pupil costs by classification of schools according to enrollment intervals. The highest total cost per pupil was in interval 2400 - 2599, while the lowest total cost per pupil was in interval 600 - 799. Costs appeared to rise in both directions from the latter interval, but not in a uniform pattern. For example, the per pupil total cost in interval 1200 - 1399 was $1,011.91 but in the next highest interval the cost decreased to $840.80 and did not increase to the level of the former interval until interval 2200 - 2399, the second highest interval. Similarly, the per pupil cost for interval 400 - 599 rose to $845.20, but fell in the next lowest interval to $716.01.

Administration costs per pupil appeared to increase as

Table 18

AVERAGE AND RANGE OF SELECTED PER PUPIL COSTS BY ENROLLMENT INTERVALS FOR ALL SCHOOLS IN THE SAMPLE*

Enrollment Interval	No. of Schools In Interval	Total Cost Per Pupil		Administration Cost Per Pupil	
		Average	Range	Average	Range
2400 - 2599	1	$1120.16	$1120.16	$33.59	$33.59
2200 - 2399	1	1048.58	1048.58	33.59	33.59
2000 - 2199	1	917.14	917.14	33.59	33.59
1800 - 1999					
1600 - 1799					
1400 - 1599	1	840.80	840.80	33.49	33.49
1200 - 1399	1	1011.91	1011.91	33.59	33.59
1000 - 1199					
800 - 999					
600 - 799	8	633.04	$506.27 - 921.99	27.78	$16.13 - 32.04
400 - 599	14	845.20	439.39 - 997.59	30.40	2.22 - 33.34
200 - 399	22	716.01	514.29 - 1081.92	19.63	13.43 - 28.96
0 - 199	20	733.94	560.49 - 1043.32	23.39	16.25 - 34.32

Table 18 (cont'd)

Enrollment Interval	No. of Schools In Interval	Direct Instruction Cost Per Pupil		Indirect Instruction Cost Per Pupil	
		Average	Range	Average	Range
2400 - 2599	1	$444.75	$444.75	$215.68	$215.68
2200 - 2399	1	468.11	468.11	163.76	163.76
2000 - 2199	1	408.16	408.16	131.60	131.60
1800 - 1999					
1600 - 1799					
1400 - 1599	1	357.26	357.26	130.60	130.60
1200 - 1399	1	462.14	462.14	165.06	165.06
1000 - 1199					
800 - 999					
600 - 799	8	365.74	$290.02 - 482.69	65.13	$31.20 - 119.02
400 - 599	14	493.37	277.82 - 589.38	73.48	19.17 - 116.05
200 - 399	22	398.61	319.50 - 566.16	61.48	28.90 - 129.88
0 - 199	20	392.55	296.25 - 480.06	37.24	10.55 - 84.06

Table 18 (cont'd)

Enrollment Interval	No. of Schools In Interval	Direct Indirect Instruction Cost Per Pupil		Transport Cost Per Pupil	
		Average	Range	Average	Range
2400 - 2599	1	$120.45	$120.45	$ 37.86	$37.86
2200 - 2399	1	108.72	108.72	37.86	37.86
2000 - 2199	1	78.03	78.03	37.86	37.86
1800 - 1999					
1600 - 1799					
1400 - 1599	1	77.49	77.49	37.86	37.86
1200 - 1399	1	80.49	80.49	37.86	37.86
1000 - 1199					
800 - 999					
600 - 799	8	45.05	$22.74 - 92.94	$ 50.06	$0.10 - 92.67
400 - 599	14	44.39	18.46 - 69.36	75.94	0.37 - 159.58
200 - 399	22	37.98	17.79 - 92.55	97.15	0.37 - 184.99
0 - 199	20	37.76	24.55 - 68.70	118.34	0.37 - 310.20

Table 18 (cont'd)

Enrollment Interval	No. of Schools in Interval	Plant Operation Cost Per Pupil		Plant Maintenance Cost Per Pupil		Fixed Charges Per Pupil	
		Average	Range	Average	Range	Average	Range
2400 - 2599	1	$107.07	$107.07	$26.19	$26.19	$17.64	$17.64
2200 - 2399	1	75.60	75.60	25.97	25.97	17.64	17.64
2000 - 2199	1	68.58	68.58	26.30	26.30	17.64	17.64
1800 - 1999							
1600 - 1799							
1400 - 1599	1	53.57	53.57	26.08	26.08	17.64	17.64
1200 - 1399	1	80.85	80.85	26.43	26.43	17.64	17.64
1000 - 1199							
800 - 999							
600 - 799	8	47.10	$28.91 - 109.38	$22.89	$7.72 - 47.15	6.10	$0.86 - 12.47
400 - 599	14	48.23	35.86 - 106.84	18.63	9.52 - 26.25	13.31	0.87 - 73.99
200 - 399	22	56.66	37.71 - 108.65	23.51	4.21 - 44.93	15.61	0.87 - 74.45
0 - 199	20	72.28	35.92 - 118.11	32.49	7.65 - 266.98	17.04	0.87 - 76.37

*Source: Tables 42 - 44 (Appendix C, pp. 161 - 167).

enrollment rose, although not uniformly. Beyond the 600 - 799 range, the figures were not meaninfgul, as costs to the schools in the remaining intervals had been prorated on an equal basis, i.e., the same basic cost to each school.

Average per pupil costs for "Direct Instruction" showed no distinct patterns. High and low per pupil expenditures were scattered indiscriminately throughout the intervals.

Per pupil expenditures for the indirect instructional classification, appeared to rise as enrollments rose, although not uniformly. The highest average cost, $215.68 was in the highest enrollment interval, while the lowest was in the 0 - 199 interval.

Expenditures per pupil in the "Direct-Indirect Instruction" category displayed one of the few uniform patterns by enrollment intervals. Per pupil costs rose uniformly from the lowest interval to the highest, with the exception of intervals 1400 - 1599 and 2000 - 2199, where the costs were slightly lower than interval 1200 - 1399.

Transportation costs per pupil decreased steadily as enrollments rose, then levelled off after the 600 - 799 interval, as a result of uniform proration of costs to each of the schools in the higher enrollment intervals.

The per pupil cost of "Plant Operation" decreased gradually from 72.28, from interval 0 - 199 to interval 600 - 799, rose sharply at interval 1200 - 1399 to $80.85, dropped in the next interval to $53.57, then rose steadily to interval 2400 - 2599 to a high of $107.07 per pupil. Enrollments appeared to have some effect on the cost of operating school plants.

No distinct patterns were readily observable in the remaining

expenditure classifications, "Plant Maintenance," and "Fixed Charges." The meaningfulness of the data for these classifications by enrollment intervals was reduced as a result of the uniformity in proration of costs to the schools.

V. ANALYSIS OF PER PUPIL DIRECT INSTRUCTIONAL EXPENDITURES BY GRADE PROGRAMS

This section is made up of four parts. Part one deals with analysis of the per pupil direct instructional costs by grade programs for all schools in the sample. Part two contains an analysis of the per pupil expenditures by grade program for schools classified as urban or rural. Part three presents an analysis of grade program costs according to school jurisdictions. Part four contains an analysis of direct instructional expenditures for grade programs for the schools classified by grade range. The terms cost and expenditures, used synonymously in this section, are interpreted to mean direct instructional expenditures. The data for this section are contained in Tables 19 to 26.

Per Pupil Direct Instructional Expenditures by Grade Programs for all Schools in the Sample

The mean per pupil direct instructional expenditures by grade program ranged from $357.81 in Grade 1 to $419.03 in Grade 12. However, the lowest cost was $312.41 per pupil in Grade 5, while the highest was $520.22 per pupil in Grade 10. Per pupil expenditures tended to be higher in the junior high school grade programs (Grades 7 - 9) than in elementary programs (Grades 1 - 6), and highest in senior high school grade programs (Grades 10 - 12).

The distributions for each grade programs were positively

Table 19

MEAN AND MEDIAN PER PUPIL-ENROLLED DIRECT INSTRUCTIONAL EXPENDITURES BY GRADE FOR ALL SCHOOLS IN THE SAMPLE*

Grade	Mean	Median
Grade 1	$357.81	$338.00
Grade 2	343.11	304.40
Grade 3	332.16	318.01
Grade 4	332.24	318.01
Grade 5	312.41	296.65
Grade 6	345.15	311.37
Grade 7	397.38	371.74
Grade 8	357.04	352.62
Grade 9	447.56	422.27
Grade 10	520.22	503.82
Grade 11	505.33	473.44
Grade 12	419.03	383.13

*Source: Tables 45 - 47 (Appendix D, pp. 168 - 174).

Table 20

RANGE AND STANDARD DEVIATION OF PER PUPIL-ENROLLED DIRECT INSTRUCTIONAL EXPENDITURES BY GRADE FOR ALL SCHOOLS IN THE SAMPLE*

Grade	Range	s
Grade 1	$192.69 - 594.04	$ 96.21
Grade 2	225.66 - 624.30	98.68
Grade 3	199.44 - 764.13	100.27
Grade 4	174.64 - 879.67	116.45
Grade 5	193.85 - 557.11	83.77
Grade 6	194.17 - 652.93	109.87
Grade 7	178.66 - 842.83	132.36
Grade 8	176.09 - 714.02	119.04
Grade 9	175.61 - 854.39	159.07
Grade 10	361.72 - 748.34	100.39
Grade 11	332.79 - 946.15	129.65
Grade 12	197.48 - 824.44	151.32

*Source: Tables 45 - 47 (Appendix D, pp. 168 - 174).

Table 21

MEAN AND MEDIAN PER PUPIL-ENROLLED DIRECT INSTRUCTIONAL EXPENDITURES BY GRADE FOR SCHOOLS CLASSIFIED AS URBAN AND RURAL*

Grade	Urban		Rural	
	Mean	Median	Mean	Median
Grade 1	$314.66	$318.33	$362.71	$344.24
Grade 2	291.16	275.67	349.01	315.03
Grade 3	288.89	292.73	337.07	321.05
Grade 4	313.12	323.39	334.41	315.71
Grade 5	261.86	271.25	318.16	307.64
Grade 6	297.08	259.85	350.61	316.37
Grade 7	481.65	481.65	393.26	361.57
Grade 8	486.52	486.52	350.40	349.30
Grade 9	431.21	431.21	448.50	422.27
Grade 10	512.83	532.53	522.24	492.78
Grade 11	447.34	452.68	521.14	477.83
Grade 12	335.78	344.13	444.00	435.02

*Source: Tables 45 - 47 (Appendix D, pp. 168 - 174).

Table 22

RANGE AND STANDARD DEVIATION OF PER PUPIL-ENROLLED DIRECT INSTRUCTIONAL EXPENDITURES BY GRADE FOR SCHOOLS CLASSIFIED AS URBAN AND RURAL*

Grade	Urban		Rural	
	Range	s	Range	s
Grade 1	$288.77 - 338.00	$ 23.48	$192.69 - 594.04	$100.20
Grade 2	264.05 - 352.77	36.71	225.66 - 624.30	101.96
Grade 3	216.77 - 390.57	71.68	199.44 - 764.13	102.48
Grade 4	213.06 - 387.33	63.08	174.64 - 879.67	121.33
Grade 5	204.35 - 296.65	34.89	193.85 - 557.11	85.96
Grade 6	214.93 - 461.73	98.74	194.17 - 652.93	110.76
Grade 7	371.74 - 591.56	155.44	178.66 - 842.83	131.98
Grade 8	355.26 - 617.79	185.64	176.09 - 714.02	114.38
Grade 9	355.31 - 507.12	107.35	175.61 - 854.39	162.59
Grade 10	423.26 - 589.21	65.48	361.72 - 748.34	109.17
Grade 11	363.03 - 506.73	57.31	332.79 - 946.15	140.02
Grade 12	276.78 - 374.45	34.23	197.48 - 824.44	164.24

*Source: Tables 45 - 47 (Appendix D, pp. 168 - 174).

Table 23

MEAN AND MEDIAN PER PUPIL-ENROLLED DIRECT INSTRUCTIONAL EXPENDITURES BY GRADE FOR SCHOOLS CLASSIFIED BY DIVISION, DISTRICT AND COUNTY*

Grade	Division		District		County	
	Mean	Median	Mean	Median	Mean	Median
Grade 1	$359.09	$329.11	$314.66	$318.33	$364.58	$346.40
Grade 2	372.64	324.83	291.16	275.67	336.78	302.61
Grade 3	320.38	318.01	288.89	292.73	345.70	328.65
Grade 4	368.36	329.70	313.12	323.39	316.85	290.91
Grade 5	332.78	309.25	261.86	271.25	310.60	302.34
Grade 6	359.81	332.82	297.08	259.85	345.86	297.79
Grade 7	392.33	346.66	481.65	481.65	393.65	387.76
Grade 8	391.91	354.22	486.52	486.52	331.94	339.81
Grade 9	396.83	385.24	431.21	431.21	466.38	428.44
Grade 10	592.63	571.47	512.83	532.53	489.39	459.52
Grade 11	566.36	530.27	447.34	452.68	500.04	471.60
Grade 12	507.05	455.35	335.78	344.13	416.98	422.85

*Source: Tables 45 - 47 (Appendix D, pp. 168 - 174).

