# Cost Analysis of Secondary School Supply Expenditures to Generate a Cost Per Pupil Per Credit Course with a Complementary Educational Supplies Cost Index

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## ABSTRACT

The two main purposes of this study were: (1) to conduct a cost analysis of 1982 secondary school supply expenditures in order to determine a cost per pupil per credit course for each course offered by the school as well as a cost per pupil breakdown of supply expenditures for service areas such as administration, library, guidance services and audio visual services; (2) to develop education supply price subindexes for the major expenditure areas of the schools ordinary supply budget for the base year 1982. The cost per pupil per credit course that was generated, represented the supply funding required to present an adequate classroom program. The education supply price subindex provided base year values which could be recalculated yearly to provide a reliable inflation indicator to be used to adjust the cost per pupil in the cost analysis.

Data were generated by examining the supply expenditures of one collegiate institute and vocational school with an enrollment of 1500 students located in Southern Ontario.

A Cost Per Pupil Per Credit Course Detail Sheet was developed to collect, assign and apportion all the supply expenditures to appropiate courses or service areas. Approximately 200 courses were analyzed using 1982 calendar year financial information, and a cost per pupil was determined for each course.

Education Supply Price Subindexes were determined for each expenditure area within the school which exhibited

distinct spending patterns. Supply Price Subindexes were developed for the following expenditure areas: (1) Administration, (2) Art, (3) Audio Visual, and Library, (4) Business Education, (5) English, (6) Family Studies, (7) History and Geography, (8) Mathematics, (9) Moderns, (10) Music, (11) Physical Education, (12) Science, (13) Technical Education. The component items, prices and weightings used to build these 1982 base year indexes were obtained directly from the data gathered during the cost analysis.

The supply cost per pupil per credit course varied ($1.03 to $80.71) as a result of (1) the nature of the currriculum (2) cost and amount of required supplies (3) equipment service costs (4) textbook costs. In general, courses which were vocational in nature were substantially more expensive than those with a more academic curriculum.

The course costs obtained may not be directly applicable to all secondary schools due to local curriculum requirements.

The Educational Supply Price Subindexes were developed from actual supply items and expenditure patterns exhibited within one school and will, therefore, have a high degree of reliability only for this school. Applicability of these subindexes to other schools is possible where the supply components used in presenting a school's curriculum is similar to the school in this study.

If curriculum requirements become more standardized both the cost per pupil data and the price index material will become more universally applicable.

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# CHAPTER I

## SIGNIFICANCE, PROBLEMS, DELINEATION AND ASSUMPTIONS

### Introduction

During the current period of economic recession there appears to have developed a conservative trend in educational budgeting across Canada. This has resulted in a demand for accountability and budget restraint in the field of educational finance. As pointed out by Wilfred J. Brown (1981 p.97) in the Canadian Teachers Federation publication Education Finance in Canada:

> It has become apparent that Canada, in common with most of the industrialized world, is experiencing a neo-conservative consolidation which is being reflected in a mood of discipline, order and gradualism in public consciousness and government policy-making.

According to Eugene W. Ratsoy (1983 p.17) in his article Recent Trends in Financing Canadian Education in Ontario, this mood has generated a policy of establishing "limits on expenditure increases" at the provincial level. Knezevich (1973 p.159) in his book Program Budgeting indicates:

> Until recently, many public educational and elementary institutions felt they were not and should not be concerned with cost of service performed. This questionable tradition is being shattered by the escalating investment in education, the growing demands for accountability, and the increasing recognition that waste is not a virtue.

Since we are faced with a situation of restraint, limitations in educational financing and demands for accountability, it

becomes imperative that educational administrators get the most out of their limited financial resources.

Educational Finance in Ontario

In Ontario, restraint has taken the form of a limit on the percentage increase in the basic provincial education grant ceilings to local school boards. Any revenue needed above these grants for local school board use must be raised from local taxpayers. During this period of public restraint conscientious trustees are reluctant to raise taxes. These two factors result in a reduction of financial resources available for education when the price of the components of education increase at a faster rate than the revenue generated. It is necessary to examine local school board financing to analyze the actual impact of these constraints.

Education Finance at County Level

An examination of a large Southern Ontario Board of Education Secondary School Ordinary Budget Expenditure indicates the extent of changes that have taken place in the last few years in the field of secondary school finance as a result of this restraint phenomenon. This portion of a county board of education budget consists of expenditures made for all non-capital items such as salaries, employee benefits, supplies, services, maintenance and repairs. It would generally include all the day to day operational costs inherent in running a county school system. The Secondary School Ordinary Expenditure Budget of this board has

increased from $25,169,712 in 1978 to $34, 231,528 in 1982. This represents a 36 percent increase in expenditure over this period. (Table 1)

At the same time this board of education, similar to many others in Ontario, has been experiencing declining enrollment. As a result, an examination of the Ordinary Expenditures Per Secondary School Pupil reveals that the total dollar increase of 36 percent had allowed an expenditure per pupil increase of 53 percent.

Table I

County Board of Education
Recognized Ordinary Expenditures
Per Secondary School Pupil

1978 - 1982

| Year | # Pupils | Budget | Per Student Budget | % + (-) |
|---|---|---|---|---|
| 1982 | 11055 | $ 34 231 528 | $ 3 097 | 8.8% |
| 1981 | 11332 | 32 248 583 | 2 846 | 18.2% |
| 1980 | 11988 | 29 387 677 | 2 407 | 7.3% |
| 1979 | 12245 | 27 475 814 | 2 244 | 10.8% |
| 1978 | 12433 | 25 169 712 | 2 024 | BASE% |

1978 - 1982 36% Increase in ordinary expenditure (approximately 8% per annum)

1978 - 1982 53% Increase in ordinary expenditure per secondary school pupil (approximately 11% per annum)

The Rates of Provincial Grant on Ordinary Expenditure Per Secondary Pupil (Table II) in this county showed a 46 percent increase in provincial funding while the County Average Secondary School Residential Mill Rate (Table III) increased 28 percent for the same period. These figures reflect the impact of provincial grant limits combined with a local resistance to tax increases for education. Nevertheless, the policy of restraint at provincial and local levels when implemented, still allowed a 53 percent increase in per pupil spending on Secondary School education in this county over the five year period (1978 - 1982). An examination of economic indicators to estimate the effect of inflation on prices over these same years is necessary to determine the net result on local education finance.

Table II

County Board of Education
Rates of Grant on Ordinary Expenditures
Per Secondary School Pupil

1978 - 1982

| Year | # Pupils | Rate of Grant | Per Student Budget | % + (-) |
|---|---|---|---|---|
| 1982 | 11055 | $ 18 680 580 | $ 1 690 | 4.4% |
| 1981 | 11332 | 18 305 008 | 1 615 | 15.6% |
| 1980 | 11988 | 16 545 227 | 1 397 | 10.0% |
| 1979 | 12245 | 15 553 162 | 1 270 | 9.5% |
| 1978 | 12433 | 14 424 187 | 1.160 | BASE% |

1978 - 1982 46% Increase in ordinary expenditure grant per secondary school pupil (approximately 10% per annum)

Table III

County Average Residential Mill Rate
For Secondary Schools

1978 - 1982

| Year | Rate | % + (−) |
|---|---|---|
| 1982 | 48.604 | 9.2% |
| 1981 | 44.470 | 4.2% |
| 1980 | 42.602 | 0.1% |
| 1979 | 42.273 | 11.6% |
| 1978 | 37.863 | BASE% |
| 1978 - 1982 | Total Residential Mill Rate Increase = 28.4% (approximately 6.5% per annum) | |

Adequacy of Current County Education Expenditure

Indexes such as the Consumer Price Index or Educational Price Index are examples of economic indicators used to allow a comparison of expenditures of different years on the basis of constant rather than current dollars. Lawton (1983 p.33) specifies:

> Current dollars are those actually spent with no adjustment made for inflation. Constant dollars are expenditures for which adjustments for inflation have been made.

The Consumer Price Index (Table IV) increased 50.1 percent (approximately 11 percent per annum) during this period. This is very close to the increase in per pupil expenditure in this board. This index is used by many boards of education as an inflation indicator for budgeting purposes even though it is based on consumer rather than education items. An examination of an index based on educational

components provides a better view of the impact of inflation on prices over this time period.

In the board under examination the per pupil expenditure increased 53 percent while the Ontario Education Price Index (Non Salary) increased 68.4 percent (approximately 14% per annum) (Table IV) during the years 1978 - 1982. This index was composed of supply and equipment items currently used by boards of education in the province and therefore should better reflect the effect of inflation on the price of these items. In terms of constant dollars the expenditure per pupil appeared to have decreased. Did this constant dollar reduction have an adverse effect on the presentation of school programs?