Table 24

RANGE AND STANDARD DEVIATION OF PER PUPIL-ENROLLED EXPENDITURES BY GRADE FOR SCHOOLS CLASSIFIED BY DIVISION, DISTRICT AND COUNTY*

Grade	Division		District	
	Range	s	Range	s
Grade 1	$278.31 - 570.81	$ 85.22	$288.77 - 338.00	$ 23.48
Grade 2	266.61 - 557.60	101.55	264.05 - 352.77	36.71
Grade 3	199.44 - 492.34	79.13	216.77 - 390.57	71.68
Grade 4	237.08 - 879.67	151.00	213.06 - 387.33	62.08
Grade 5	217.60 - 557.11	97.54	204.35 - 296.65	34.89
Grade 6	217.85 - 564.14	97.79	214.93 - 461.73	98.74
Grade 7	217.72 - 612.02	137.35	371.74 - 591.56	155.44
Grade 8	247.85 - 714.02	142.47	355.26 - 617.79	185.64
Grade 9	175.61 - 606.48	124.45	355.31 - 507.12	107.35
Grade 10	466.51 - 748.34	106.65	423.26 - 589.21	65.48
Grade 11	386.28 - 750.17	128.87	363.03 - 506.73	57.31
Grade 12	294.32 - 824.44	199.45	276.78 - 374.45	34.23

Table 24 (cont'd)

Grade	County	
	Range	s
Grade 1	$192.69 - 594.04	$180.52
Grade 2	225.66 - 624.30	101.76
Grade 3	205.96 - 764.13	113.01
Grade 4	174.64 - 622.22	101.33
Grade 5	193.85 - 485.50	80.11
Grade 6	194.17 - 652.93	118.28
Grade 7	178.66 - 842.83	132.17
Grade 8	176.09 - 515.54	96.87
Grade 9	209.49 - 854.39	172.34
Grade 10	361.72 - 714.49	96.79
Grade 11	332.79 - 946.15	144.19
Grade 12	197.48 - 688.59	146.64

*Source: Tables 45 - 47 (Appendix D, pp. 168 - 174).

Table 25

MEAN AND MEDIAN PER PUPIL-ENROLLED DIRECT INSTRUCTIONAL EXPENDITURES BY GRADE FOR SCHOOLS CLASSIFIED BY GRADE RANGE*

Grade	School Type					
	Grades 1 - 6		Grades 1 - 8		Grades 1 - 9	
	Mean	Median	Mean	Median	Mean	Median
Grade 1	$353.49	$332.65	$341.00	$320.93	$392.35	$350.64
Grade 2	317.49	291.85	384.97	291.18	351.69	319.34
Grade 3	295.57	293.81	367.94	339.92	364.93	339.62
Grade 4	301.61	315.71	341.82	307.54	363.89	322.20
Grade 5	281.24	284.85	348.70	317.17	346.00	363.58
Grade 6	315.11	299.84	486.37	493.03	318.45	280.96
Grade 7	-	-	446.46	411.92	384.39	391.46
Grade 8	-	-	377.62	308.17	361.08	359.98
Grade 9	-	-	-	-	541.31	510.08
Grade 10	-	-	-	-	-	-
Grade 11	-	-	-	-	-	-
Grade 12	-	-	-	-	-	-

Table 25 (cont'd)

Grade	School Type					
	Grades 1 - 12		Grades 7 - 9		Grades 10 - 12	
	Mean	Median	Mean	Median	Mean	Median
Grade 1	$312.77	$318.17	$ -	$ -	$ -	$ -
Grade 2	329.57	300.19	-	-	-	-
Grade 3	306.08	301.43	-	-	-	-
Grade 4	318.10	290.91	-	-	-	-
Grade 5	308.83	306.03	-	-	-	-
Grade 6	338.37	314.74	-	-	-	-
Grade 7	428.34	387.76	335.18	333.37	-	-
Grade 8	360.31	366.46	336.23	335.76	-	-
Grade 9	393.39	364.28	357.75	345.71	-	-
Grade 10	510.54	487.76	-	-	550.97	550.61
Grade 11	536.48	505.10	-	-	478.81	473.04
Grade 12	509.95	489.96	-	-	366.28	348.33

Table 25 (cont'd)

Grade	School Type			
	Grades 7 - 12		Other	
	Mean	Median	Mean	Median
Grade 1	$ -	$ -	421.09	387.44
Grade 2	-	-	374.54	337.76
Grade 3	-	-	362.09	368.35
Grade 4	-	-	356.97	342.99
Grade 5	-	-	229.68	241.98
Grade 6	-	-	305.34	294.87
Grade 7	411.99	410.22	234.03	234.03
Grade 8	366.06	369.14	278.35	278.35
Grade 9	403.63	422.27	401.68	398.92
Grade 10	489.57	447.51	514.60	459.52
Grade 11	476.43	482.62	518.82	471.60
Grade 12	319.39	338.52	391.82	391.82

*Source: Tables 45 - 47 (Appendix D, pp. 168 - 174).

Table 26

RANGE AND STANDARD DEVIATION OF PER PUPIL-ENROLLED DIRECT INSTRUCTIONAL EXPENDITURES BY GRADE FOR SCHOOLS CLASSIFIED BY GRADE RANGE*

Grade	Grades 1 - 6		Grades 1 - 8		Grades 1 - 9	
	Range	s	Range	s	Range	s
Grade 1	$292.02 - 537.37	$72.54	$236.80 - 533.83	$ 93.63	$254.05 - 594.04	$112.88
Grade 2	225.66 - 537.37	87.85	266.61 - 624.30	147.73	246.92 - 576.20	98.12
Grade 3	205.96 - 455.90	74.81	214.46 - 764.13	185.25	199.44 - 530.58	95.24
Grade 4	213.06 - 462.91	63.11	174.64 - 484.60	113.11	187.90 - 879.67	183.54
Grade 5	193.97 - 353.22	48.58	217.60 - 557.11	132.51	199.96 - 485.50	83.53
Grade 6	214.93 - 564.14	87.20	288.09 - 652.93	125.67	194.17 - 461.73	96.59
Grade 7	-	-	217.72 - 842.83	217.58	178.66 - 606.41	131.00
Grade 8	-	-	250.57 - 714.02	191.95	176.09 - 617.79	146.51
Grade 9	-	-	-	-	209.49 - 854.39	183.71
Grade 10	-	-	-	-	-	-
Grade 11	-	-	-	-	-	-
Grade 12	-	-	-	-	-	-

Table 26 (cont'd)

Grade	Grades 1 - 12		Grades 7 - 9		Grades 10 - 12	
	Range	s	Range	s	Range	s
Grade 1	$192.69 - 505.43	$ 87.78	$ -	$ -	$ -	$ -
Grade 2	238.54 - 499.47	84.43	-	-	-	-
Grade 3	208.10 - 414.50	56.88	-	-	-	-
Grade 4	215.95 - 444.39	70.82	-	-	-	-
Grade 5	213.41 - 410.43	69.89	-	-	-	-
Grade 6	209.36 - 500.11	97.76	-	-	-	-
Grade 7	301.16 - 629.68	106.64	302.24 - 371.74	29.00	-	-
Grade 8	188.90 - 482.24	89.89	314.25 - 359.15	24.29	-	-
Grade 9	175.61 - 777.24	148.75	309.82 - 429.77	51.51	-	-
Grade 10	405.61 - 714.49	97.84	-	-	423.26 - 748.34	93.63
Grade 11	332.79 - 946.15	177.29	-	-	363.03 - 682.65	89.46
Grade 12	217.50 - 824.44	168.77	-	-	276.78 - 566.75	86.44

Table 26 (cont'd)

Grade	Grades 7 - 12		Other	
	Range	s	Range	s
Grade 1	$ -	$ -	$324.77 - 551.05	$116.83
Grade 2	-	-	321.56 - 464.30	78.16
Grade 3	-	-	340.15 - 377.76	19.57
Grade 4	-	-	331.26 - 396.67	34.88
Grade 5	-	-	193.85 - 253.20	31.53
Grade 6	-	-	285.04 - 336.11	27.10
Grade 7	335.28 - 489.98	55.19	217.97 - 250.09	22.71
Grade 8	266.88 - 457.57	76.41	184.74 - 371.96	132.38
Grade 9	315.19 - 438.92	50.96	282.71 - 523.41	120.36
Grade 10	425.94 - 591.13	74.59	361.72 - 722.57	186.85
Grade 11	386.28 - 563.71	88.30	444.39 - 640.48	106.23
Grade 12	197.48 - 498.59	124.00	-	-

*Source: Tables 45 - 47 (Appendix D, pp. 168 - 174).

skewed and displayed some variation in dispersion patterns. The lowest cost program, Grade 5, had the least variation in terms of standard deviation, $83.77. The greatest variation among the schools in grade program costs was in the Grade 9 and Grade 12 programs. The "higher" grades (Grades 7 - 12) tended to display more variation in per pupil direct instructional expenditures than Grades 1 - 6.

Per Pupil Direct Instructional Expenditures by Grade Program for Schools in Urban and Rural Classifications

As was the case for the total sample, the mean per pupil direct instructional expenditures for the Grade 5 program in urban and rural schools were the lowest, $261.86 and $318.16 respectively. The highest mean per pupil cost was in Grade 10, $512.83 per pupil in urban schools, and $522.24 in rural schools. With exception of per pupil expenditures for Grade 7 and Grade 8, grade programs in rural areas had higher mean costs than schools in urban areas. The mean per pupil expenditures per program were higher than the sample means in rural districts, and lower than the sample means in urban areas, except in the case of Grades 7 and 8, where the positions relative to the sample mean were reversed.

The distributions of per pupil expenditures by program displayed some degree of skewness in all cases, with a tendency towards negative skewness in urban areas, and uniform positive skewness in the programs in rural areas. The greatest variation in program costs among schools for urban areas was in the junior high school programs (Grades 7 - 9), with both elementary and senior high school programs displaying consistent low variation. The lowest variation was for the Grade 1 program, with a standard deviation of $23.48, with Grade 12 having a standard deviation of $34.23. Grade 8, with a standard deviation of $185.64, had the

greatest variation among schools in urban areas.

In contrast, the variation of per pupil costs by program for rural schools was least in Grade 5, with a standard deviation of $85.96, while Grade 12 showed the greatest variation, with a standard deviation of $164.24. Although junior and senior high school programs tended to have greater variation than elementary grades, no distinct patterns were visible.

Per Pupil Direct Instructional Expenditures by Grade Program for Schools in School Districts, Divisions, and Counties

The mean direct instructional expenditures per pupil by grade program were lowest, $271.25, in Grade 5, in School Districts. The highest cost program was Grade 10, with a mean of $512.83. Mean expenditures per pupil tended to be lower in elementary grades and higher in junior and senior high school grades.

In school Divisions, the lowest cost program was Grade 3, with a mean expenditure per pupil of $320.38. The highest mean expenditure in this category was for Grade 10, $592.63 per pupil. The highest cost programs were at the senior high level, with junior high grades and elementary grades ranked second and third.

In Counties, the lowest cost program was Grade 5, with a mean expenditure of $310.60 per pupil. The highest cost program was Grade 11, with a mean cost of $500.04 per pupil.

Average expenditures in Counties and School Divisions tended to be higher in grade programs than in School Districts, except in Grades 7 and 8 where direct instructional expenditures were higher in School Districts. In School Districts the mean expenditures per program were less than the sample means, except in Grades 7 and 8, where the

respective means, $481.65 and $486.52, were higher than the sample means for Grades 7 and 8.

In School Divisions, the means for all grade programs except Grades 3, 7, and 9, were higher than the sample averages. In Counties, the means for grade programs compared to the sample means showed some variation. The means for Grades 1, 2, 6, and 9 were above the sample means, while the means for the remaining grades were below the sample averages.

The distributions for each program for the various categories showed varying degrees of skewness, although not significantly. The distributions for Districts tended to be negatively skewed while those of Divisions and Counties tended to be positively skewed.

In Districts, the least variation among schools in per pupil cost of direct instructional expenditures was in Grade 1, where the standard deviation was $23.48. The greatest variation was in Grade 8, with a standard deviation of $185.64. Junior high school programs showed the greatest variation in per pupil expenditures.

In Divisions, the Grade 3 program showed the least variation, while in Counties the Grade 5 program was least varied. The greatest standard deviation in Divisions, $199.45, was in Grade 12, while in Counties, Grade 1 had the highest standard deviation, $180.52. In Divisions and Counties, the junior and senior high school grades tended to have the greatest variation in per pupil direct instructional expenditures, although considerable variation was evident within some of the programs at the elementary level. The dispersion patterns of the grade programs in Counties and Divisions tended to follow those of the sample more closely than did those of School Districts.

Per Pupil Direct Instructional Expenditures by Grade Program for Schools Classified by Grade Range

Grades 1 - 6 programs were offered in four types of schools, elementary, Grades 1 - 8 type, elementary-junior high, and Grades 1 - 12 type schools. Several of the "other" type of schools also offered the elementary (Grades 1 - 6) programs. Few distinct patterns in per pupil expenditures for Grade 1 - 6 programs were evident among these types of schools.

The lowest mean per pupil expenditures for Grades 1 - 6 programs tended to be found in elementary schools. As most of these schools were located in urban districts, or in rural centres of larger population, student enrollments tended to be large enough to support this kind of school organization. The larger enrollment per grade program in this type of school was a contributing factor to the lowest per pupil costs. Grades 1 - 8 type schools tended to have the highest per pupil costs in grade programs The least variation among schools within grade programs was in the elementary schools, "other" type of schools and Grade 1 - 12 type of schools categories. Schools in grade programs in Grades 1 - 8 type schools displayed consistently high variation in per pupil costs. The per pupil costs of programs in elementary schools, tended to be lower than the sample averages, while the means for the programs in other schools tended to be higher than the sample means.

Junior high school, or Grade 7 - 9, programs were offered in six of the eight types of schools. The per pupil costs of these programs tended to be fairly constant among the types of schools. The lowest Grade 7 mean per pupil cost, $234.03 was in the "other" category, as was the lowest Grade 8 mean per pupil cost, $278.35. The remainder of the

types of schools displayed relatively uniform mean program costs. All of the types of schools, except elementary-junior high schools, were consistent in Grade 9 per pupil expenditures. In elementary-junior high schools, the Grade 9 mean per pupil cost was $541.31, more than $135.00 per pupil higher than in any other type of school. Junior high schools tended towards the lower end of the range of per pupil expenditures by grade program. Junior high schools also consistently displayed less variation in per pupil costs of schools within programs, as did junior-senior high schools. Grades 1 - 8 and 1 - 9 types of schools displayed the greatest variation. Only junior high schools had mean program costs consistently below the sample means, while both this type of school and junior senior high schools were uniformly less varied than the sample, in terms of standard deviation.

Four types of schools offered senior high school (Grades 10 - 12) programs, Grades 1 - 12 type schools, senior high schools, junior-senior high schools, and "other"types of schools. Per pupil costs of these programs tended to decrease as the grade level increased, for most types of schools. The lowest per pupil costs, $489.57, $476.43, and $319.39, for Grades 10, 11, and 12 respectively, were in senior high schools, while the highest costs tended to be in Grades 1 - 12 type schools. Senior high schools also displayed the least variation among schools within programs in terms of standard deviation. Senior high schools were the only type of school to be consistently below the sample parameters.

VI. ANALYSIS OF PER PUPIL DIRECT INSTRUCTIONAL EXPENDITURES BY CURRICULAR PROGRAMS

This section is composed of four parts. Part one contains an analysis of the per pupil costs for all schools in the sample. Part two deals with costs according to the classification of schools as urban and rural. Part three provides an analysis of per pupil expenditures according to schools in the three types of school jurisdictions. Part four contains an analysis of the expenditure patterns for curricular programs according to schools classified by grade range. The terms cost and expenditure, used synonymously in this section, are interpreted to mean direct instructional expenditures. Tables 27 to 34 tabulate the data with respect to this section.

Direct Instructional Expenditures Per Pupil by Curricular Programs for All Schools in the Sample

The mean expenditure per pupil for curricular programs ranged from $13.81 to $118.29. The non-instruction program was the least costly, while Language Arts had the highest mean cost. The "basic core" of programs, including Language Arts, Social Sciences, Mathematics, Science, Physical Education and Fine Arts, tended to have higher mean costs per program than the remaining programs, although Physical education appeared to be less costly than many of the programs. Vocational Education per pupil costs were the highest among the second group of programs. The distributions for each program tended to display some skewed characteristics, although only the Vocational Education program showed any marked tendency, in this case a positive skewness. The Language Arts and Vocational Education programs displayed the greatest

Table 27

MEAN AND MEDIAN PER PUPIL-ENROLLED DIRECT INSTRUCTIONAL EXPENDITURES BY PROGRAM FOR ALL SCHOOLS IN THE SAMPLE*

Program	Mean	Median
Language Arts	$118.29	$117.24
Social Sciences	55.02	53.02
Mathematics	55.86	54.52
Science	43.46	42.97
Physical Education	19.77	18.25
Fine Arts	24.47	22.61
Second Languages	16.52	13.42
Home Economics	16.74	14.78
Industrial Arts	19.71	16.67
Vocational Education	43.42	26.98
Special Classes	22.16	23.16
Non-Instruction	13.81	10.03

*Source: Tables 48 - 50 (Appendix E, pp. 175 - 181).

Table 28

RANGE AND STANDARD DEVIATION OF PER PUPIL-ENROLLED DIRECT INSTRUCTIONAL EXPENDITURES BY PROGRAM FOR ALL SCHOOLS IN THE SAMPLE*

Program	Range	s
Language Arts	$57.93 - 224.85	$35.94
Social Sciences	26.03 - 90.62	14.10
Mathematics	38.08 - 95.79	11.83
Science	13.08 - 81.78	17.26
Physical Education	9.69 - 43.28	8.97
Fine Arts	3.46 - 65.37	11.87
Second Languages	1.23 - 41.93	11.34
Home Economics	2.01 - 45.01	11.43
Industrial Arts	2.35 - 58.12	14.97
Vocational Education	2.13 - 162.57	43.72
Special Classes	0.62 - 67.45	17.86
Non-Instruction	1.06 - 61.06	11.78

*Source: Tables 48 - 50 (Appendix E, pp. 175 - 181).

Table 29

MEAN AND MEDIAN PER PUPIL-ENROLLED DIRECT INSTRUCTIONAL EXPENDITURES BY PROGRAM FOR SCHOOLS CLASSIFIED AS URBAN AND RURAL*

Program	Urban		Rural	
	Mean	Median	Mean	Median
Language Arts	$93.18	$83.27	$123.57	$124.89
Social Sciences	54.29	54.53	55.17	52.93
Mathematics	48.69	47.72	57.37	56.39
Science	44.35	47.36	43.28	41.82
Physical Education	20.63	24.11	19.59	18.22
Fine Arts	23.63	22.96	24.65	22.14
Second Languages	26.53	30.49	13.41	12.39
Home Economics	16.33	16.85	16.87	13.03
Industrial Arts	15.01	15.92	21.65	18.10
Vocational Education	88.68	84.00	32.10	20.68
Special Classes	34.43	26.01	18.33	16.25
Non-Instruction	16.59	16.74	13.53	9.99

*Source: Tables 48 - 50 (Appendix E, pp. 175 - 181).

Table 30

RANGE AND STANDARD DEVIATION OF PER PUPIL-ENROLLED DIRECT INSTRUCTIONAL EXPENDITURES BY PROGRAM FOR SCHOOLS CLASSIFIED AS URBAN AND RURAL*

Program	Urban		Rural	
	Range	s	Range	s
Language Arts	$60.32 - 139.03	$25.48	$57.93 - 224.85	$35.74
Social Sciences	29.95 - 77.07	14.52	26.03 - 90.62	14.14
Mathematics	40.93 - 58.13	6.01	38.08 - 95.79	12.23
Science	16.64 - 81.78	22.45	13.08 - 80.49	16.21
Physical Education	9.69 - 42.46	14.36	5.93 - 43.28	7.55
Fine Arts	8.68 - 40.21	8.46	3.46 - 65.37	12.54
Second Languages	4.19 - 41.93	12.63	1.23 - 35.35	9.06
Home Economics	6.29 - 23.74	5.40	2.01 - 45.01	12.95
Industrial Arts	2.35 - 26.11	8.27	2.44 - 58.12	16.81
Vocational Education	38.62 - 141.92	14.27	2.13 - 162.57	35.73
Special Classes	23.16 - 67.45	18.79	0.62 - 59.77	16.28
Non-Instruction	3.34 - 30.56	10.93	1.06 - 61.06	11.93

*Source: Tables 48 - 50 (Appendix E, pp. 175 - 181).

Table 31

MEAN AND MEDIAN PER PUPIL-ENROLLED DIRECT INSTRUCTIONAL EXPENDITURES BY PROGRAM FOR SCHOOL CLASSIFIED BY DIVISION, DISTRICT AND COUNTY*

Program	Divisions		Districts		Counties	
	Mean	Median	Mean	Median	Mean	Median
Language Arts	$128.50	$124.89	$93.18	$83.27	$120.70	$123.52
Social Sciences	58.09	61.46	54.29	54.53	53.47	51.71
Mathematics	55.91	56.50	48.69	47.72	58.23	55.67
Science	41.71	41.61	44.35	47.36	44.19	42.39
Physical Education	18.67	16.89	20.63	24.11	20.12	20.01
Fine Arts	27.93	25.23	23.63	22.96	22.82	20.82
Second Languages	16.36	17.01	26.53	30.49	12.08	11.75
Home Economics	22.71	19.07	16.33	16.85	14.54	12.25
Industrial Arts	22.57	20.52	15.01	15.82	21.14	17.34
Vocational Education	40.82	39.27	88.68	84.00	29.20	18.58
Special Classes	21.74	21.33	34.43	26.01	16.77	5.90
Non-Instruction	10.23	9.53	16.59	16.74	15.19	12.09

*Source: Tables 48 - 50 (Appendix E, pp. 175 - 181).

Table 32

RANGE AND STANDARD DEVIATION OF PER PUPIL-ENROLLED DIRECT INSTRUCTIONAL EXPENDITURES BY PROGRAM FOR SCHOOLS CLASSIFIED BY DIVISION, DISTRICT, AND COUNTY*

Program	Divisions Range	s	Districts Range	s	Counties Range	s
Language Arts	$72.20 - 203.71	$38.21	$60.32 - 139.03	$25.48	$57.93 - 224.85	$34.44
Social Sciences	26.03 - 90.62	16.52	29.95 - 77.07	14.52	31.25 - 86.20	12.48
Mathematics	41.73 - 68.36	8.69	40.93 - 58.13	6.01	38.08 - 95.79	13.93
Science	16.59 - 80.49	17.18	16.64 - 81.78	22.45	13.08 - 76.44	15.79
Physical Education	9.12 - 43.28	8.07	9.69 - 42.46	14.36	5.93 - 36.83	7.30
Fine Arts	3.46 - 65.37	15.08	8.68 - 40.21	8.46	7.35 - 50.40	10.68
Second Languages	2.89 - 35.35	10.79	4.19 - 41.93	12.63	1.23 - 28.55	8.12
Home Economics	2.01 - 43.48	17.27	6.29 - 23.74	5.40	2.80 - 45.01	10.61
Industrial Arts	3.01 - 52.43	16.87	2.35 - 26.11	8.27	2.44 - 58.12	17.58
Vocational Education	2.13 - 93.56	33.07	38.62 - 141.92	46.27	4.15 - 162.57	37.91
Special Classes	11.29 - 37.89	10.24	23.16 - 67.45	18.79	0.62 - 59.77	18.63
Non-Instruction	4.60 - 31.23	6.61	3.34 - 30.56	10.93	1.06 - 61.06	13.63

*Source: Tables 48 - 50 (Appendix E, pp. 175 - 181).

Table 33

MEAN AND MEDIAN PER PUPIL-ENROLLED DIRECT INSTRUCTIONAL EXPENDITURES BY PROGRAM FOR SCHOOLS CLASSIFIED BY GRADE RANGE*

Program	Grades 1 - 6		Grades 1 - 8		Grades 1 - 9		Grades 1 - 12	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Language Arts	$134.57	$125.91	$150.75	$149.90	$141.03	$135.45	$114.36	$114.91
Social Sciences	44.52	42.49	51.31	52.93	57.21	54.74	55.37	53.55
Mathematics	49.12	47.40	62.70	64.36	66.02	62.36	55.94	59.92
Science	24.95	24.13	34.71	32.57	41.11	39.15	49.15	48.58
Physical Education	10.97	11.42	21.53	23.68	24.19	22.79	19.15	18.25
Fine Arts	26.15	24.34	31.47	26.19	26.33	26.87	21.58	20.39
Second Languages	2.81	2.81	12.25	-	13.89	11.69	15.36	14.68
Home Economics	-	-	-	-	11.11	11.11	9.66	7.11
Industrial Arts	-	-	-	-	16.00	-	11.99	10.25
Vocational Education	-	-	-	-	17.14	8.65	18.96	16.15
Special Classes	38.83	28.35	17.60	-	8.77	8.77	18.08	4.96
Non-Instruction	13.29	11.47	17.10	13.22	10.03	6.57	14.69	9.99

Table 33 (cont'd)

Program	Grades 7 - 9 Mean	Grades 7 - 9 Median	Grades 10 - 12 Mean	Grades 10 - 12 Median	Grades 7 - 12 Mean	Grades 7 - 12 Median	Other Mean	Other Median
Language Arts	$83.06	$85.19	$ 76.07	$ 80.00	$71.28	$73.82	$123.41	$115.38
Social Sciences	60.11	60.94	60.26	61.21	67.05	73.36	58.02	52.06
Mathematics	45.19	42.17	53.55	56.39	54.87	54.10	50.26	50.17
Science	41.12	44.20	66.67	69.36	65.74	65.07	39.42	40.20
Physical Education	23.60	19.39	28.01	27.40	18.45	17.85	14.33	13.57
Fine Arts	25.66	24.11	15.38	17.26	19.60	21.67	29.54	19.64
Second Languages	5.95	4.81	29.46	25.91	15.88	14.13	9.72	10.64
Home Economics	20.61	14.93	18.90	16.25	23.17	19.17	13.36	13.36
Industrial Arts	13.84	14.00	25.22	20.40	29.89	25.97	10.16	10.16
Vocational Education	6.82	6.82	100.94	101.20	29.86	25.92	39.50	39.50
Special Classes	26.01	26.01	-	-	-	-	12.14	11.29
Non-Instruction	3.76	3.34	6.24	6.24	27.52	25.32	15.40	19.40

*Source: Tables 48 - 50 (Appendix E, pp. 175 - 181).