Table IV

Ontario Education Price Index

1978 - 1982

| Year | Consumer Price Index | Education Price Index | Education Price Index (Non Salary) |
|---|---|---|---|
| 1982 | + 10.8 | + 12.2 | + 12.5 |
| 1981 | + 12.5 | + 11.6 | + 17.2 |
| 1980 | + 10.2 | + 9.6 | + 13.6 |
| 1979 | + 9.2 | + 7.1 | + 12.4 |
| 1978 | + 8.8 | + 6.8 | + 7.5 |
| Total Increase From Base Year 1978 | + 50.1 | | + 68.4 |
| Approximate % per annum | | | + 14 |

Secondary School Teaching and Non-Teaching Salaries Wages and Employee Benefits

Over this period of time, salaries across Ontario tended to chase the inflation rate as represented by the Consumer Price Index. Teaching and non-teaching salaries, wages and employee benefits attributable to secondary schools in this county (Table V), constituted approximately 89 percent of Ordinary Expenditures each year during 1978 - 1982. This major section of the budget increased 37 percent in dollar terms and 54.8 percent on a per pupil basis from 1978 to 1982 (Table V). This portion of the budget actually increased at a slightly greater rate than the budget as a whole, and as a result other areas of the budget tended to decrease.

Table V

County Secondary School Teaching and Non-Teaching Salaries, Wages and Employee Benefits

1978 - 1982

| Year | Expenditure | (-) | # Pupils | Expenditure | (-) |
|---|---|---|---|---|---|
| 1982 | 34 127 576 | 8.1 | 11055 | 3087 | 10.8% |
| 1981 | 31 579 136 | 9.4 | 11332 | 2787 | 15.7% |
| 1980 | 28 863 300 | 9.4 | 11988 | 2408 | 11.7% |
| 1979 | 26 388 204 | 6.1 | 12245 | 2155 | 7.6% |
| 1978 | 24 879 396 | BASE | 12433 | 2002 | BASE% |

1978 - 1982 Increase in Expenditure 37%
(8.5% per annum)
Increase in Per Pupil Expenditure 54%
(11% per annum)

Need for An Examination of Supply Expenditures

There was a subjective feeling among administrative personnel in this county in 1981 - 1982 that the secondary school supply budget portion of the total secondary school ordinary budget may have been one of the areas that decreased, in constant dollar terms, to a greater degree than that experienced by other budget areas. The Secondary School Ordinary Supply Budget was the portion of the budget which was allocated to the secondary schools to purchase supplies for school and classroom operation. Even though this budget only represented 2.4 percent of the total Secondary School Operating Expenditure Budget (Table VI) it did represent a significant expenditure ($926,106 in 1982) to this board. Administrators at that time were concerned with the potential impact of changes in the level of this expenditure on program. Burrup (1977 p.27) states in Financing Education in a Climate of Change:

> Research studies of cost-quality relation in education have been numerous but their results have not been conclusive.

Even though it is difficult to gauge a quantifiable relationship between cost and quality, it is not difficult to understand that the presentation of adequate classroom program depends on a resonable level of expenditure for current texts, classroom supplies, and maintenance of classroom equipment.

Initial evidence that there was reason for concern was the fact the Ordinary Supply Budget for secondary schools in this county had increased only 43 percent over the years 1978 - 1982. This was substantially less than the 68.4 percent inflation rate for this type of item as indicated by the Ontario Education Price Index (Non Salary).

Table VI

County Board of Education
Ordinary Supply Budget
Per Secondary School Pupil

1978 - 1982

| Year | # Pupils | Budget | Per Student Budget | + % (-) |
|---|---|---|---|---|
| 1982 | 11055 | $ 926 106 | $ 183.77 | 15.8% |
| 1981 | 11332 | 820 155 | 72.37 | 13.0% |
| 1980 | 11988 | 767 556 | 64.02 | 9.8% |
| 1979 | 12245 | 714 337 | 58.33 | NIL % |
| 1978 | 12433 | 725 150 | 58.33 | BASE% |

1978 - 1982 43.6% In ordinary supply budget per secondary school pupil (approximately 9.5% per annum)

Need for Research

The general opinion among principals in this county during 1982 was that current supply expenditures still enabled the secondary schools to present courses which met Ontario Ministry of Education Curriculum Guideline requirements. They considered that the quality of programs defined by these requirements was at least adequate. They also felt that any further budget reduction in constant dollar terms could impair the ability of schools to meet these curricular requirements. Therefore, they contended that the 1982 level of secondary school supply expenditure should be thought of as a base level of spending for delivery of adequate program. Provision would also have to be made to allow for adjusting the base year costs for inflation and anticipated changes in curriculum as dictated by the Ontario Ministry of Education.

In order to implement this proposal a method was needed to generate data on the present and future supply cost per pupil per secondary school credit course. This would entail a detailed breakdown of the cost of the items used in the present courses. It would also require the development of a reliable economic indicator indigenous to this board to indicate the effect of inflation on the cost of the items included in the cost per pupil data. The cost per pupil data and the cost indicator would be used primarily for budgeting purposes but would also provide additional information for

use in curriculum planning, public and trustee information and managerial decision making in appropriate areas.

Problem Statement

This thesis examined these two distinct but related problems. The first problem was to develop a method for generating a supply cost per pupil for secondary school credit courses. The second problem required the development of an economic indicator that would reliably reflect the effect of inflation and program component changes on the supply cost per pupil data.

Study Location

The Board of Education that was chosen to participate in in this research was chosen for two reasons. First, the writer was employed with this board and was familiar with the accounting system, programs and personnel. Second, this board was concerned that their method of arriving at and allocating a supply budget to the secondary schools was obsolete and was possibly not providing adequate revenue to present adequate program. The school selected for analysis was the home base of the writer because he was familiar with the various departmental programs as well as the school's internal accounting system. This school was the largest (1550 students) of the thirteen secondary schools in the county and contained the greatest variety of programs (approximately 200 courses) thereby providing maximum information. The cost analysis was conducted for the fiscal

year 1982 since this year was considered to reflect adequate program levels. In this county, the fiscal year is based on the calendar year. Therefore, expenditures examined for the fiscal year 1982 included those made in January and June from school year 1981 - 1982 and September to December from the school year 1982 - 1983. Use of data from this year also allowed an examination of actual rather than predicted costs.

Research Stages

The study consisted of five phases:

1) Development of a model for the unit cost analysis of the cost of credit courses in secondary schools.
2) Application of the model to the analysis of the ordinary supply budget expenditures of one large secondary school for the year 1982.
3) Generation of a supply cost per pupil per credit course for all courses offered as outlined in the schools Student Course Selection Guide.
4) Investigation of non classroom costs inherent in the ordinary supply budgets in this secondary school and generation of a cost per pupil for these non classroom areas.
5) Development of an economic indicator to be utilized for updating the cost per pupil data in years when the model is not utilized.

Assumptions - Cost Analysis

1) The bases used for prorating expenditures was realistic and equitable.

2) Variation in expenditure between individual courses did not indicate a variation in the quality of program but rather a variation in the cost of the required supply components.

3) The courses presented at the school studied in 1982 met the requirements of Ontario Ministry of Education Curriculum Guidelines and were therefore, assumed to be of at least adequate quality.

4) All course costs which fell into the category of ordinary supply budget expenditures were variable costs.

5) Even though some aministrative costs were fixed, they were assumed to be variable in nature in order to adapt the model to analyse the non classroom expenditure portion of a schools ordinary supply budget.

6) Since the costs arrived at are applicable to an individual school only, they are useful as guidelines but should not be thought of as absolute universal costs without further study and adaptation to local areas.

Assumptions - Education Supplies Cost Index

1) The quality and quantity of items included in the index would remain constant in order that any price increases would only be attributable to inflation.
2) The items included in the development of subindexes were common to all secondary schools in this board of education.

Limitations

1) School size factors were not considered as only one school was examined.
2) Basic level courses and school-based special education courses were not included as information was not available at this school.
3) Continuing education courses offered at this school were excluded as they were funded in a different manner.

Delimitations

1) The study is delimited to secondary school ordinary supply expenditures for the calendar year 1982.
2) The study examined expenditures of one large collegiate institute and vocational school which was only one of the secondary schools under the jurisdiction of this of this board of education.
3) The method developed was devised specifically to analyze cost of courses and may not be completely applicable to other user areas of supply budgets within a school.

The delimitations and limitations mentioned above indicate that the use of the per pupil supply costs or the economic indicator arrived at by this study should only be used as guidelines for other schools or boards. Further analysis for verification should be made before attempting to utilize the costs or indexes developed as standards. There is no indication inherent in the costs discovered that variance in program cost has an effect on program quality.

Definitions

It is important that there is a clear understanding of the terminology used in this study in order to allow the consistent application of the model developed. This then permits comparisons to be made between various schools or boards when analysis of costs is based on the same methodolgy and terminology.

Ordinary Supply Expenditure - spending at the school level-- classroom supplies, texts, machine service, support services.

Cost Accounting - method of accumulating historical costs and tracing them to units of output and to departments. Provides information used mainly by internal decision makers.

Managerial Accounting - similar to Cost Accounting.

Unit Costs - cost of production divided by units produced.
- in essence an average cost of product.

Variable Cost - cost per unit varies in direct proportion to changes in production rate.

Fixed Cost - cost which is unchanged by changes in the rate of production.

Cost Allocation - assignment of relevant costs to appropriate departments, processes or products.