Table 34

RANGE AND STANDARD DEVIATION OF PER PUPIL-ENROLLED DIRECT INSTRUCTION EXPENDITURES BY PROGRAM FOR SCHOOLS CLASSIFIED BY GRADE RANGE*

Program	Grades 1 - 6 Range	s	Grades 1 - 8 Range	s	Grades 1 - 9 Range	s
Language Arts	$101.52 - 203.71	$32.73	$125.25 - 180.11	$16.57	$104.41 - 224.85	$29.98
Social Sciences	29.95 - 63.67	8.27	34.94 - 65.80	10.57	42.25 - 77.07	10.14
Mathematics	38.08 - 67.48	8.01	44.97 - 78.22	10.97	41.73 - 95.79	15.70
Science	13.08 - 47.68	9.58	25.22 - 51.94	8.89	28.46 - 59.43	9.71
Physical Education	9.68 - 20.85	7.58	8.04 - 33.93	9.79	16.28 - 33.16	5.78
Fine Arts	18.29 - 43.48	6.64	12.50 - 50.40	14.91	7.35 - 56.46	14.81
Second Languages	1.44 - 4.19	1.94	-	-	1.35 - 30.83	12.33
Home Economics	-	-	-	-	6.22 - 16.00	6.92
Industrial Arts	-	-	-	-	-	-
Vocational Education	-	-	-	-	4.15 - 38.62	18.74
Special Classes	5.90 - 67.45	16.52	-	-	2.64 - 14.91	8.68
Non-Instruction	4.60 - 30.56	7.34	6.19 - 33.08	10.99	1.06 - 31.23	9.22

Table 34 (cont'd)

Program	Grades 1 - 12 Range	s	Grades 7 - 9 Range	s	Grades 10 - 12 Range	s
Language Arts	$79.70 - 145.40	$18.72	$72.20 - 89.65	$ 8.29	$60.32 - 83.64	$ 8.98
Social Sciences	39.05 - 75.67	12.39	47.83 - 70.72	11.00	33.05 - 74.73	12.67
Mathematics	43.87 - 63.36	8.92	39.92 - 56.50	7.66	43.85 - 65.75	7.20
Science	31.59 - 61.16	10.69	29.28 - 46.80	8.03	49.51 - 81.78	11.36
Physical Education	12.40 - 26.62	4.94	13.16 - 42.46	13.49	17.58 - 43.28	8.61
Fine Arts	9.25 - 35.84	7.25	14.20 - 40.21	12.49	3.46 - 24.71	7.51
Second Languages	1.23 - 35.35	10.29	2.89 - 11.28	3.81	22.22 - 41.93	7.66
Home Economics	2.80 - 22.44	7.16	10.26 - 42.31	15.11	6.29 - 43.48	11.08
Industrial Arts	2.44 - 28.73	10.35	4.43 - 22.95	7.72	2.35 - 58.12	20.15
Vocational Education	2.13 - 39.69	10.57	-	-	46.66 - 162.57	43.80
Special Classes	0.62 - 59.77	25.05	-	-	-	-
Non-Instruction	4.59 - 61.06	15.87	1.39 - 6.55	2.61	1.91 - 10.57	6.12

Table 34 (cont'd)

Program	Grades 7 - 12 Range	s	Other Range	s
Language Arts	$57.93 - 85.07	$10.57	$79.12 - 167.38	$35.56
Social Sciences	31.25 - 86.20	20.96	26.03 - 90.62	26.31
Mathematics	48.91 - 62.79	4.99	41.06 - 60.37	7.00
Science	56.65 - 76.44	7.77	16.59 - 64.21	19.75
Physical Education	15.12 - 23.80	3.24	9.12 - 20.56	4.47
Fine Arts	8.98 - 27.39	6.81	17.56 - 65.37	20.27
Second Languages	7.74 - 23.81	6.91	6.08 - 12.44	3.16
Home Economics	9.74 - 45.01	13.35	2.01 - 24.72	-
Industrial Arts	22.71 - 44.91	10.16	3.01 - 17.34	-
Vocational Education	20.90 - 46.59	10.72	5.43 - 73.56	-
Special Classes	-	-	3.79 - 31.33	8.77
Non-Instruction	9.37 - 54.84	16.85	4.77 - 20.98	7.28

*Source: Tables 48 - 50 (Appendix E, pp. 175 - 181).

variation in per pupil costs, with standard deviations of $35.94 and $43.72 respectively. The remainder of the programs were relatively uniform in cost variation.

Per Pupil Direct Instructional Expenditures in Urban and Rural Classifications

The highest cost programs in urban schools were Language Arts and Vocational Education, with mean per pupil expenditures of $93.18 and $88.68 respectively. The lowest cost programs were Industrial Arts, Home Economics, and Non-instruction, at $15.01, $16.33, and $16.59 respectively. The mean per pupil costs of the remaining programs fell into two groups, the one group including Social Sciences, Mathematics, and Science, whose mean costs ranged from $44.35 to $54.29, and another group, including Physical Education, Fine Arts, Second Languages, and Special classes, whose per pupil costs ranged from $20.63 to $34.43.

In contrast, the highest cost program in rural schools was Language Arts with a mean per pupil expenditure of $123.57. The remaining programs fell into two groups, one including Social Sciences, Mathematics, and Science, where the mean costs were $55.17, $57.37 and $43.28 respectively, and a second group, which contained the remaining programs, ranging in mean per pupil cost from $13.41 to $32.10. The lowest cost programs were Second Languages and Non-instruction.

All the cost distributions for programs in both types of classifications displayed some skewness. The only program to show a significant degree of skewness was the Vocational Education program in the rural classification. The greatest variation in terms of standard deviation in both classifications was in the Language Arts program. In addition, costs in the Science program in the urban classification were

widely dispersed, as were costs in the Vocational Education program in the rural classification. The least variation in program costs in the urban category was in the Home Economics and Mathematics Programs, while Physical Education had the least variation among the programs in the rural classification. The parameters of the two classifications, urban and rural, tended to parallel those of the sample.

Direct Instructional Expenditures by Program for Schools Classified by Division, County, and School District

As the schools in School Districts were all drawn from urban areas, the patterns within the classification were identical to those of the urban classification.

In School Divisions, the mean per pupil cost was highest in Language Arts, $128.50, with lowest cost, $10.23 per pupil, for Non-Instruction. Outside of Language Arts, two groups of programs according to average costs were visible, the first group, ranging from $40.82 to $58.09, included Vocational Education, Social Sciences, Mathematics and Science; the second group, ranging from $10.23 to $27.93, included the remaining programs. The same patterns were evident for County program costs, although the Vocational Education program was included in the second group. While Language Arts was highest cost County program, Second Languages was the lowest cost program. School Districts paralled the County and Division program costs in order of magnitude. The only noticeable difference was the noticeably higher cost of Vocational Education in Districts.

Although all the distributions of program costs displayed some skewed characteristics in all categories, only the Vocational Education and Special Classes programs in the County classification showed any

marked skewness. The greatest variations in program costs per pupil in all classifications were in Language Arts and Vocational Education. In Divisions, the least variation was in Non-instruction, in Districts in Mathematics, and in Counties in Physical Education. Variations in cost patterns within programs tended to parallel the sample variations in all classifications.

Direct Instructional Expenditures Per Pupil by Program in Schools Classified by Grade Range

The various types of schools classified by grade range tended to follow the patterns of the sample of all schools in terms of the order or magnitude of per pupil program costs. That is, the Language Arts program had the highest mean per pupil costs, with Social Sciences, Mathematics, and Science following, although not in uniform order. Physical Education tended to be uniformly low in cost, while Fine Arts tended to be closer to the higher cost programs in magnitude of program costs. Only in the case of senior high schools was the predominant position of Language Arts usurped. In this category, Vocational Education, with a mean per pupil cost of $100.94, was the highest cost program. The cost of Special Classes was highest in elementary schools and junior high schools. The Second Languages program was highest in per pupil cost in senior high schools. No distinct patterns were visible in the dispersion patterns of per pupil costs by type of school according to grade range.

Chapter 5

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND SUGGESTIONS FOR FURTHER RESEARCH

This chapter contains 4 sections. The first section presents a summary of the study. Section two deals with a presentation of the major findings and conclusions of the study. Section three deals with implication of the analysis. The fourth section suggests directions for further research.

I. SUMMARY

Public and government concern with the rapid increases in the costs of education has suggested a need for closer examination of the resources being applied to education (inputs) and the value being received (outputs). As a result, a Research Project, entailing the cost analysis of a number of school jurisdictions in Alberta, was undertaken in 1969, at the request of the then Minister of Education, to establish what resources school authorities were allocating to the functions and programs of education.

One of the uses of such analyses is to assess the variations in costs of various types of schools in different types of jurisdictions. The problem of this study was of that nature, and related to the studies conducted within the terms of reference for the Cost Analysis Research Project.

The main problem of this study was: What variations were

evident among the unit costs of the schools of the sample of Alberta school jurisdictions included in the Cost Analysis Research Project conducted at the University of Alberta in 1969-70? Five sub-problems, related to the sample of schools included in this study, were investigated, including analyses related to enrollments, pupil-teacher ratios, and the average salaries, qualifications, and experience of the teachers in the schools of the sample. The major portion of the analysis was concerned with the per pupil costs of the function-object classifications of expenditures, and the grade and curricular programs of the schools. The analysis was based on the total sample of schools, as well as sub-classifications of the schools according to type of jurisdiction, grade range, and enrollment size.

To facilitate the analysis of the distributions of costs among the schools, a number of statistics descriptive of the distributions were computed. These included measures of central location, the arithmetic mean and the median, and measures of dispersion or scatter, the range and standard deviation. In addition, the function-object classifications for the total sample were connected to standard scores.

The sample included 69 schools, of which 21 were from School Divisions, 36 were from Counties, and 12 from urban School Districts.

II. FINDINGS AND CONCLUSIONS

Enrollments, Number of Teachers, and Pupil-Teacher Ratios

The mean enrollment of the sample of schools was 445.20, with an average staff complement of 23.04 teachers. The mean pupil-teacher ratio was 19.70. Enrollments and the number of teachers per school tended to be higher in urban schools than in schools from rural

jurisdictions. Urban schools also tended to be more varied in enrollments than their rural counterparts in terms of these two variables. Senior high schools had the highest average enrollments and number of teachers, as well as the greatest variations.

Pupil teacher ratios appeared to be fairly uniform for the schools when classified by area and jurisdiction. However, rural schools (schools from School Divisions and Counties) showed more variation. The highest average ratios were in the elementary schools category, with senior high schools having the lowest average ratios. Senior high schools, however, displayed the greatest variation in pupil-teacher ratios.

Average Salaries, Qualifications, and Experience

The mean teachers' salary for the sample was $8,000.94, while the mean years of training and experience were 2.93 and 8.51 respectively. Average salaries and qualifications were highest in urban schools, in both cases above the averages for the sample. The average for schools in School Divisions and Counties were below the sample. However, the teachers in rural areas had higher average years of experience than their urban counterparts. The lowest averages for salaries and qualifications were reported in the School Division category. Counties and School Divisions reversed positions in respect to years of experience. Urban schools tended to show the greatest variation in salaries and qualifications, but rural schools displayed greater variation in years of experience.

Senior high schools recorded the highest average salary, $9,442.22, and the highest average qualifications. The other types of

schools appeared to exceed senior high schools in mean years of experience. Senior high schools displayed the greatest variation in average salaries and qualifications, while elementary schools were the least varied.

The average years of experience variable was difficult to assess, as not all of the data from the studies were consistent in use of only years of experience for salary purposes.

Per Pupil Expenditures in Aggregate Function-Object Expenditure Classifications

The mean total expenditure per pupil for all schools in the sample was $720.86, ranging from $439.39 to $1,120.16, with a standard deviation of $166.21. None of the schools were less than -1.69 standard score units below the sample mean, while four schools (all senior high schools) exceeded the mean by more than +2.00 standard score units. The distribution of costs tended to parallel the distribution of schools by enrollments, with the highest costs associated with schools with larger enrollments. Higher total costs per pupil tended to parallel schools with higher average salaries.

The highest per pupil costs in the expenditure classifications were in the Direct Salaries (direct instruction) classification. The mean per pupil cost in this classification was $392.96. Pupil Transportation costs, and the expenditures for Indirect Salaries and Plant Operation were next in order of magnitude. The administration category was one of the lowest cost classifications. In contrast to its sixth ranked position in order of magnitude of cost, Plant Maintenance displayed the greatest variation among the schools in per pupil costs. Direct Salaries, which had the largest per pupil costs, ranked fifth in

variation among the schools in unit costs.