Budget - quantitative expression of a plan of action and an aid to coordination and implementation.

Adequate Program - Program outlined by Ministry of Education curriculum.

Adequate Supply Budget - sufficient funds to purchase necessary supplies to deliver a course as outlined by Ministry of Education Curriculum Guidelines.

Conclusion

Recent public demand for restraint in the area of public finance resulted in the imposition of limits on Ontario Government funding for secondary school education. A concern was raised within the administration of this board of education that these grant limits could adversely effect the presentation of adequate classroom program over time as a result of supply costs increasing at a faster rate than provincial funding.

The main problems in this thesis involved: (1) the development of a method for generating a supply cost per pupil for present secondary school courses in order to accurately determine the funding necessary to deliver these courses, (2) the development of an economic indicator to be used in the future to adjust these course costs for the effect of inflation in order to generate the required funds to ensure the same level of program in the future and thereby prevent any further deterioration of program.

The data necessary to attain these two major objectives were obtained by a cost analysis of the supply budget of a large collegiate institute and vocational school and the preparation of educating supply price sub-indexes from this data.

# CHAPTER II

## REVIEW OF COST ANALYSIS LITERATURE

### Introduction

The utilization of cost accounting methodology in education is a reasonably recent phenomenon. The concepts inherent in this traditionally business oriented dicipline have been gradually introduced to education over the last decade. Even now the educational application of cost accounting techniques is not generally well understood or widely utilized by educators. The major impact appeared in the development of Program Budgeting Systems or as a tool in research designed to examine the cost of presenting specific programs in the schools. Both of these uses involved a macro-examination of the expenditures of schools. All costs incurred in operating a school system were examined. There appeared to be little research available which concentrated on any micro-expenditure area in education such as the detailed examination of secondary school supply costs.

### Program Budgeting

Knezevich (1973 p.10) defines Program Budgeting as:

> A decision system concerned with improving resource allocation decisions when an educational institution is confronted with competive objectives and limited resources.

Several offshoots of this type of budgeting, such as zero based budgeting, were introduced in education during the same decade. He indicates more specifically (p.71) that:

> Program budgeting in education may be defined as decisions technology concerned with the identification, analysis and appraisal of public school expenditure aternatives by and through the application of the logic of economics.

Knezevich reveals similar types of systems were in operation in industry for many years as evidenced by General Motors' 1924 budget. The introduction in education did not become evident until the late 1960's and early 1970's. The fact (p.23) that the:

> National Academy for School Executives began to disseminate information on program budgeting and its application to education, in Canada as well as the United States, as early as 1969.

was pinpointed by Knezevich as the beginning of a movement towards a more sophisticated cost-oriented or cost-benefit-oriented approach to educational budgeting.

Duke's (1972) work in Alberta resulted in the development and publication of a program budgeting system for the Alberta Department of Education. The resultant Accounting and Budgeting Manual provides an excellent example of Canadian work in this area.

The cost accounting principles, involved in allocating costs to specific programs, used as a basis for obtaining data for these systems, are consistent with the methodology needed to conduct any unit cost analysis. The difference is in the object of the analysis. Program budgeting takes a macro-viewpoint and is concerned with total school system expenditure. The information gathered is used to make intelligent decisions on total system resource allocation.

A cost analysis of secondary school supply budget expenditures must take a micro-viewpoint. This enables the supply costs within the school to be examined in detail. The information generated in this type of study allows for an intelligent discussion of the allocation of financial resources within this specific area and the resultant impact of funding variations on program.

There have been numerous research studies conducted, including Dukiet (1973), Rossmiller et al (1973), Harris (1973), Bredeweg (1980), which attempted to examine the total cost per pupil for various secondary school courses. Unfortunately these studies apply only indirectly to cost analysis of supply expenditures since few directly analyze this specific area. However, they were valuable as related research which indicated potential methodology and potential problem areas in the field of cost analysis. Doty (1975-1976), Morrison and Strasler (1982) are discussed in more detail as they are representative of the major research in this area.

Macro-Expenditure Literature

Cost-per-Pupil Research

Doty (1975, 1976) directed research teams for the New Jersey State Department of Education in two of the largest and most comprehensive early research studies in area of program costing. The initial study (1975 p.3) was designed to:

> Develop a model for collection and analysis of cost data for defining the cost per pupil per program per type of school.

A practical nursing and a health related occupations course were examined in two comprehensive high schools. A model was developed which consisted of twenty-nine tasks to be completed in order to collect data and calculate per pupil costs. It is interesting to note that they found (p.4) the:

> Expenditures listed in a program budgeting system are more accessible than those listed in the traditional administative accounting system.

However:

> Per pupil cost can be determined when available data is in the program budget and program accounting system and traditional administrative accounting system.

Other conclusions which may be germane to the examination of the micro-expenditure area of supplies were: average daily enrollment gives more accurate costs than average daily attendance and actual expenditures should be used rather than budgeted expenditures to improve the accuracy of cost data. It was felt the model derived could be used to generate an accurate cost per pupil per program cost. The difficulty in applying the model was in separating direct from indirect program costs and then allocating the indirect costs to the program being analyzed. Program budgeting accounting systems already had the data in this form while traditional accounting system information required further analysis.

The purpose of the second phase of the project was to refine and apply the model developed in stage one to determine the variation between costs of college preparation, general and vocational programs. Doty (1976 p.14) suggested:

> Accountability and widening discrepencies in proposed and actual figures for rapidly expanding vacational education strongly suggest the need for determining as realistically as possible the existing status of vocational education programs.A beginning step in this direction is the availability and use of a system for determining actual costs of educating pupils.

This judgement has similar relevance in Ontario today.

An assumption built into this study is relevant to unit cost analysis of supply expenditures. Supply budget expenditures usually include the purchase of a small equipment items whose cost is under a maximum dollar level, as dictated by the accounting system in use locally ($100 in this study). Therefore, a method for allocating those costs over the years of life of the article had to be devised. The assumption in this research (p.15) was:

> Industrial estimates are generally based on industrial usage not usage in educational environments. Therefore, computing the depreciation of tools, equipment, and facilities on a straight line basis is no better or worse than depreciation based on life of equipment as suggested by manufacturers.

Therefore, it was felt both methods of allocation were acceptable as long as the one chosen was defined and applied consistently.

Three of the final conclusions of Doty's (1976 p.41) study are applicable as background information when initiating a costing study whether macro or micro in nature:

1) No perfectly accurate cost per pupil will be obtained without program budgeting.

2) Costs could be updated by multiplying them by inflation indexes.

3) The schools participating in this study seem to be of quality ie., they offer a variety of programs for a heterogeneous population and have pleasing facilities and equipment. The cost and ratios might be considered as optimum.

The first conclusion did not eliminate the possibility of examining traditional accounting systems. It did, however, reinforce the difficulty of arriving at accurate costs in such a study. The second conclusion provided an indication of the potential use of an education cost index of some form but left the development to future studies. The final conclusion indicated, as most cost study do, the program being examined was declared to be of a certain quality very subjectively. This indicated further work in the area of defining adequate program was necessary if cost studies were to become more refined in the future.

One of the recent extensive investigations in this field was conducted by Morrison and Strasler (1982) in South Carolina. They attempted to develop a method by which the pupil cost of providing instruction in vocational education could be determined as well as to determine the per pupil cost of vocational education in the state. The model developed took the form of a Vocational Education Cost Survey Instrument which was sent to the principals of the 221 high schools and 56 vocational schools in the state which offered vocational education programs. Examination of this questionnaire raised the question whether the respondents would have had the data requested readily available and whether all respondents used consistent methods of pro rating

expenditures. The low level of response (33%) made the findings and research procedures somewhat suspect. A wide range of costs for the same program was indicated forcing the researchers to list medians as the final cost per course figure for each course. The researchers felt this was a "typical cost" but unfortunately their purpose was to obtain an "appropriate cost" for administrators to use in budgeting. It is impossible to say whether there is a positive relationship between spending this "typical cost" figure and presenting an adequate level of program.

Current Canadian Research

McNab (1977) in his research funded by the Ministry of Education in Ontario, attempted to develop a model for program costing for Ontario Schools. As he indicated (p.3) the:

> Accounting approaches to costing involve setting up a subcategory for each program in the budget or code of accounts and then allocating expenditures for salaries, instruction materials, texts, etc. to the appropriate program subcategory within that account.

His theory (p.10) was that:

> Costs are not intrinsic to a program but depend on choices made about personnel and their utilization, learning material, classroom space, class size, administrative curriculum development needs, location, bussing etc.

He attempted to develop a mathematical formula to indicate the cost of various choices by the administrator to aid in managerial decision making. At present his theory is not fully developed.