Mean per pupil costs for Total Expenditures, Administration, Indirect Salaries, and Direct and Indirect Expenditures were higher in urban schools than in schools from rural jurisdictions. The average costs for Direct Salaries were slightly higher in rural schools. In each instance, the higher cost category tended to be above the sample average, while the lower cost categories were below the sample in mean unit costs. Rural schools tended to display less variability in unit costs than urban schools but not uniformly.

Schools in School Districts, for the most part, displayed the highest average costs, with County and Division schools somewhat below. No significant patterns were evident between County and Division categories with respect to the magnitude or variation of unit costs.

Total Expenditures were highest in senior high schools and lowest in elementary schools. This pattern held for most expenditure classifications except Pupil Transportation, where the types of schools other than elementary, junior high, and senior high, tended to have higher per pupil costs for this classification. This pattern was for the most part related to the geographic location of the other types, most of which were in rural school jurisdictions.

Contrary to popular opinion, no "economies of scale" were evident in respect to the unit costs of schools by enrollment level. While lower costs tended to be associated with lower enrollments, and higher costs with larger enrollments there appeared to be no point at which the most "efficient" size of school operation could be identified.

Direct Instructional Expenditures Per Pupil for Grade Programs

For the total sample, grade program costs per pupil tended to increase as grade levels increased, with the lowest costs for elementary grades and the highest costs for senior high school grades. The higher grades also tended to display the greatest variation among schools in grade program costs.

Schools in rural jurisdictions appeared to have higher per pupil costs for grade programs than urban schools. Rural school unit costs for programs tended to be above the sample means while urban school costs appeared to be below. The higher average salary costs in urban School Districts appeared to be compensated for by the higher enrollments. The low enrollments of rural schools appeared to push the direct costs of grade programs up in rural areas.

The per pupil costs of Grade 1 - 6 programs appeared to be lowest in elementary schools (Grades 1 - 6) and highest in schools of the Grade 1 - 8 type.

Per pupil costs of Grade 7 - 9 programs tended to be lower in junior high schools. However, all the types of schools offering these programs were reasonably consistent in per pupil costs.

Senior high schools displayed the lowest per pupil direct instructional costs for Grade 10 - 12 programs, as well as the least variation among schools within the programs. Grades 1 - 12 types of schools appeared to have the highest per pupil costs for these programs.

Direct Instructional Expenditures Per Pupil for Curricular Programs

The highest cost per pupil for curricular or instructional programs for the sample was in Language Arts. The basic "core" of programs,

including Language Arts, Social Sciences, Mathematics, Science, Physical Education, and Fine Arts, tended to be the highest cost programs. Vocational Education appeared to be the most costly program among the remaining programs.

In urban schools, Language Arts and Vocational Education displayed the highest average unit costs. In rural schools, Language Arts was the most costly, with the remaining programs' average costs considerably below this program.

The unit costs of programs in the various types of schools according to grade range paralleled the patterns for the sample. Only in the case of senior high schools was the position of Language Arts usurped; the average unit cost of Vocational Education was higher in this type of school.

III. IMPLICATIONS AND RECOMMENDATIONS

The findings and conclusions arrived at in this study suggest a number of implications at both provincial and local administrative levels.

At the provincial level, the findings of this study suggest that:

(1) For meaningful analysis to be conducted on an inter-system or inter-school basis, consistent and reliable data are required. Essential to this condition is the existence of a standardized accounting system. In order to relate resources (inputs) to goals and objectives (outputs), the accounting system should be two-dimensional, including both traditional function-object classifications of expenditures as well as performance-based program classifications of expenditures. The cost

analysis studies conducted as part of the Research Project represented the initial attempts at the design and use of such an accounting system. Developments underway at the Department of Education, Government of Alberta, hold promise for further progress in this area.

(2) Cost differentials exist between urban and rural schools, both in function-object classifications of expenditures and in program costs. The present Foundation Program appears to compensate to some degree for the cost differentials among different types of schools according to grade range. A greater effort should be made to allow for the extremes of costs or extraordinary burdens born by urban or rural school systems, for example transportation costs in rural areas, and Vocational Education costs in urban schools.

(3) Current priority appears to be given to the Language Arts program, and other "core" programs, at least in terms of Direct Salary costs. In addition, a greater range and depth of programs appear to be offered to students in urban schools. If one of the goals of a provincially based financial plan is to improve the equity of educational opportunity, concerted efforts should be made to assess the current priorities of programs, as well as the opportunities for students to be exposed to as wide a range of educational experiences as possible, regardless of geographic location.

At the local level, the findings of this study suggest that:

(1) Local school systems should adopt a type of financial information system that enables consistent year-to-year analysis of the resource allocations within the system.

(2) Consideration should be given to the cost differentials experienced among different types and sizes of schools, with a view to

providing greater equality of educational opportunity.

(3) Questions should be raised about the priorities in teacher time and cost currently devoted to programs.

IV. SUGGESTIONS FOR FURTHER RESEARCH

A number of suggestions for further research were indicated by the findings and conclusions of this study. Included among these considerations are:

(1) What specific statistical relationships exist between salaries, and their structural components (experience and qualifications), and the costs of urban and rural schools?

(2) What specific statistical relationships exist between pupil-teacher ratios, and their components (enrollments and number of staff) and the costs of urban and rural schools, and of different types of schools according to grade range?

(3) Do costs other than Direct Salaries, contribute to significant differences between program costs?

(4) Do the current priorities in terms of program costs reflect the priorities of the public and of educators in the provision of educational services?

(5) Are the existing types of school organization the most effective and efficient organizational arrangements?

(6) Does the current mode of program description, i.e., by curricular and grade programs, reflect the goals and objectives of education in Alberta?

(7) What other factors, other than cost, can assist in the prediction of educational needs?

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APPENDIX A

NUMBER OF SCHOOLS IN SAMPLE, SCHOOL CLASSIFICATIONS AND PROGRAMS

Table 35

NUMBER OF SCHOOLS IN TOTAL SAMPLE, RURAL, URBAN, DIVISION, DISTRICT, AND COUNTY CLASSIFICATIONS BY GRADE*

	Sample	Rural	Urban	Division	District	County
	69	57	12	21	12	36
Grade 1	49	44	5	15	5	29
Grade 2	49	44	5	15	5	29
Grade 3	49	44	5	15	5	29
Grade 4	49	44	5	15	5	29
Grade 5	49	44	5	15	5	29
Grade 6	49	44	5	15	5	29
Grade 7	43	41	2	12	2	29
Grade 8	41	39	2	12	2	27
Grade 9	37	35	2	9	2	26
Grade 10	28	22	6	7	6	15
Grade 11	28	22	6	7	6	15
Grade 12	26	20	6	6	6	14

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

Table 36

NUMBER OF SCHOOLS IN RURAL, URBAN, DIVISION, DISTRICT, COUNTY AND TOTAL SAMPLE CLASSIFICATIONS BY PROGRAM*

	Rural	Urban	Division	District	County	Total
Language Arts	57	12	21	12	36	69
Social Sciences	57	12	21	12	36	69
Mathematics	57	12	21	12	36	69
Sciences	57	12	21	12	36	69
Physical Education	57	12	21	12	36	69
Fine Arts	56	12	20	12	36	68
Second Languages	29	9	9	9	20	38
Home Economics	21	7	6	7	15	28
Industrial Arts	17	7	6	7	11	24
Vocational Education	24	6	6	6	18	30
Special Classes	16	5	5	5	11	21
Non-Instruction	51	5	17	5	34	56

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

Table 37

NUMBER OF SCHOOLS IN TYPE OF SCHOOL CLASSIFICATIONS BY PROGRAM*

	Grades 1 - 6	Grades 7 - 9	Grades 10 - 12	Grades 1 - 9	Grades 7 - 12	Grades 1 - 8	Grades 1 - 12	Other
Language Arts	14	4	9	14	5	7	11	5
Social Sciences	14	4	9	14	5	7	11	5
Mathematics	14	4	9	14	5	7	11	5
Science	14	4	9	14	5	7	11	5
Physical Education	14	4	9	14	5	7	11	5
Fine Arts	14	4	8	14	5	7	11	5
Second Languages	2	4	9	4	5	0	11	3
Home Economics	-	4	8	2	5	1	6	2
Industrial Arts	-	4	8	1	4	0	5	2
Vocational Education	-	1	8	3	5	0	11	2
Special Classes	9	1	0	2	-	1	5	3
Non-Instruction	12	3	2	13	5	5	11	5

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

Table 38

TOTAL NUMBER OF SCHOOLS AND NUMBER OF SCHOOLS CLASSIFIED BY TYPE OF SCHOOL ACCORDING TO GRADE RANGE*

School Type	Number of Schools
Grades 1 - 6	14
Grades 7 - 9	4
Grades 10 - 12	9
Grades 1 - 9	14
Grades 7 - 12	5
Grades 1 - 8	7
Grades 1 - 12	11
Other	
Grades 1 - 2	1
Grades 1 - 11	2
Grades 3 - 6	1
Grades 9 - 12	1
Total	69

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

APPENDIX B

ENROLLMENTS, AVERAGE SALARIES, AVERAGE EXPERIENCE, AVERAGE QUALIFICATIONS, NUMBER OF TEACHERS AND PUPIL-TEACHER RATIOS

Table 39

ENROLLMENTS, AVERAGE SALARY, AVERAGE EXPERIENCE, AVERAGE QUALIFICATIONS, NUMBER OF TEACHERS, AND PUPIL TEACHER RATIO FOR SCHOOLS IN URBAN SCHOOL DISTRICTS*

School	Enrollment	Average Salary	Average Experience	Average Qualifications	No. of Teachers	Pupil Teacher Ratio
1	172	$ 8085.00	7.4	2.6	9	19.1
2	542	7290.00	4.8	2.3	25	21.7
3	365	8143.00	6.4	2.3	18	20.3
4	405	7851.00	5.6	2.5	19	21.3
5	643	8470.00	4.8	3.1	36	17.9
6	751	9774.00	5.9	4.0	44	17.1
7	200	8209.00	5.8	3.3	10	20.0
8	2464	10114.00	6.5	4.6	148	16.6
9	1205	10515.00	6.7	4.9	68	17.7
10	1581	9555.00	5.1	4.5	75	21.1
11	2022	10068.00	5.8	4.7	90	22.5
12	2224	9834.00	6.2	4.3	134	16.6

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

Table 40

ENROLLMENTS, AVERAGE SALARY, AVERAGE EXPERIENCE, AVERAGE QUALIFICATIONS, NUMBER OF TEACHERS, AND PUPIL TEACHER RATIO FOR SCHOOLS IN COUNTIES*

School	Enrollment	Average Salary	Average Experience	Average Qualifications	No. of Teachers	Pupil Teacher Ratio
1	93	$8286.00	12.0	2.3	6	14.8
2	149	7339.00	7.8	1.9	7	21.0
3	131	6921.00	7.3	2.0	6	21.1
4	103	7203.00	12.1	1.8	5	19.4
5	114	7284.00	8.5	1.5	7	17.5
6	269	8341.00	7.9	2.9	13	21.2
7	292	7569.00	9.0	2.0	15	19.6
8	434	8282.00	7.7	2.5	24	17.8
9	426	8070.00	7.0	3.3	23	18.5
10	481	7811.00	7.8	2.4	21	23.0
11	341	9012.00	6.0	3.5	20	17.6
12	761	6882.00	11.2	2.2	35	21.7

Table 40 (cont'd)

School	Enrollment	Average Salary	Average Experience	Average Qualifications	No. of Teachers	Pupil Teacher Ratio
13	386	$6665.00	6.4	3.3	20	19.3
14	565	9325.00	11.2	4.2	35	16.1
15	186	7635.00	9.5	3.0	10	18.6
16	285	7672.00	14.2	3.1	13	21.9
17	107	7782.00	7.8	3.5	6	17.8
18	465	7551.00	8.5	3.1	26	17.9
19	224	7381.00	12.6	2.6	11	20.4
20	399	7692.00	12.5	3.5	20	20.0
21	234	7605.00	13.1	2.6	12	19.5
22	245	6255.00	5.9	3.6	15	16.3
23	436	8290.00	10.5	4.0	25	17.4
24	635	8318.00	9.8	3.7	31	20.5

Table 40 (cont'd)

School	Enrollment	Average Salary	Average Experience	Average Qualifications	No. of Teachers	Pupil Teacher Ratio
25	767	$7362.00	11.1	2.5	28	27.4
26	684	7940.00	8.9	3.9	35	19.5
27	799	7576.00	12.1	3.0	37	21.6
28	404	6959.00	9.4	3.2	22	18.4
29	84	7016.00	6.3	2.8	4	21.0
30	78	7329.00	11.0	2.9	4	19.5
31	488	7575.00	6.7	3.1	20	24.4
32	196	7946.00	8.3	3.4	9	21.7
33	163	8278.00	10.1	2.3	9	18.1
34	564	9273.00	10.7	3.5	27	20.9
35	349	9591.00	8.2	4.1	19	18.4
36	391	8844.00	11.0	2.8	18	21.7

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

Table 41

ENROLLMENTS, AVERAGE SALARY, AVERAGE EXPERIENCE, AVERAGE QUALIFICATIONS, NUMBER OF TEACHERS, AND PUPIL TEACHER RATIO FOR SCHOOLS IN SCHOOL DIVISIONS*