## Micro-Expenditure Research

### Supply Budget Study

Wessel (1979) investigated the micro-expenditure area of supply budgets with her research into the secondary school expenditures for art supplies in the United States. This was an attempt to arrive at a national per pupil supplies budget allocation guideline for art education to be used by administrators and art educators to finance an acceptable program. As in previous cost studies there was an implicit assumption that spending the median figure of national expenditure on art supplies would automatically produce an adequate art program in any school in the country. Definition of an adequate program was based more on the level of expenditure than on any examination of program content. As in many studies into program costs, the cost analysis was conducted by questionnaire. The questionnaire was distributed to members of the National Arts Education Association. The low response level (30%) could have indicated a lack of familiarity with the financial data requested on the part of the respondents. There was no attempt made to provide a consistent method to allocate costs to the various programs. The data returned indicated a wide range of expenditure for the same course and median figures were derived to indicate the cost per pupil for art supplies in the various courses. As indicated by the researcher (p.19) "obviously such estimates are not rigid standards and are subject to considerable variation."

Conclusion

Research in the field of cost analysis tended to suffer from two major problems. The programs being analyzed in many cases were not fully defined as to quality, and the people attempting to generate the cost data in order to fill out questionnaires were not familiar with or interested in obtaining the required financial information. Therefore, they were not necessarily consistent in their costing analysis or did not reply to the questionnaire. The result was a lack of response and a wide divergence in cost data generated for the same course. The studies did provide good information on the need for cost analysis, the potential benefits and the pitfalls to avoid. In general they indicated it was wise to limit the examination to an analysis of inputs, while assuming quality is a given factor. There is also an indication that the survey form of research did not produce reliable results as many respondents did not possess the accounting knowledge or interest to generate the required data. Therefore, the method of cost analysis used in a cost study must be easily understood by educational practitioners with limited accounting background, and the study must be very closely monitored to obtain consisted results.

Relationship Between Price Indexes and Cost Analysis

The final data generated by a cost analysis is a cost per pupil figure whether derived on the basis of complete program cost or as in this study the supply cost per pupil

for various programs. The information developed pertains to the year the study was performed and is only accurate for that base year. In order to use these figures for future managerial decision making, especially in the budget area, a method had to be developed which would re-value the cost figures to reflect cost changes in future years.

Price Index Versus Cost Index

Wasserman (1963 p.2) states:

> The cost of education can increase in a school district if prices of educational goods or services increase, or if the school district purchases more, and for higher quality, educational goods and services. Actually, then costs can change because of a change in prices, or in quantities purchased or in quality of items purchased. The expressions cost change and price change are not synonymous.

Assuming the cost of education changes in this manner, which form of economic indicator, price or cost index, can best reflect the change in cost over time?

Assimakopulos (1963) argued that there are four major differences between a price index and a cost index (represented by a cost of living index) for a constant population and time period:

1) The relative quantities of commodities purchased during the base period changed.
2) New products which do not have a counterpart in the constant basket are made available. These would be included in a cost of living but not a price index.
3) Consumer tactics have changed since the base period.
4) Relative prices of new and used items have changed.

After examining these differences Atherton (1966 p.46) argues that in the field of education:

> These are grounds, however, for suggesting that a price index of educational inputs would correspond quite closely to a cost of education index.

His conclusion were formulated on the basis of the following considerations:

1) Within limits, the relative quantities of commodities purchased to provide a given level of educational service do not vary extensively. The components of educational expenditures, within the present state of educational technology do not permit a high degree of substitutability.
2) The inclusion of new items into the expenditure pattern would not appear to be of great significance in an education index. The appearance of new items would tend to be reflected in that part of budget now described as Instructional Supplies. Although changes in this category of expenditure might be considerable, the relatively small weighting for it would not distort the final index.
3) Changes in the quality of items included in an educational price index is likely to be of far greater significance since this change may be observed in one of the major categories of expenditure, labour inputs.

Therefore, Atherton's findings provided a strong endorsement for the use of an education price index to reflect the change in the cost of education over time. In addition, he noted the one area, Instructional Supplies which could face considerable change, although the effect was discounted in his study since the weight for subindex was relatively small.

The Statistics Canada Methodological Report (1979 p.23) made the following statement regarding their Education Price Index Elementary-Secondary Level:

> The educational price index at the elementary secondary level only measures the price change of a fixed quantity of goods and services bought by school boards in Canada. It is price index whose movements are attributable to price variations and not to quality variations.

The report (p.23) also noted a potential weakness that educational administrators should be aware of when they attempt to use this index for local board applications.

> It is also related to the school boards as a whole and therefore, does not necessarily reflect the price evaluation of a particular school board.

It appears that the Statistics Canada Education Price Index could be used as an indicator of the change in the total cost of education with the understanding that it may not provide completely accurate information for all local situations.

Cost Per Pupil Adjustment

This study required the development of an index to reflect the change over time of the supply cost per pupil per credit course rather than the total cost of educating a pupil. The use of current Education Price Index information did not provide reliable indicator of change in these supply costs over time, since changes in cost of the supply components were not only a result of price variations but featured additional component variations dictated by changes in Ministry of Education Curriculum, guidlines, textbook revisions, and technological changes. In order to reflect all these variables in the various school courses, it was necessary to construct a specific supply cost index indigenous to this specific board of education. However, as pointed out by Atherton (p.47):

> It might be said that a price index of educational inputs would provide a good measure of changes in the cost of education.

In this study it was similarly felt that a price index of educational supply inputs would provide a good measure of changes in the cost of the supply component of education.

Review of Index Literature

A variety of price indexes exists in industry and government. Consumer Price Index, Industrial Price Index and Wholesale Price Index are samples of currently used indexes. These indexes are used to reflect the expenditure necessary in current dollars to buy the same quality and quantity of

goods as in the base year of analysis. Therefore, a school administrator may wish to estimate for budgeting purposes what amount of money would have to be spent in 1983 or 1984 to purchase the same quantity and quality of supplies for the classroom as in 1982 (base year). In all probability there will be a difference in current dollar costs and constant dollar costs between these years. Indexes allow the administrator to analyze trends, compare expenditures and plan budgets in constant dollars to better examine effect of expenditure changes on program.

When utilizing indexes for management decision making it is necessary to utilize an index which has direct relevance to the items being purchased. Historically in many boards of education the Consumer Price Index has been used as an indication of price change for educational budgeting purposes. This index is not based on items purchased for educational use but on items utilized by consumers and therefore has no direct relationship to the changes in prices in the educational area.

An Educational Price Index was developed and published by Statistics Canada using 1973 as a base year. This index is based on items utilized by elementary and secondary school systems. Lawton (1983) indicates the difference between the resulting Educational Price Index and the Consumer Price Index during the years 1975 - 1981. His comparison shows the Consumer Price Index posted an increased of 70.5 percent

while the Educational Price Index rose 80.3%. If an administrator has been matching budget increases to changes in the Consumer Price Index the result would be underfunding in constant dollars spent on educational items.

The same problem could also arise when considering price changes of secondary school supply budgets. Even if the secondary school administrator based budget adjustments on changes in the Educational Price Index (non salary), the resulting calculations could be in error as the index is not based only on secondary school supply items but includes a variety of educational items from elementary and secondary schools including supplies and equipment. As indicated previously, the supplies component of this index has a relatively small weight in calculating the full index value and is not necessarily adaptable to local application. The most accurate index for this purpose would be a local Secondary School Educational Supplies Price Index.

Development of Education Price Indexes

As with cost accounting applications, the use of price indexes in education is also a relatively recent phenomenon. Wasserman (1963) in his book Education Price and Quantity Indexes gave impetus to the development and use of Education Price Indexes. He presents a methodology for the calculation of a price subindex by using a method of weighted average of price relatives which is reasonably simple to use and can be easily adapted for use in education. He indicates p.19):

> A weighted average of price relatives will be employed here, as this method is especially well adapted to the handling of different types of data ranging from original price figures to published price subindexes that are likely to be employed in compiling an education price index.

His formula for calculating this price index is as follows (p.21):

$$\frac{\text{Sum } \frac{pai}{poi} \times 100 \text{ Wi}}{\text{Sum i Wi}}$$

Notations: i item

p price

n any year

o base year

wi relative weight for item

This same methodology can be used to combine subindexes into indexes. Constructing an index from this methodology removes from consideration the complicating factors of changes in quality and quantity. If the same quality and quantity of items are being compared year to year the only variable under consideration is price. It is, therefore, only necessary to describe fully the items contained in the index and ensure exactly the same items are priced each year. In developing an Educational Supplies Price Index no further variables would need be considered.

Canadian Applications of Price Index Theory

There is no literature available on the development of a specific Secondary School Educational Supplies Price Index. Peter J. Atherton (1966) in his doctoral thesis developed a

set of educational price indexes for Alberta. His Instructional Supplies Subindex provides an example of research closely related to the development of a Secondary School Educational Supplies Price Index. The components of his subindex are correspondence courses, library, reference and text books and instructional supplies. The weighting for these components was based on the percentage of average total expenditure spent on each area over a three year period. The Instructional Supplies Price Subindex was then built by a weighted combination of price relatives based on actual expenditure patterns on these items. This technique provides a methodology which can be modified to develop a pure Educational Supplies Price Index for secondary schools.

Statistics Canada Educational Price Index

As previously discussed, Statistics Canada (1979) publishes an Education Price Index - Elementary and Secondary Level. A brief example of the methodology used in preparing this index revealed a possible weakness for administrators attempting to use this index for local application or for supply expenditure decisions.

The items and weights included in the Index were derived from information from all provinces and from both elementary and secondary experiences. This could result in local boards using the index while the items used in their local situation were quite different from the index. Ontario Ministry of Education Curriculum Guidelines provided a wide latitude to

local boards in their choice of textbooks, curriculum materials and type of course presentation (practical versus theoretical in the vocational area) within secondary schools. Therefore, the supply inputs varied significantly from board to board. The advent of computer technology permitting easier development and maintenance of local educational indexes using local information may provide more accurate information in the future for managerial decision making regarding specific expenditure areas at the county board level.

Conclusion

Previous research and development of Educational Price Indexes have been used mainly to reflect the change in the total cost of education over time. Items normally included in these indexes reflected expenditures for all educational items such as salaries, equipment and instructional supplies. They were also based on provincial or country wide expenditure experiences. Indexes such as the Statistics Canada Educational Price Index were obviously of more use to educators than previous indexes such as Consumer Price Index as they were constructed on the basis of expenditure on educational goods and services. However, this index did not reliably indicate changes in the prices of educational supplies items since changes in the price of higher weighted items such as salaries influenced the index to a greater degree than supplies. In addition, the supply items used

locally may vary from those used in a provincial or country index. Therefore, the development of a Secondary School Educational Supplies Price Index on a local basis was needed to provide accurate information upon which to base management supply budgeting decisions. This could be particularly useful in the future as an inflation indicator to adjust cost per pupil data from year to year.

# CHAPTER III

## RESEARCH PROCEDURES - ANALYSIS OF SECONDARY SCHOOL SUPPLY COSTS

There were two key factors in this portion of the research:

1) The development of a model for cost analysis which would generate an accurate cost per pupil per credit course for secondary school supply budget expenditures.
2) The development of a user acceptable procedure for applying this model in a secondary school in order to facilitate gathering the required cost analysis data.

### Model for Cost Analysis

The model was designed in the form of a "Cost Per Pupil Per Credit Course Detail Sheet." It was used to collect, assign and apportion the supply expenditure components of a secondary school to each secondary school credit course.

### Secondary School Credit Course

Ontario Ministry of Education defines a credit course as one which is presented at the secondary school level for a period of 110 hours of instruction. Therefore, the cost per pupil per credit course detail sheet was designed to collect expenditures for the 110 hours of instructional time. This time delimitation ensured all courses were costed on the basis of a constant time period.

Cost Per Pupil Per Credit Course Detail Sheet

The costing methodology and the assumptions inherent in this research are best explained by a detailed examination of the model Cost Per Pupil Per Credit Course Detail Sheet. (Appendix I, pp. 93-96) The detail sheet was designed to be used by educational practitioners who were not necessarily familiar with accounting terminology, methodology, or data collection. It attempted to ensure that consistent cost analysis methodology was used by all persons involved in the study. Since this model was to be applied in a county which used a traditional accounting system, rather than a program cost system, it was necessary to instruct respondents on an acceptable and consistent method of apportioning cost to courses. Where possible costs used in completing the detail sheets were based on actual 1982 invoices found in school records. All supply items used in courses were included and priced at 1982 levels whether purchased in 1982 or in previous years. This was necessary to ensure all items used in the delivery of the course were included. For example, items which had a useful life of more than one year (textbooks, small equipment) were included at 1982 prices regardless of original purchase date. Therefore, all supply items used in presenting the course were included in the final cost data.

## I Examination of Information Requested on Detail Sheet

### Identifiers

#### A School and Department

Even though this research was conducted in one school, the detail sheets were designed to be used in future cost studies where a differentiation between schools may be necessary.

The department identification was necessary to enable the classification of the cost per pupil data by department for budgeting and price index building purposes.

#### B Course and Phase

The course being examined had to be listed using the same descriptive coding as found in the school's Student Course Selection Guide. This included the abbreviation of the name of the course and the phase level indentifier.This enabled the researcher to cross check to the Student Course Selection Guide to ensure all courses in the school had been costed.

The type of course and the phase level designation are very important as they directly affected the costing of the course. Since the cost analysis was designed to arrive at a cost per pupil, it was necessary to have a consistent method of assigning a number of pupils to a specific course. In actual practice the number of pupils in a course depends on many variables. In order to provide consistency in costing, the maximum class size, as specified by the collective

agreement in the county under examination, was used to place consistent limits on this size variable. This method of assigning class size appeared reasonable since schools in this county attempted to keep their average class size at these limits. The same procedure could be used by any other board of education attempting to perform a similar cost analysis. This collective agreement specified class size according to phase level and/or type of course. Phase level indicates the level of difficulty of the course being offered. The levels or phases at the time of this study included advanced, general, unphased, and basic levels. The collective agreement specified the maximum class size to be advanced 30, general or unphased 25, and basic 15 students per class. In addition the maximum size for technical courses was limited to 20 students per class.

Therefore, when the phase load and type of course were stated, the number of students to be used in the costing analysis for that course was also specified. This provided a consistent and easily understood method for defining the size of the unit under study. Other methods of assigning class size such as county average class size, could be incorporated into this model by future users if they felt these methods would give more accurate information within their locality.

II Subsections

In order to arrive at a cost per pupil credit course it was imperative that all related costs were included. The Cost Per Pupil Detail Sheet was arranged into subsections which reflected the major areas of ordinary supply expenditure required to present a course in a secondary school. These major expenditure areas were identified as texts, classroom supplies, repair and maintenance of equipment, and teacher aids. Therefore, the model detail sheet was set up to collect data within these major categories. The expenditures for each course were allocated to the specific subsections in total and were later divided by the appropriate number of pupils to arrive at the final cost per pupil for a course. This method was used since the costs in some subsections were more easily apportioned by using cost centres. This concept will be explained fully in the subsection explanation to follow.

A Texts

This subsection provided a place to list the textbooks used in a course. Detailed information was required regarding the name of the text, author, publisher, and price. This allowed for reference to publishers' catalogues for price varification as well as price updating for future cost index development.

Variables Which Influence Credit Cost of Textbooks

1) Text Life Assumptions

In order to arrive at a cost per credit for texts for a class it was necessary to make some assumptions regarding the life expectancy of the textbooks. Two factors seemed to be relevant in determining text life assumptions.

The first factor was the principle of deterioration of the text. This was caused by 110 hours of classroom use combined with additional student useage for homework. A complicating factor in the principle of deterioration of the text was whether it was bound by a hard or soft cover. Hard cover books generally last longer than soft cover as a result of better binding procedures. Schools also experience shorter or longer years of useful life for texts due to local policies, student behaviour, handling procedures, etc. Secondary school administrators in this county indicated a lifespan of five years for a hardcover book and three years for a softcover book represented a reasonable average text life based on their county-wide experience.

The second factor was the potential obsolescence of the content in the text. As the text became older, there was a decrease in the opportunity to present up-to-date information in the classroom. Since the majority of textbooks in secondary schools are revised on a five year cycle, a maximum life based on this information would keep the material current.

Consideration of both these factors resulted in the decision to define the life of a hardcover book as five years and softcover book as three years. This provided a consistent rule for determining text life based on a combination of physical deterioration and content obsolescence. This was used in prorating the cost of textbooks to the years of usefulness in the classroom.

2) Class Size

The class size variable was predetermined by the phase level or type of class.

3) Individual Text or Class Set Variable

Individual Text

The cost per class for a textbook that was distributed to each student was calculated according to the following formula:

(Text Cost x Class Size) ÷ # Years Life = Cost/Class

Class Set

The formula for arriving at the cost per class of class sets of texts was:

(Text Cost x Class Size) ÷ Years Life) ÷ # Classes
Using Set Each Year Cost/Class

This allowed for an apportionment of the cost to all classes using the set of textbooks over the years of life of the text.

As a result of the number of variables it is very important that all this information is detailed in order to allow for comparison between the costs of similar courses in various schools.

B Repair and Service - Cost Centre Method

Subsection B of the model was designed to collect the expenditures made for repair and maintenance of classroom or department owned equipment. This category was of major importance to machine intensive courses in business education or technical departments. It was suggested in the model that the concept of a cost centre be utilized to arrive at the cost per class figure.

A cost centre is designed to collect expenditures on a room basis rather than a class basis as this is more consistent with the accounting information available. Costs were collected by adding repair invoices which were normally billed on a per room basis or a per machine basis and therefore could be easily identified as belonging to a certain room. All costs of maintaining or servicing a specific room of machines were collected as indicated and then apportioned to the classes utilizing the facility on a usage basis. For example, the total cost of repairing and servicing a room of typewriters for a year was collected. The following calculation was performed:

Cost of Service per Room ÷ # Classes
using Room = Cost per class

This calculation assumes approximately equal class size and time usage by all classes using the room. If the usage was not equal, the cost could be apportioned on the basis of hours usage or some other logical method. The method was then fully outlined for future comparison. This equal usage method however, provided a simple consistent method to be used by persons unfamiliar with costing methodology.