School	Enrollment	Average Salary	Average Experience	Average Qualifications	No. of Teachers	Pupil Teacher Ratio
1	259	$8036.00	10.0	3.0	13	19.9
2	113	6412.00	7.0	1.2	5	22.6
3	464	6978.00	7.1	2.0	21	22.6
4	89	7775.00	7.6	2.2	4	22.3
5	147	7358.00	5.5	2.3	10	14.7
6	420	7885.00	7.1	2.4	21	20.0
7	33	7925.00	10.0	1.5	2	16.5
8	136	7028.00	5.0	2.1	6	22.7
9	340	8500.00	6.0	2.1	17	20.0
10	320	7203.00	7.3	3.1	15	22.1

Table 41 (cont'd)

School	Enrollment	Average Salary	Average Experience	Average Qualifications	No. of Teachers	Pupil Teacher Ratio
11	287	$7270.00	6.4	2.0	14	20.5
12	289	8504.00	6.2	3.1	17	17.0
13	281	8718.00	5.9	3.6	21	13.7
14	387	7572.00	12.1	2.2	17	22.8
15	654	7647.00	11.1	2.5	26	25.2
16	409	6874.00	6.4	3.1	20	20.5
17	250	7077.00	9.4	3.9	19	13.2
18	276	7921.00	10.1	3.0	15	18.4
19	111	8990.00	16.4	2.4	5	22.2
20	90	8531.00	11.0	2.8	5	18.0
21	62	9093.00	8.3	2.7	3	20.7

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

A P P E N D I X C

EXPENDITURE PER PUPIL BY AGGREGATE EXPENDITURE CLASSIFICATIONS

Table 42

EXPENDITURE PER PUPIL BY AGGREGATE EXPENDITURE CLASSIFICATIONS FOR SCHOOLS IN URBAN SCHOOL DISTRICTS*

Schools	1	2	3	4	5	6	7	8	9	10	11	12
Total Cost ($)	576.31	439.39	514.29	450.09	639.06	921.99	523.73	1120.16	1011.91	840.80	917.14	1048.58
Administration ($)	24.56	24.56	24.56	24.56	26.29	26.29	23.45	33.59	33.59	33.49	33.59	33.59
Direct Inst. ($)	339.37	277.82	332.71	288.44	374.81	482.69	369.60	444.75	462.14	357.26	408.16	468.11
Indirect Inst. ($)	50.35	42.94	45.91	40.11	89.20	119.02	45.24	215.68	165.06	130.60	131.60	163.76
Direct-Indirect Instruction ($)	33.38	24.44	25.73	25.07	51.28	92.94	18.18	120.45	80.49	77.49	78.03	108.72
Transportation ($)	.37	.37	.37	.37	.10	30.22	7.15	37.86	37.86	37.86	37.86	37.86
Plant Operation ($)	71.67	35.86	45.10	36.09	46.78	109.38	39.23	107.07	80.85	53.57	68.58	75.60
Plant Maint. ($)	42.31	19.10	25.61	21.15	36.30	47.15	4.21	26.19	26.43	26.08	26.30	25.97
Fixed Charges ($)	12.47	12.47	12.47	12.47	12.47	12.47	6.87	17.64	17.64	17.64	17.64	17.64

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

Table 43

EXPENDITURE PER PUPIL BY AGGREGATE EXPENDITURE CLASSIFICATIONS FOR SCHOOLS IN COUNTIES*

Schools	1	2	3	4	5	6	7	8	9	10	11	12
Total Cost ($)	892.18	762.25	667.62	750.86	804.87	674.59	625.03	762.18	751.78	658.52	799.89	506.27
Administration ($)	27.51	19.83	19.33	26.40	23.35	21.36	19.03	21.08	22.22	21.08	18.74	16.13
Direct Instruction ($)	480.06	385.92	336.16	342.55	385.42	347.63	364.55	454.30	453.49	336.55	501.72	302.63
Indirect Inst. ($)	47.88	29.15	67.54	36.45	31.65	50.59	47.55	51.50	34.16	57.75	38.33	37.76
Direct-Indirect Instruction ($)	48.56	24.55	39.26	36.02	39.37	40.15	37.71	25.44	32.00	26.27	38.33	22.74
Transportation ($)	186.28	191.08	119.86	181.12	170.59	102.88	87.95	122.25	104.33	159.58	107.59	52.58
Plant Operation ($)	74.07	68.07	80.14	80.16	111.18	60.45	47.93	58.89	53.61	39.61	59.10	38.26
Plant Maintenance ($)	18.51	29.29	25.33	27.66	30.00	44.93	17.18	18.78	31.39	22.46	17.65	17.27
Fixed Charges ($)	4.85	3.65	3.46	4.39	3.93	4.82	10.45	8.41	7.58	5.45	3.45	.86

Table 43 (cont'd)

Schools	13	14	15	16	17	18	19	20	21	22	23	24
Total Cost ($)	622.71	997.59	696.96	532.37	749.64	714.43	622.68	676.14	599.80	715.15	720.98	653.94
Administration ($)	16.30	16.33	16.25	16.07	16.33	16.32	16.19	16.27	16.04	16.25	32.12	31.84
Direct Instruction ($)	350.25	589.38	415.88	353.75	442.99	432.26	366.96	390.59	395.30	387.76	453.97	374.77
Indirect Inst. ($)	67.72	116.05	48.56	44.00	35.18	69.33	52.91	77.54	49.27	98.35	68.37	63.77
Direct-Indirect Instruction ($)	51.29	69.36	28.29	31.67	35.26	42.11	36.74	39.90	26.95	38.34	56.89	48.16
Transportation ($)	61.58	84.42	112.00	29.00	143.24	86.91	92.00	96.89	47.10	98.79	52.28	66.29
Plant Operation ($)	51.82	106.84	52.07	37.71	65.06	59.33	50.44	45.37	50.28	46.04	37.72	45.57
Plant Maintenance ($)	20.72	14.42	23.01	23.09	17.29	17.31	11.52	23.06	14.42	28.78	16.12	19.94
Fixed Charges ($)	.87	.87	.87	.87	.87	.87	.87	.87	.87	.87	4.27	3.43

Table 43 (cont'd)

Schools	25	26	27	28	29	30	31	32	33	34	35	36
Total Cost ($)	477.49	712.40	590.71	731.99	587.70	683.10	524.44	699.79	864.85	712.30	1065.16	749.85
Administration ($)	31.07	32.04	31.89	31.65	29.82	34.32	33.34	31.54	32.38	31.31	32.79	31.43
Direct Inst. ($)	290.02	425.37	357.29	368.81	340.14	382.42	318.77	356.10	459.53	438.42	513.11	400.59
Indirect Inst. ($)	31.20	82.24	52.66	84.57	10.55	25.12	40.51	18.25	37.94	19.17	28.90	31.09
Direct-Indirect Instruction ($)	34.28	44.90	39.09	55.03	33.55	36.10	24.40	30.84	30.02	23.71	44.20	18.84
Transportation ($)	45.76	47.11	65.80	122.60	95.50	97.08	53.13	84.65	114.57	44.39	129.34	108.72
Plant Operation ($)	29.48	46.30	28.91	47.03	35.92	44.36	38.36	59.14	74.09	39.20	62.81	47.64
Plant Maintenance ($)	12.27	30.88	11.63	18.84	7.65	28.15	12.00	26.68	26.75	26.25	26.22	25.60
Fixed Charges ($)	3.32	3.41	3.29	3.26	3.26	3.28	3.30	76.37	73.43	73.99	73.85	70.45

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

Table 44

EXPENDITURE PER PUPIL BY AGGREGATE EXPENDITURE CLASSIFICATIONS FOR SCHOOLS IN SCHOOL DIVISIONS*

Schools	1	2	3	4	5	6	7	8	9	10	11	12
Total Cost ($)	631.43	563.43	561.86	568.56	751.16	551.54	850.18	560.49	707.72	553.19	699.00	892.23
Administration ($)	16.64	16.64	16.64	16.64	16.64	16.64	16.64	16.64	16.64	16.64	16.64	16.64
Direct Instruction ($)	401.13	322.45	304.91	342.13	432.04	361.15	468.18	296.25	391.55	293.43	319.50	438.16
Indirect Inst. ($)	53.14	32.41	52.33	34.30	84.06	52.27	35.75	45.32	67.17	59.80	56.14	77.90
Direct-Indirect Instruction ($)	38.93	27.14	18.46	30.11	30.29	28.73	68.21	26.21	28.45	17.79	24.50	45.56
Transportation ($)	28.63	38.56	97.73	42.46	51.42	17.95	114.51	55.57	110.82	70.86	184.34	155.30
Plant Operation ($)	54.95	76.32	40.91	50.23	84.65	42.69	73.91	72.55	49.14	55.16	59.53	106.42
Plant Maintenance ($)	16.66	28.56	9.52	31.33	30.37	13.13	52.63	26.59	22.57	18.17	16.59	31.89
Fixed Charges ($)	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00

Table 44 (cont'd)

Schools	13	14	15	16	17	18	19	20	21
Total Cost ($)	1056.57	601.43	562.49	727.89	1081.92	807.50	723.92	881.72	1043.32
Administration ($)	16.64	26.50	26.76	26.55	28.96	26.23	27.17	26.81	29.19
Direct Instruction ($)	530.77	332.64	318.35	348.81	566.16	421.68	409.59	473.94	440.00
Indirect Instruction ($)	107.71	47.27	45.13	79.23	129.88	76.52	17.31	31.83	25.38
Direct-Indirect Instruction ($)	59.67	36.00	27.06	83.34	92.55	44.19	47.07	42.34	68.70
Transportation ($)	184.99	87.95	92.67	116.95	145.40	128.86	107.49	150.32	310.20
Plant Operation ($)	108.65	40.20	32.18	39.19	70.08	58.56	68.95	85.01	118.11
Plant Maintenance ($)	41.16	19.09	7.72	20.39	28.55	39.69	33.29	51.94	92.64
Fixed Charges ($)	20.00	11.79	9.62	13.42	20.32	1.77	13.03	19.00	18.09

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

APPENDIX D

DIRECT INSTRUCTIONAL EXPENDITURES PER PUPIL BY GRADE PROGRAMS

Table 45

DIRECT INSTRUCTIONAL EXPENDITURES BY GRADE PROGRAM
FOR SCHOOLS IN URBAN SCHOOL DISTRICTS*

Grade	Schools											
	1	2	3	4	5	6	7	8	9	10	11	12
1	$336.20	$292.02	$318.33	$338.00	$	$	$288.77	$	$	$	$	$
2	266.85	264.05	352.77	296.48			275.67					
3	319.32	216.77	225.08	292.73			390.57					
4	330.09	311.73	323.39	213.06			387.33					
5	204.35	259.15	296.65	277.88			271.25					
6	237.53	259.85	311.37	214.93			461.73					
7					371.74		591.56					
8					355.26		617.79					
9					355.31		507.12					
10						555.58		589.21	522.10	423.26	443.85	542.96
11						431.52		473.85	503.09	363.03	405.82	506.73
12						339.94		318.85	356.32	276.78	374.45	348.33

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

Table 46

DIRECT INSTRUCTIONAL EXPENDITURES BY GRADE
PROGRAM FOR SCHOOLS IN COUNTIES*

Grade	School 1	2	3	4	5	6	7	8	9	10	11	12
1	$351.50	$338.31	$254.05	$346.40	$448.18	$551.05	$314.27	$213.91	$321.81	$351.48	$	$306.54
2	356.77	257.96	246.92	576.20	411.08	321.56	280.70	315.28	450.89	267.39		232.01
3	418.85	338.38	315.92	338.90	419.64	377.76	309.47	243.65	289.45	280.01		317.81
4	389.61	358.29	294.23	187.90	373.59	342.99	313.42	289.62	320.69	214.32		216.95
5	485.50	199.96	302.34	362.27	393.37	193.85	260.49	226.47	409.24	227.15		339.60
6	436.94	204.51	278.63	252.77	414.61	285.04	413.36	252.87	442.45	263.12		265.91
7	359.64	453.41	178.66	298.74	186.70	217.97		515.05	360.64	273.56	410.22	
8	352.62	367.34	176.09	399.44	189.41	184.74		475.05	382.70	198.71	418.96	
9	854.39	446.59	513.04	454.99	821.88	282.71		311.42	457.34	209.49	422.27	
10						361.72		463.56	424.31		425.94	
11						471.60		531.34	439.04		562.51	
12								505.04	469.53		197.48	

Table 46 (cont'd)

Grade	School 13	14	15	16	17	18	19	20	21	22	23	24
1	$	$	$401.53	$577.68	$293.47	$379.15	$349.80	$505.43	$360.35	$	$	$352.13
2			323.90	314.78	624.30	398.46	415.28	238.54	255.22			296.31
3			483.29	340.34	764.13	293.91	266.62	208.10	455.90			268.91
4			622.22	239.88	252.07	278.31	268.77	290.91	462.91			268.61
5			289.24	377.18	254.55	285.18	423.53	213.41	353.22			319.78
6			385.45	194.17	652.93	245.96	459.87	451.61	297.79			290.19
7	326.47		436.00	297.89	429.89	408.77	429.65	387.76		401.87	422.60	346.43
8	316.26		406.58	339.81	266.02	429.06	404.77	280.24		266.88	317.76	366.46
9	309.82		403.02	631.72		399.29	490.37	348.95		315.19	434.61	454.72
10		582.81				509.84		650.68		436.34	447.51	423.86
11		473.04				946.15		360.26		563.71	482.62	443.65
12		566.75				396.41		349.97		338.52	498.59	217.50

Table 46 (cont'd)

Grade	School 25	26	27	28	29	30	31	32	33	34	35	36
1	$292.99	$	227.46	$318.17	$325.21	$533.83	$492.54	$342.09	$594.04	$192.69	$	$236.80
2	302.61		272.67	242.54	390.25	291.18	225.66	357.93	516.86	300.19		283.30
3	205.96		328.65	347.49	339.22	218.27	261.50	294.11	530.58	414.50		354.15
4	323.41		215.95	253.26	484.60	174.64	265.34	240.10	350.18	444.39		451.51
5	193.97		241.26	410.43	232.03	317.17	312.94	296.19	432.44	285.19		369.40
6	266.86		209.36	274.51	618.73	515.41	318.20	259.47	345.86	314.74		418.57
7		335.28	545.26	301.16	359.97	842.83		361.57	486.35	629.68		411.92
8		369.14	330.79	483.24				227.83	515.54	188.90		308.17
9		407.18	333.02	320.19				572.62	754.98	777.24	398.92	
10		546.91	405.61	714.49						487.76	459.52	
11		387.03	332.79	463.96						598.56	444.39	
12		206.21	688.59	449.30						562.03	391.82	

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

Table 47

DIRECT INSTRUCTIONAL EXPENDITURES BY GRADE PROGRAM
FOR SCHOOLS IN SCHOOL DIVISIONS*

Grade	School 1	2	3	4	5	6	7	8	9	10	11	12
1	$348.93	$320.93	$363.61	$366.97	$387.44	$283.52	$537.37	$278.31	$	$329.11	$314.09	$
2	499.47	266.61	355.93	281.53	464.30	321.61	537.37	304.40		287.22	324.83	
3	309.56	361.25	294.89	324.09	368.35	301.43	318.01	199.44		286.87	207.46	
4	399.69	304.52	237.08	307.54	396.67	401.75	318.01	288.31		258.05	319.38	
5	390.90	217.60	251.50	493.03	241.98	306.03	318.01	418.64		291.83	333.20	
6	500.11	288.09	283.66	493.03	294.87	323.82	318.01	217.85		301.90	357.98	
7	523.69	217.72		250.87	250.09	340.88		421.35	340.27			489.98
8	274.01	250.57		349.30	371.96	340.23		247.85	359.15			456.57
9	175.61				523.41	364.28		311.68	429.77			438.92
10	466.51				722.57	497.81						591.13
11	505.10				640.48	750.17						386.28
12	656.72					489.96						356.15

Table 47 (cont'd)

Grade	School 13	14	15	16	17	18	19	20	21
1	$	$324.77	$	$	$	$297.24	$353.46	$570.81	$309.79
2		337.76				289.27	463.22	298.55	557.60
3			340.15			361.20	426.24	492.34	214.46
4			331.26			335.89	329.70	879.67	417.83
5			253.20			309.25	244.51	364.90	557.11
6			336.11			416.43	564.14	283.29	417.83
7				302.24		352.44		606.41	612.02
8				314.25		412.71		611.35	714.02
9				336.11		385.24		606.48	
10	550.61				748.34	571.47			
11	682.65				469.59	530.27			
12	294.32				420.74	824.44			

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

APPENDIX E

DIRECT INSTRUCTIONAL EXPENDITURES PER PUPIL BY CURRICULAR PROGRAMS

Table 48

DIRECT INSTRUCTIONAL EXPENDITURES BY CURRICULAR PROGRAM
FOR SCHOOLS IN URBAN SCHOOL DISTRICTS*

Grade	School 1	2	3	4	5	6	7	8	9	10	11	12
Lang. Arts	$109.21	$103.01	$129.56	$113.54	$80.97	$ 80.00	$139.03	$ 61.53	$83.64	$60.32	$82.90	$ 74.51
Social Studies	38.78	29.95	42.14	43.73	47.83	56.04	77.07	58.66	71.15	61.21	71.94	53.02
Mathematics	46.48	40.93	47.35	45.40	41.13	57.35	48.09	49.75	57.28	43.85	58.13	48.51
Science	19.18	16.64	23.68	18.00	45.21	63.22	30.98	49.51	71.09	51.63	81.78	61.33
Physical Ed.	10.69	9.69	5.85	10.69	42.46	32.00	33.16	17.79	28.99	27.40	20.87	27.36
Fine Arts	22.81	21.84	23.12	33.83	40.21	16.73	31.88	18.16	24.71	17.80	8.68	23.85
Mod. Lang.				4.19	11.28	31.05	30.83	22.22	41.93	30.49	41.74	25.08
Home Ec.					19.54	13.91	16.00	16.85	23.74	6.29		18.01
Industrial Arts					15.92	22.71	16.00	15.08	26.11	6.89	2.35	
Voc. Ed.						108.84	38.62	141.92	46.66	59.17		136.88
Special	67.45	23.56	31.97	23.16	26.01							
Non-Instruct.	16.74	30.56	23.47	8.84	3.34							

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

Table 49

DIRECT INSTRUCTIONAL EXPENDITURES BY CURRICULAR PROGRAM FOR SCHOOLS IN COUNTIES*

Grade	School 1	2	3	4	5	6	7	8	9	10	11	12
Lang. Arts	$155.20	$151.34	$120.79	$145.12	$96.59	$167.18	$73.82	$76.22	$114.91	$101.52	$57.93	$104.12
Social Studies	60.47	52.93	62.47	53.11	59.54	50.85	74.96	86.20	53.55	39.10	69.49	39.05
Mathematics	57.03	71.57	64.79	54.64	59.92	48.21	54.52	62.79	45.50	38.08	54.02	46.70
Science	28.46	32.37	47.74	41.82	47.29	27.36	56.65	76.44	39.35	13.08	65.07	31.59
Physical Ed.	25.70	23.68	20.11	20.88	24.28	15.71	17.02	18.46	15.78	5.93	15.12	16.70
Fine Arts	26.07	50.40	19.71	31.78	35.84	32.36	21.88	18.08	20.39	18.29	21.67	30.60
Mod. Lang.	12.71		12.39		28.55	1.44	7.44	14.13	5.79		23.81	4.01
Home Ec.			5.45				9.74	19.17	5.77		17.08	13.03
Industrial Arts			4.82					25.09	13.72		22.71	2.44
Vocational Ed.			20.46	4.15	28.05		21.77	25.92	11.32		34.12	16.71
Special			4.96						59.77	34.46		0.62
Non-Instruct.	1.74		4.59	11.18	6.54	13.40	20.10	25.32	7.89	12.87	27.99	16.62

Table 49 (cont'd)

Grade	School 13	14	15	16	17	18	19	20	21	22	23	24
Lang. Arts	$113.33	$158.83	$149.90	$126.94	$126.25	$224.85	$134.50	$79.12	$144.74	$146.53	$126.78	$109.66
Social St.	52.07	46.45	59.94	48.66	42.25	49.78	73.34	78.49	43.02	65.73	50.09	50.46
Mathematics	44.95	78.22	44.97	53.87	59.34	79.37	61.99	41.06	64.92	95.79	62.77	69.24
Science	57.46	25.22	34.84	15.59	36.49	49.15	59.74	64.21	39.01	54.06	59.43	31.99
Physical Ed.	18.25	8.04	29.71	13.22	23.35	32.20	15.49	13.57	33.93	21.02	19.92	17.87
Fine Arts	23.33	23.16	40.42	25.21	19.54	36.81	17.89	17.56	26.19	41.73	7.35	11.73
Mod. Lang.	20.44						14.68	12.44				
Home Ec.	8.46		12.25					24.72				
Indust. Arts	10.25							17.34				
Voc. Ed.	13.30					8.65	16.00	73.56				
Special	1.74			5.90					17.60			
Non-Instruct.	12.38		33.08	13.50	21.58	20.80	11.81	20.98	23.31	10.58	9.78	1.64

Table 49 (cont'd)

Grade	School 25	26	27	28	29	30	31	32	33	34	35	36
Lang. Arts	$127.63	$131.88	$104.54	$134.53	$79.79	$145.40	$104.41	$63.35	$117.24	$89.41	$ 80.58	$160.34
Social Studies	51.36	61.21	52.06	50.42	43.02	47.80	56.37	31.25	34.84	53.92	33.05	47.69
Mathematics	83.77	88.30	47.75	47.45	43.87	61.50	61.96	48.91	47.20	39.92	56.39	54.96
Science	33.08	34.50	40.20	47.68	60.13	33.07	42.97	69.94	23.18	46.80	71.66	53.16
Physical Ed.	22.23	25.19	20.56	6.90	13.80	26.62	18.22	23.80	9.90	24.19	36.83	30.24
Fine Arts	7.84	16.65	19.64	21 26	9.25	18.85	10.59	8.98	24.25	14.20	9.62	42.54
Mod. Lang.			10.64		11.12	1.23	1.35	22.18		3.56	22.66	10.68
Home Ec.					22.44	2.80	6.22	45.01		10.26	15.66	
Industrial Arts					28.73			44.91		4.43	58.12	
Voc. Ed.			5.43		39.69	16.15		20.90		6.82	162.57	
Special			3.79	28.35					24.69			2.64
Non-Instruct.	6.57	3.55	19.40	7.41	61.06	15.84	5.94	54.84	9.66	1.39	1.91	1.06

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

Table 50

DIRECT INSTRUCTIONAL EXPENDITURES BY CURRICULAR PROGRAM
FOR SCHOOLS IN SCHOOL DIVISIONS*

Grade	School 1	2	3	4	5	6	7	8	9	10	11	12
Lang. Arts	$128.16	$125.25	$121.63	$145.08	$115.38	$99.11	$203.71	$115.94	$89.65	$131.33	$124.89	$85.07
Social Studies	61.46	34.94	42.07	56.09	90.62	75.67	63.67	60.39	70.72	42.84	41.32	73.36
Mathematics	68.36	64.36	42.21	53.90	60.37	57.79	67.48	41.73	56.50	49.23	50.39	54.10
Science	61.16	27.05	24.59	32.57	52.57	48.58	25.77	35.98	43.19	27.58	25.41	60.61
Physical Ed.	26.36	11.13	12.16	16.69	16.89	20.86	17.31	16.28	13.16	14.80	20.87	17.85
Fine Arts	24.58	12.50	24.44	19.21	65.37	22.41	43.48	27.68	16.35	28.62	26.53	27.39
Mod. Lang.	17.01				6.08	18.34			2.89			11.53
Home Ec.									42.31			24.86
Industrial Arts									22.95			26.86
Voc. Ed.	31.96					2.13						46.59
Special							37.89					
Non-Instruct.	9.53	9.68	8.30	13.22	20.10	5.35		4.71	6.55		4.60	9.37

Table 50 (cont'd)

Grade	School 13	14	15	16	17	18	19	20	21
Lang. Arts	$81.84	$167.38	$150.63	$72.20	$79.31	$121.33	$199.76	$160.80	$180.11
Social Studies	62.54	26.03	42.91	67.96	74.73	41.10	50.71	74.96	65.80
Mathematics	65.75	51.97	50.17	43.22	44.92	59.96	63.46	67.33	60.93
Science	69.36	16.59	23.55	29.28	80.49	54.53	41.61	43.51	51.94
Physical Ed.	17.58	11.50	9.12	14.60	43.28	12.40	19.25	32.42	27.52
Fine Arts		25.89	19.23	31.87	3.46	14.53	20.10	56.46	48.44
Mod. Lang.	24.07			6.07	25.91	35.35			
Home Ec.	13.28		2.01	10.33	43.48				
Industrial Arts	18.10		3.01	12.08	52.43				
Voc. Ed.	93.56				57.90	12.79			
Special		21.33	11.29			23.30		14.91	
Non-Instruct.		9.73	4.77		10.57	9.99	10.08	31.23	6.19

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

APPENDIX F

INSTRUCTIONAL COURSES CATEGORIZED BY PROGRAM

Table 51

BREAKDOWN OF PROGRAMS FOR GRADES 1 - 6*

Program	Courses
Language Arts	Language Printing and/or Writing Reading Library Periods and/or Story Time Spelling Literature Creative-Developmental Reading
Social Sciences	Enterprise Social Studies Health Religious Instruction
Mathematics	Arithmetic
Science	Science
Physical Education	Physical Education
Fine Arts	Music Art Drama Elementary Band Elementary Strings
Second Languages	French
Special Classes	Remedial Instruction Opportunity Room
Non-Instruction	Opening Exercises Home Room Period Supervised Study

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

Table 52

BREAKDOWN OF PROGRAMS FOR GRADES 7 - 9*

Program	Courses
Language Arts	Language Reading Creative Writing Creative-Developmental Reading Communications
Social Sciences	Social Studies Sociology Psychology Geography Anthropology Agriculture Social Studies Option Community Economics Religious Instruction Social Problems Health
Mathematics	Mathematics Mathematics Option
Science	Science Science Option
Physical Education	Physical Education Physical Education Option
Fine Arts	Music Art Drama Band Choral Music Music Appreciation Option Orchestra
Second Languages	French French Option
Home Economics	Home Economics
Industrial Arts	Industrial Arts