C Classroom Supplies

This subsection was utilized to collect the expenditures for classrooom supplies. They included minor expenditures in academic courses such as spirit masters, paper, and chalk, while in technical shops they included major expenditures such as steel, welding supplies and small tools. Due to a lack of time, need, expertise, or development of a simple accounting system, most secondary school departments do not keep detailed records on distribution of small expense items such as masters and paper to specific classes. Therefore, it was recommended that alternative section F (Cost Centre Method) be used for these expenditures. Where departments did have this detailed information they listed the specific items in this subsection C. Technical shops normally have a record of major supply usage by shop class. Therefore, a collection of supply costs per course was possible. The data required include the specific name and quality of the item, cost per unit for that year and the quantity used per class. This detail would allow for comparison of courses and costs between schools as well as providing needed information for price subindex building in the second portion of the study.

Supply Cost Allocation

If the costs collected applied to more than one class they were apportioned on an equitable basis. The method suggested was equal distribution. For example:

Supply Costs for Auto Mechanics Grade 9 General Level
÷ # Classes = Cost Per Class.

Small Equipment Cost Proration

The accounting policy of the board examined in this study classified any equipment expenditure of $200 or lower as a supply expenditure. This policy will vary between boards, and the model could easily be adapted to the local policy. Therefore, items such as business machines, small tools and some department purchased audio visual equipment were included in the classroom supplies subsection. These items were assigned a life expectancy based on the historical experience of the individual department in the school rather than estimated industry life. This methodology is basically consistent with those used in Doty's (1976) cost analysis of vocational school courses as outlined in the review of literature. The life expectancy assumptions were explained on the detail sheet to allow future comparison between schools. The important concept was that the items cost should be apportioned to a course over a number of years rather than including the full cost in the year of purchase.

D Teacher Aids

This category was designed to collect the costs of teacher manuals, reference books, answer books, etc. Since in most cases these aids were used in more than one class and for more than one year it was necessary to apportion these costs. Since the majority of these aids were text material, the years of life for these aids were based on the same assumptions as textbooks: five years and three years.

Therefore, the costs per class would be arrived at by the following calculations:

(Total Cost of Teacher Aids for Course ÷ # Classes using aids) ÷ Years Life = Cost Per Class

E Other Costs

This category allowed for the collection of items which did not fall into the major categories. Examples of such items were computer software, professional magazine subscriptions, etc. Again, an attempt was made to only include the yearly cost and apportion the costs between classes receiving benefit from the item on an equitable basis. It may be that all classes in the department receive indirect benefit from an item such as subscriptions to journals and magazines. Therefore, their cost should be spread over all classes. The only requirement was that the method used to arrive at the cost per class was outlined in sufficient detail to allow for comparison with data from other schools.

F Department Supplies Centre

As was mentioned previously in part C, many inexpensive items such as masters, paper and chalk are purchased on a regular basis by departments within a school and used by teachers as needed for classes. There was no accurate method for arriving at the exact cost for these items for specific classes without devising an accounting system which would be cumbersome, time consuming or expensive. In this case it was simpler to collect the total department expenditures for

these items and apportion the cost to the classes in the department. In this Board of Education this type of item was requisitioned through a central purchasing department at the board level and charged directly to the department ordering the supplies. It was relatively simple in this case to add the invoices for these expenditures and arrive at a total department cost. Therefore, the department became a cost centre for these high volume low cost supply items.

Department Supplies Proration

Once the total department supplies expenditure for these items had been calculated, the cost per class was developed in the following manner:

Total Department Supplies Cost ÷ # Classes in Department
= Cost per Class

This proration assumed equal usage by all classes. If the usage was not equal, the type of apportionment was logical and was fully detailed. The equal usage method provided a simple consistent method for apportioning these items.

Cost Per Pupil Per Credit Course Final Calculation

The last portion of the model provided space for the final calculation needed to generate the cost per pupil per credit course of the course that was analyzed. The final calculation required adding the course costs calculated in each subsection of the model and dividing by the number of pupils as indicated by the phase level or type of class.

(Subsection A+B+C+D+E+F cost per class)
÷ Class type/phase level = cost per pupil per course

Field Testing the Model

The Cost per Pupil Credit Course Detail Sheet was field tested in the Business Education Department of the school selected for this study before application to all courses. This department was chosen for two reasons. First, the researcher was a member of this department and this provided ease of access to financial data and course materials. Secondly, there was a wide variety of courses within the jurisdiction of this department. These courses included theory-based (academic) as well as practical-based (vocational) courses. Historically, in this county, these type of programs indicated different budget requirements. These two basic types of course reflected the two main categories of course found within most schools. The Cost Per Pupil Per Credit Course Detail Sheets were used to analyse the cost of all Business Education Courses offered in this school as listed in the school Student Course Selection Guide. The cost analysis involved all the business teachers in order to obtain a complete listing of teacher aids and supplies involved in presenting these courses. Department invoices were used to obtain accurate financial data.

Model Revision

Weaknesses in the model were noted during this field test and an attempt was made to make the cost detail sheet more acceptable for full school use. The major change as a result of the field test was the addition of sample calculations in each subsection for user reference.

Full School Data Collection Procedures

A Courses Included

The unit costing model was applied to all courses offered at a large collegiate institute and vocational school. As indicated previously, the school was chosen as it was the researcher's home school and familiarity with the system and procedures reduced the time required to obtain the co-operation of in-school personnel, locate the required data and assist the participants in the study. The listing of courses to be costed was outlined in the school's Student Course Selection Guide. This provided a cost per pupil per credit course figure for approximately 200 specific secondary school courses. In addition, an attempt was made to arrive at a cost per pupil for student support areas such as administration, library, guidance, and audio visual services which normally are part of in-school expenditures within the total ordinary supply budget allocation from the board of education.

B Personnel Involved in Collecting Data

The actual data collection and completion of the cost detail sheets were the responsibilities of the individual (department head) in the school who was in charge of the organizational unit (department) which taught the specific course under analysis. Therefore, the Head of English was responsible for gathering the data on all the English courses under his jurisdiction. This costing was performed only after the procedures were fully explained to the Department Heads by the researcher and were performed with the researcher's assistance and guidance. Department Heads and their teaching staff gathered the necessary data within their departments as they possessed the most accurate knowledge of the supply items that were used in the delivery of their courses.

C Initial Meeting of Personnel Involved in Completing Detail Sheets

A meeting of the school administration and the department heads was convened to discuss the purpose of the study and the methodology to be utilized to collect the data. The usefulness of the final data in budgeting and planning was stressed at this time. The cost detail sheet was introduced to the group and the use was fully explained. A completed detail sheet from the pre-test conducted in the Business Education Department was utilized as an example for discussion purposes. The prorating methods and assumptions built into the model were discussed in order to ensure

consistent application of the model within the various departments. An appointment was then set-up with each department head and administration representative to clarify problems inherent in costing their department's specific courses, and to further reinforce the discussion regarding consistency of methodology.

D Personal Interviews

A personal interview was held between the researcher and the department head before an attempt was made to complete the actual cost analysis. The cost detail sheets for their department were distributed at this time and the model was reviewed again with reference to specific courses within their jurisdiction. A completed cost detail sheet from the pre-test was again used to provide a visual picture of the type of data required and the prorating methodology used. Specific questions regarding how and where to locate the needed information for their departments was discussed. The researcher also indicated that he should be called on for advice in conducting the costing or for help with prorating decisions at any time. The participants in the study were asked to perform the costing and return the completed detail sheets to the researcher by a specified date (approximately one month). At this time another meeting was scheduled, for two weeks later, in order to check progress and answer any questions that developed during the time the costing was being performed.

E Follow-Up Procedure

Department heads or administrative personnel who did not return the completed forms one week before the deadline received a memo reminding them of the impending due date. Anyone who had not returned the completed detail sheets three days after the due date was visited by the researcher to assist with problems in completing the forms. At this time a new due date was set which was mutually acceptable to the researcher and the department head.

F Verification and Auditing of Results

When a department's cost detail sheets were returned, the researcher checked the mathematical accuracy of the calculations. The returns were audited for exceptions to the pattern of costs generated for that department and similar departments in the school.

Courses of similar nature within a department normally fell within a small range of prices. For example, a Grade 9 Advanced Level English course did not vary greatly in cost from a Grade 9 General Level English course. A cost matrix generated from the costs per course data indicated approximately 90 percent of the costs for similar courses fell within a range of $5 from the average cost for a department. The remaining 10 percent were considered by the researcher to be exceptions to the normal cost pattern and therefore required further examination. If the cost varied by more than $5 per pupil, the researcher investigated the courses in question in order to verify the accuracy of the costs produced.

A further verification of results was provided by the researcher auditing a random sample of the detail sheets for accuracy of information.

Both forms of audit included a review with the department head of all the items included in the detail sheets and all of the documentation used to arrive at cost figures.

Presentation of Results

When the completed forms were collected and verified, the data were summarized into more useable form for future reference and decision making.

A Department Supply Cost Book

The completed detailed forms were bound for future references. As course content, textbook requirements, or material costs change the data can then be updated using these books. If costing is to become a regular management tool it will be easier to perform future analysis using the detailed information derived from this study.