Table 52 (cont'd)

Program	Courses
Vocational Education	Typing
Special Classes	Opportunity Class Remedial Instruction
Non-Instruction	Supervised Study Library Study Hall Activities Noon-Hour Intermurals

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

Table 53

BREAKDOWN OF PROGRAMS FOR GRADES 10 - 12*

Program	Courses
Language Arts	English 10, 20, 30, 13, 19, 23, 33 Literature 11, 21 Reading 10, 19, 10/20 Language 21 and 22
Social Sciences	Social Studies 10, 20, 30, 13, 19, 23, 29 33, 36, 30/36 Psychology 20 Sociology 20 Geography 20 Economics 30
Mathematics	Mathematics 10, 20, 30, 12, 22, 32, 14, 15, 25, 31, 11, 21, 10X, 19, 29
Science	Biology 10, 20, 30, 10/20 Chemistry 10, 20, 30, 10X, 20X, 30X, 10/20 Physics 10, 20, 30, 22, 20X, 10/20, 30X Science 11, 15, 19 Chemistry-Biology 10, 20 Chemistry/Physics 10, 20 Physics/Biology 10
Physical Education	Physical Education 10, 20, 30, 10A, 20/30
Fine Arts	Music 10, 20, 30, 11, 21, 31, 14, 15, 11/13, 25, 11/31, 10/30, 35, 11/21/31, 21/31 Tutorial Music Art 10, 20, 30, 20/21, 21, 30/31 Drama 10, 20, 11, 30 Arts and Crafts 10, 20, 30
Second Languages	French 10, 20, 30, 11, 21, 31 German 10, 20, 30 Ukrainian 10, 20, 30 Latin 10, 20, 30

Table 53 (cont'd)

Program	Courses
Home Economics	Home Economics 10 Food and Nutrition 10, 20, 30 Fabrics and Dress 10, 20, 30, 20/30 Home Economics Crafts 10 Child Care and Home Nursing 10 Homes and Home Furnishings 20
Industrial Arts	Industrial Arts General 10 Drafting 10, 20, 12, 22, 32 I.A. Graphic Communications 10, 20, 30 I.A. Electronics 10, 20, 30 Electricity 10, 21 I.A. Materials 10, 20 I.A. Power Mechanics 10, 20 Woodworking 10
Vocational Education (Includes Business and Vocational Education)	Bookkeeping 10, 20 Accounting 30 Shorthand 10, 20, 30 Typewriting 10, 20, 30, 31 Data Processing 22, 32, 20 22, 32, 32, 32K Merchandizing 20, 30 Business Machines 30 Office Practice 30, 32 Health 10 Record Keeping 10 Clerical Practice 20 Law 20 Occupations 10 Business Fundamentals 10 Distributive Education 20, 30 Business Organization and Management 30 Secretarial Practice 35 STOP 31 Automotives 12, 22, 32, 19, 12/22, 22/32 Beauty Culture 12, 22, 32, 12/22 Building Construction 12, 22, 32, 19, 12/22, 22/32 Electronics 12, 22, 32, 12/22, 22/32 Machine Shop 12, 22, 32, 12/22 Commercial Art 12, 22, 12/22, 32

Table 53 (cont'd)

Program	Courses
	Electricity 12, 19, 22, 12/22 Food Preparation 19, 12, 22, 32, 29/32 General Technology 15/16 Graphic Arts 12, 22, 12/22, 32 Pipe Trades 12, 22, 12/22, 32 Vocational Experience 15/16 Welding 12, 19, 12/22, 32 Sheet Metal 12/19, 22, 12/22, 32 Commercial Foods 12/22, 32 Drafting 12, 22, 12/22, 32 Performing Arts 12/22, 32
Non-Instruction	Supervised Study Study Hall Library Noon-Hour Intermural Supervision

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

APPENDIX G

PER PUPIL COSTS IN AGGREGATE EXPENDITURE CLASSIFICATIONS IN STANDARD SCORE FORM

Table 54

PER PUPIL COSTS IN AGGREGATE EXPENDITURE CLASSIFICATIONS IN STANDARD SCORE FORM FOR SCHOOLS IN URBAN DISTRICTS*

Classification	Schools											
	1	2	3	4	5	6	7	8	9	10	11	12
Total Cost	-0.87	-1.69	-1.24	-1.63	-0.49	1.21	-1.19	2.40	1.75	0.72	1.18	1.97
Administration	0.11	0.11	0.11	0.11	0.38	0.38	-0.05	1.48	1.48	1.46	1.48	1.48
Direct Salaries	-0.78	-1.69	-0.88	-1.53	-0.27	1.31	-0.34	0.76	1.01	-0.52	0.22	1.10
Indirect Salaries	-0.29	-0.48	-0.40	-0.56	0.73	1.51	-0.42	4.04	2.71	1.81	1.84	2.68
Direct-Indirect	-0.43	-0.84	-0.78	-0.81	0.39	2.29	-1.12	3.55	1.72	1.59	1.61	3.01
Transportation	-1.52	-1.52	-1.52	-1.52	-1.52	-1.00	-1.40	-0.87	-0.87	-0.87	-0.87	-0.87
Plant Operation	0.53	-1.08	-0.67	-1.07	-0.59	2.24	-0.93	2.13	0.95	-0.28	0.39	0.71
Plant Maintenance	1.32	-0.47	0.03	-0.32	-0.85	-1.69	-1.62	0.07	0.09	0.06	0.08	0.06
Fixed Charges	-0.12	-0.12	-0.12	-0.12	-0.12	-0.12	-0.42	0.17	0.17	0.17	0.17	0.17

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

Table 55

PER PUPIL COSTS IN AGGREGATE EXPENDITURE CLASSIFICATIONS
IN STANDARD SCORE FORM FOR SCHOOLS IN COUNTIES*

Classification	Schools											
	1	2	3	4	5	6	7	8	9	10	11	12
Total Cost	1.03	0.25	-0.32	0.18	0.51	-0.28	-0.58	0.25	0.19	-0.38	0.48	-1.29
Administration	0.56	-0.60	-0.68	0.39	-0.07	-0.37	-0.72	-0.41	-0.24	-0.41	-0.77	-1.16
Direct Salaries	1.28	-0.10	-0.83	-0.74	-0.11	-0.66	-0.42	0.90	0.89	-0.83	1.59	-1.32
Indirect Salaries	-0.35	-0.84	0.16	-0.65	-0.78	-0.28	-0.36	-0.26	-0.71	-0.09	-0.60	-0.62
Direct-Indirect	0.26	-0.83	-0.16	-0.31	-0.16	-0.12	-0.23	-0.79	-0.49	-0.75	-0.20	-0.92
Transportation	1.69	1.77	0.55	1.60	1.42	0.25	0.00	0.59	0.28	1.23	0.33	-0.61
Plant Operation	0.64	0.37	0.92	0.92	2.32	0.03	-0.54	-0.04	-0.28	-0.92	-0.03	-0.98
Plant Maintenance	-0.52	0.31	0.01	0.19	0.37	1.52	-0.62	-0.50	0.47	-0.22	-0.59	-0.62
Fixed Charges	-0.54	-0.60	-0.61	-0.56	-0.59	-0.54	-0.23	-0.34	-0.39	-0.50	-0.61	-0.76

Table 55 (cont'd)

Classification	Schools 13	14	15	16	17	18	19	20	21	22	23	24
Total Cost	-0.59	1.66	-0.14	-1.13	0.17	-0.04	-0.59	-0.27	-0.73	-0.03	0.00	-0.40
Administration	-1.14	-1.13	-1.14	-1.17	-1.13	-1.13	-1.15	-1.14	-1.17	-1.14	1.26	1.22
Direct Salaries	-0.63	2.88	0.34	-0.57	0.73	0.58	-0.38	-0.03	0.03	-0.08	0.89	-0.27
Indirect Salaries	0.17	1.43	-0.33	-0.45	-0.68	0.21	-0.22	0.42	-0.32	0.97	0.18	0.06
Direct-Indirect	0.39	1.21	-0.66	-0.51	-0.34	-0.03	-0.28	-0.13	-0.72	-0.20	0.64	0.25
Transportation	-0.46	-0.07	0.41	-1.02	0.95	-0.02	0.07	0.15	-0.71	0.18	-0.62	-0.38
Plant Operation	-0.36	2.12	-0.35	-1.00	0.24	-0.02	-0.43	-0.65	-0.43	-0.62	-1.00	-0.65
Plant Maintenance	-0.35	-0.84	-0.17	-0.17	-0.61	-0.61	-1.06	-0.17	-0.84	0.27	-0.70	-0.41
Fixed Charges	-0.76	-0.76	-0.76	-0.76	-0.76	-0.76	-0.76	-0.76	-0.76	-0.76	-0.57	-0.61

Table 55 (cont'd)

Classification	Schools 25	26	27	28	29	30	31	32	33	34	35	36
Total Cost	-1.46	-0.05	-0.78	-0.07	-0.80	-0.23	-1.18	-0.13	0.87	-0.05	2.07	0.17
Administration	1.10	1.25	1.22	1.19	0.91	1.59	1.44	1.17	1.30	1.14	1.36	1.15
Direct Salaries	-1.51	0.47	-0.52	-0.35	-0.77	-0.15	-1.09	-0.54	0.98	0.67	1.76	0.11
Indirect Salaries	-0.79	0.55	-0.23	0.61	-1.33	-0.95	-0.55	-1.13	-0.61	-1.10	-0.85	-0.79
Direct-Indirect	-0.39	0.10	-0.17	0.56	-0.42	-0.31	-0.84	-0.55	-0.58	-0.87	0.06	-1.09
Transportation	-0.73	-0.71	-0.39	0.59	0.13	0.15	-0.61	-0.06	0.45	-0.76	0.71	0.35
Plant Operation	-1.37	-0.61	-1.40	-0.58	-1.08	-0.70	-0.97	-0.03	0.64	-0.93	0.13	-0.55
Plant Maintenance	-1.00	0.43	-1.05	-0.49	-1.36	0.22	-1.02	0.11	0.12	0.08	0.07	0.03
Fixed Charges	-0.62	-0.62	-0.62	-0.62	-0.62	-0.62	-0.62	3.41	3.24	3.28	3.27	3.08

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.

Table 56

PER PUPIL COSTS IN AGGREGATE EXPENDITURE CLASSIFICATIONS IN STANDARD SCORE FORM FOR SCHOOLS IN SCHOOL DIVISIONS*

Classifications	Schools 1	2	3	4	5	6	7	8	9	10	11	12
Total Cost	-0.54	-0.95	-0.96	-0.92	0.18	-1.02	0.78	-0.96	-0.08	-1.01	-0.13	1.03
Administration	-1.08	-1.08	-1.08	-1.08	-1.08	-1.08	-1.08	-1.08	-1.08	-1.08	-1.08	-1.08
Direct Salaries	0.12	-1.03	-1.29	-0.74	0.57	-0.47	1.10	-1.42	-0.02	-1.46	-1.08	0.66
Indirect Salaries	-0.21	-0.76	-0.24	-0.71	0.59	-0.24	-0.67	-0.42	0.15	-0.04	-0.14	0.43
Direct-Indirect	-0.18	-0.71	-1.11	-0.58	-0.57	-0.64	1.16	-0.76	-0.65	-1.14	-0.84	0.13
Transportation	-1.03	-0.86	0.16	-0.79	-0.63	-1.21	0.45	-0.56	0.39	-0.30	1.66	1.16
Plant Operation	-0.22	0.74	-0.86	-0.44	1.12	-0.78	0.64	0.57	-0.48	-0.21	-0.01	2.10
Plant Maintenance	-0.66	0.26	-1.21	0.47	0.40	-0.94	2.11	0.10	-0.21	-0.55	-0.67	0.51
Fixed Charges	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30

Table 56 (cont'd)

Classifications	Schools 13	14	15	16	17	18	19	20	21
Total Cost	2.02	-0.72	-0.95	0.04	2.17	0.52	0.02	0.97	1.94
Administration	-1.08	0.41	0.45	0.42	0.78	0.37	0.51	0.45	0.81
Direct Salaries	2.02	-0.88	-1.09	-0.65	2.54	0.42	0.24	1.19	0.69
Indirect Salaries	1.21	-0.37	-0.42	0.47	1.79	0.40	-1.15	-0.77	-0.94
Direct-Indirect	0.77	-0.31	-0.72	1.85	2.27	0.06	0.20	-0.02	1.18
Transportation	1.67	0.00	0.08	0.50	0.99	0.70	0.33	1.07	3.83
Plant Operation	2.21	-0.89	-1.25	-0.93	0.46	-0.06	0.41	1.14	2.63
Plant Maintenance	1.23	-0.48	-1.35	-0.38	0.25	1.11	0.62	2.06	5.20
Fixed Charges	0.30	-0.15	-0.27	-0.06	0.32	-0.71	-0.09	0.24	0.19

*Source: Compiled from the studies of the Unit Cost Analysis Research Project.