B Summary of Department Supply Costs Per Pupil Per Credit Course

A summary was developed to show the final supply cost per pupil per credit course in each department. This information will be useful for department, school and board level use in management decision making as well as sample budget analysis development in the second phase of the study.

C Summary of Service Area Supply Costs Per Pupil

Although the model devised in this research was specifically designed to analyze and allocate supply expenditures to credit courses, an attempt was made to extend its use to the analysis of the remaining supply expenditures in the school. Therefore, a supply cost per pupil enrolled in the school was derived for administration, guidance services, library, and audio visual areas. This provided necessary information for the building of the Educational Supply Cost Subindexes in the second phase of this study as well as providing useful budgeting information for managerial decision making. Cost per pupil data was summarized for administrative services, guidance services, library, and audio visual services.

D Full School Cost Summary

This summary contained a cost per pupil per credit course figure for all courses offered in the school plus a cost per pupil figure for all service areas. This information is highly useful for school budget development, board budget preparation, curriculum decisions, and in many other managerial decisions making processes.

E Department Budget Based on Cost Per Pupil

A sample department budget was prepared for 1982 based on the cost per pupil per course data derived in the research. This was calculated by multiplying actual course enrollments for each department by the cost per pupil per course and then adding the resultant course costs together to

obtain the amount needed by each department. This data also provided the basis for calculating index weightings later in this study.

F Service Area Budget Based on Cost Per Pupil and Actual Enrolement in 1982

A sample budget was prepared for 1982 for the areas of Administration, Guidance, Library, and Audio Visual Services based on the cost per pupil data arrived at in the research. The actual school enrollment was multiplied by the cost per pupil of providing these services to arrive at the amount necessary to deliver these services in 1982. This information also provided the basis for calculating index weightings later in the study.

G Comparison of Cost Per Pupil Budget to Actual Budget in 1982

This comparison was used to calculate the amount of adjustment that would have to be made to actual 1982 level funding to present adequate program as indicated by the cost analysis.

Therefore, the data generated from this study was summarized into a form useful for department, school and board decision making.

# RESEARCH PROCEDURES - DEVELOPMENT OF A SECONDARY SCHOOL EDUCATION SUPPLIES PRICE INDEX

## Introduction

The application of the unit costing model generated a supply cost per pupil per credit figure for each secondary school course for the base year 1982. It was then necessary to develop a procedure for updating these costs yearly, without the expense and time consumption of recosting, in order to have current data upon which to base budgeting and managerial decisions. The method devised to adjust these cost per pupil figures each year was the development of a Secondary School Education Supplies Price Index to determine the effect of inflation on the cost of the supply components.

The index development was based on similar methodology to the Education Price Index produced by Statistics Canada. The Statistics Canada Index included a variety of elementary and secondary school educational items such as supplies, salaries, school services and contractual services from across Canada. The advantage of developing a specific Secondary School Educational Supplies Price Index as outlined in this study was that it was based on specific supply items used by the board analyzed. The items used in the index were taken directly from the Cost Per Pupil Per Credit Course Detail Sheets. The weighting of the items was based on spending patterns indicated by the previous cost analysis. Therefore, this index provided information on price increases

or decreases which directly affected the costs per pupil developed for this specific school. This index should have a high degree of reliablility when used as an inflation indicator to adjust base rate cost per pupil figures within this school or similar schools.

Index Methodology

A Subindex Development

The costing model used to calculate the cost per pupil per credit indicated four main categories of supply expenditure: textbooks, service and parts, classroom supplies, and teacher aids. Therefore, these same categories were used in building the price subindex. Examination of the actual dollar expenditure on each of these categories within each of the departments in the secondary school examined revealed very few departments expended their funds in the same proportion. Areas of study such as Business, Art, and English indicated a distinct pattern of supply item usage. For example, academic areas such as the English Department tended to spend a high percentage of total funds on textbooks (70%), while the vocational areas such as Technical Department tended to spend the majority of their funds (70%) on classroom supplies. Therefore, an overall index composed of a random sample of items did not appear to be able to reflect accurately the price changes in an individual departments cost per pupil per course. Therefore, a subindex was developed for each subject area that used supply

components in similar proportions based on actual expenditures. This produced a reliable indicator of price change for each area. The subindex information could then be used to adjust each individual department's cost per pupil figures yearly for planning purposes rather than increase all departments by a full school index amount. In order to represent all the areas with distinct spending patterns, it was necessary to develop thirteen subindexes:

1) Administration (including guidance services)
2) Art
3) Audio Visual and Library Services
4) Business Education
5) English
6) Family Studies
7) History and Georgraphy
8) Mathematics
9) Moderns
10) Music
11) Physical Education
12) Science
13) Technical and Industrial arts

These subindexes were also used as the components to build a full Secondary School Educational Supplies Price Index.

B Items included in Subindexes

The supply items chosen for each subindex were selected from the cost detail sheets in order to provide a cross section of items used at varying grade levels and levels of difficulty within each department or area of expenditure. The cost of these items also had to be easily obtainable from a verifiable source as well as represent a significant expenditure to the area. This is consistent with the Methodological Report of Statistics Canada (1979 p.8) which specifies the items included should represent:

> Sufficiently large sums of money to satisfy the relevancy criterion and for which price change data are available.

C Weighting of Items

The weightings attached to the items reflected the actual spending pattern within the component area. The cost detail sheets for each department were examined and a percentage of total spending was developed for each of the four major categories. For example Business Education spent approximately 30 percent on textbooks, 40 percent on classroom supplies, 20 percent on machine service and 10 percent on teacher aids. All percentages were rounded to the nearest 10 percent for ease of calculation. Therefore when developing the subindex for Business Education the textbooks were weighted 30 percent and the other items were weighted accordingly.

For each 10 percent weighting, a specific item was listed. Therefore three textbooks were listed from the business area. These represented three different grade and difficulty levels. Four supply items were included which represented highly used classroom supplies. One service item was listed to represent the most utilized service cost and one teacher aid was chosen at random from the detail cost sheets.

Therefore, an item list with weightings was developed for each of the thirteen subindexes. This provided a specific list of supply items indigenous to these areas to be used to calculate price changes by area. From this information a subindex for each of the major spending areas was developed.

D Subindex Item Identification

All items listed in the subindex were fully defined as to quality and quantity. This ensured that price was the only future variable in the index.

E Pricing Items in the Index Base Year

The detail costing sheets were completed for the year 1982. The prices identified in this research were utilized as base year prices in order to develop the Educational Supplies Price Subindexes.

Source of Prices

(a) Texts and Library Books

Textbooks prices were obtained from Circular 14 (Ontario Ministry of Education approved texts) or publishers catalogues 1982.

(b) Services

Service costs for machinery, such as typewriters, in this board were submitted by tender on a yearly basis. The 1982 tender price was used as the base year price.

(c) Classroom Supplies

Most classroom supplies were purchased centrally on the basis of yearly tender prices. The 1982 central stores catalogue price was used in building the subindex.

(d) Teacher Aids

Teacher aids chosen for the index were listed in 1982 publishers' catalogues.

Index Item List

When the items within each of the subindex areas were combined they made up the total Educational Supplies Price Index Item List. In this study the list was composed of 100 supply budget items used by this board of education. This list included items representing all departments and cost categories yet was small enough in number to allow updating of prices as required.

Index Detail

Therefore, each of the thirteen subindexes was composed of supply items fully described as to quality and quantity priced at 1982 levels and weighted according to the pattern of expenditure exhibited in the area as revealed by an examination of the Cost Per Pupil Per Credit Course Detail Sheets. The value of the subindex in the base year was then calculated on the basis of the following index formula.

Index Formula

The index formula used for this Secondary School Educational Supplies Price Index was based on the Laspeyres' formula utilizing fixed weights and a fixed base year as outlined by Wasserman in Education Price and Quantity Indexes. The theory of this method is covered in the review of literature.

Example Calculation for the Business Education Subindex

(Appendix VI, pp. 114)

A) (Base Year Index

Total of Item Prices in Base Year x weight = Weighted Price Value of Index in Base Year O. For the Business Education Component used as an example the weighted price value was 14.959. This figure was assigned the base index value of 100.

B) (Year I Index

Total of Item Prices in Year I x Weight = Weighted Price Value of Index Year I.

Calculating Change in Index Value

$$\frac{\text{Weighted Price Value Index (Year I - Year 0) x 100}}{\text{Weighted Price Value Index Year 0}}$$

= % Change in Index. Therefore, in the example, the weighted price value increased from 14.959 to 15.700 from year 0 to Year I. This represented a percentage increase of 5 percent. Therefore, the Educational Supplies subindex for Business Education increased from 100 to 105 in Year I.

Use of Resulting Index Change

The percentage change in the Educational Supplies Price Subindex for Business Education can be used to adjust the cost per pupil figures for that area in future years. If the cost per credit for a course in Business was $9.77 per pupil when costed in the base year, and the subindex moved from 100 to 105, an adjustment of 5 percent in budget as indicated by the index price change would permit the same level of expenditure on this program in real dollar terms in Year I.

Updating Unit Costs Per Pupil Per Credit Using Index

Business Education Cost Per Pupil Per Credit Course data could be updated yearly using the new year subindex value: Example:

$$\text{Year I} = \text{Base Year Cost/Pupil} \times \frac{\text{New Index}}{100} = \text{Updated Cost}$$

$$\text{Acc 2U0 } \$9.77 \times \frac{105}{100} = \$10.26$$

$$\text{Year II} = \text{Base Year Cost/Pupil} \times \frac{\text{New Index}}{100} = \text{Updated Cost}$$

$$\text{Acc 2U0 } \$9.77 \times \frac{107}{100} = 10.45$$

Date for Updating Prices in the Future

Prices should be obtained for each item in the index on a consistent date each year. A date after the publication of Circular 14, which lists approved texts and prices for Ontario, is preferable since a large proportion of the Educational price Index is made up of Textbooks.

Computerization

Computerization of the index calculation would be a simple matter. A program could be created which would include 100 items included in the Educational Supplies Price Index List with their base year price. The prices could be easily revised yearly. The actual computation work of assigning the items to the subindexes with appropriate weightings and calculation of yearly subindex values is an obvious computer application. The new index value could be used to automatically adjust the cost per pupil per credit information for each course on file from the previous year.

Development of Educational Supplies Price Index from Subindex Data

Methodology

The methodology used to build a full Educational Supplies Price Index is similar to that used to develop the previously described subindexes. Wasserman (1963 p.22) states:

> Each subindex is handled in the same way as a price relative. Now, however, the expenditure weights are based on expenditures during a typical period for the group of items represented by the respective subindexes.

This process was also utilized by Atherton (1966) and Statistics Canada (1979) in building their Educational Price Indexes. The only difference in this case is that the micro-budget area of supply expenditure for one school has been subindexed instead of the full area of education expenditure. Atherton and Statistics Canada both use subindexes for each major component of educational expenditure such as salaries and supplies. This index was based on the supply expenditures by component area as outlined in the section on subindex methodology.

Subindexes

Each of the thirteen subindexes developed as explained previously contains samples of items used in the area. The items are weighted according to the percentage expenditure they represent within the subindex area. A price index has been generated for the base year 1982 for each subindex. An Educational Supplies Price Index can now be formulated directly from this data.

Weighting of Subindexes

The same methodology that was used to assign weights to items in the subindexes was followed in obtaining weights for the subindexes when they were combined to form the full Educational Supplies Price Index. Ideally weights would be assigned to the subindexes on the basis of the proportion of the total supply expenditure within the board of education that the subindex area consumes. The proportions were

rounded to the nearest 1 percent in order to accommodate the smaller expenditure levels represented by some subindexes in the school examined. Therefore, if science area expenditures represented 10 percent of the total board supply expenditures it would be assigned a weight of 10 in building the full Educational Supply Price Index. Since the data generated from this study was derived from one school the weightings reflect the school expenditures and therefore are not reflective of total board weightings. A breakdown of all secondary schools spending patterns would have to be prepared to obtain accurate boardwide weights and that research goes beyond the scope of this study. Therefore, in this research the subindexes were a more accurate indicator. The items within the subindexes were common to the majority of schools within the county system under examination. However, the weightings of subindexes probably are not representative of all schools since the school in the study was a collegiate institute and vocational school and therefore had a large Technical and Business Program. This influenced the weightings toward those more costly areas. More traditional or academic schools have different expenditure patterns. Therefore, the Secondary School Educational Supplies Price Index developed in this thesis was actually a school rather than a board wide index.

Base Year Index Calculation ESPI

The sum of the weighted dollar value of the subindexes x weight = Weighted dollar value of the Secondary School Education Supplies Price Index (ESPI) in base year 0. For example, the Business Education Subindex had a weighted dollar value in the base year of 14.959. This amount would be multiplied by the weight of Business Education spending which was 15. All other components would be similarly calculated and added together to arrive at the total weighted dollar value of the ESPI. This would then be assigned the value 100 for the base year.

Presentation of Index Research

A detailed presentation of the thirteen subindexes was made for the base year 1982. The subindexes were combined into a full Secondary School Educational Supplies Price Index based on weightings developed from the school spending patterns in 1982.

# CHAPTER IV

# COST ANALYSIS DATA

## Introduction

The Ordinary Supply Budget of one secondary school was analyzed in order to determine the actual cost per pupil of presenting a predetermined level of acceptable quality program in that school. This chapter includes a discussion of these findings and their applicability to other schools and boards of education.

## Cost Per Pupil Per Credit Course Findings

The cost per pupil per credit course for each course offered in the secondary school studied was calculated, and the findings are outlined in the Summary of Department Supply Costs Per Pupil Per Credit Course (Appendix II, pp. 97-103)

## A Cost Range

The analysis of course costs indicated a wide range of costs in this secondary school. The costs ranged from a low of $1.03 per pupil for a year five geography (GEO5AO) course to a high of $80.71 per pupil for a year four welding (WEL4UBC) course. Within individual departments the range of costs was less dramatic. The costs in Georgraphy Department ranged from $1.03 to $15.62 for environmental science (ENS3UO).

B Variables Which Influenced Cost

The wide variety of cost per pupil data for courses resulted from the following major factors:

1) Courses which had a curriculum stressing practical work (vocational courses) required a large quantity of supplies to be consumed. Therefore, the cost of these courses was high when compared to courses with a more theoretical (academic) curriculum.

2) The supplies used in some courses were more expensive than other courses. This was especially evident in some technical courses where industrial materials (steel, welding supplies, etc.) were used.

3) Courses which required equipment in the presentation of the course (typewriters, computers, etc.) were more costly than non machine courses as a result of machine service and repairs expenditures.

4) Year five courses had no textbook costs since the textbooks were purchased by the students. Therefore, these courses generally produced the lowest cost per pupil of the courses offered in the school.

These factors, when combined, explain the wide variation in course costs within the school. Technical courses tended to require a large quantity of high priced supplies in addition to having equipment repair and

maintenance costs. Therefore, these courses produced the highest cost per pupil. Academic courses such as mathematics reflected a much lower cost since the only major expenditure was a textbook. Courses in the Business Education Department generated costs between these extremes. This reflected higher supply and equipment repair costs than academic programs but less than technical programs. The cost analysis revealed each course had its own individual cost based on curriculum requirements and the teaching methodology instituted in the school to meet those requirements.

C Additional Methods of Revenue Generation

The analysis of course costs also revealed that many courses in the school actually cost more to operate than the amount funded by the board of education. The data generated in this research are based on actual board expenditures for a program. These board expenditures, however, do not reflect the full cost of many courses. As a result of budget restrictions, additional revenue was generated from user fees and school based fund raising activities. Examination of the Art Department Budget (Appendix IV, pp. 107) indicates the extent of revenue generated by user fees in the form of student payments for course materials. This department, for example, raised almost as much revenue by this method as was provided by board funding. Similarily, the Physical Education Department (Appendix IV pp. 110) financed approx-

imately 50 percent of its budget requirements through in-school fund raising activities. It was interesting to note that these activities were representative of numerous fund raising activities throughout the school.

D Applicability of Costs Per Pupil to Other Schools

The school examined offered a large number of technical and business education courses. This is an important factor to consider when attempting to compare the course costs derived in this school with other schools. Technical courses generally speaking are the most expensive type of course offered in secondary schools. Even though this board of education allotted additional funding for technical education (approximately $11 per student per course) many of these courses were seriously underfunded when actual costs were examined. Therefore, it appears some funds were allocated to finance these programs when they would probably be utilized by different programs in non-vocational schools. It is quite possible, since actual expenditures were examined in this study, that the costs derived for academic courses were lower than they would be if an academic oriented school was examined. In essence, the cost per pupil data reflect the curricular orientation of this particular school and therefore, the data would only be reliable for schools of similar nature.

Service Area Cost Per Pupil Findings

The supply budget allocated to this secondary school was intended to finance the supply costs of course delivery, expressed in the cost per pupil per credit course data, as well as adminstrative and service area supply costs shown by a cost per pupil figure for these areas. (Appendix III, pp. 104)

A Service Area Cost Findings

The findings indicate the supply costs in the area of administration ($20.50 per pupil enrolled) is the highest service area cost. This cost includes expenditures which are necessary to operate the school facility such as telephone, postage, general school supplies, maintenance, etc. Costs for the other support service areas in the school were also analyzed. A cost per pupil was generated for audio visual, library and guidance services. Extra curricular activities and transportation of teams was considered a school rather than a department or course cost and was therefore, calculated on an enrollment basis.

B Variables Which Influenced Cost

In the section on research methodology, it was indicated that the model used to analyze the cost per pupil per course was not designed to generate a cost per pupil for these service areas but was adapted in order to analyze the complete school supply budget area. The actual expenditures for these areas was determined and a cost per pupil was

generated by dividing the cost by the September 30, 1982 enrollment. This date was used since it is the same date used to determine enrollment for provincial grant purposes. The resulting cost figure does not take into account two related factors: school size and fixed costs. There is no doubt that there are some fixed costs in the area of administation supply budgets. For example, telephone costs within the city are constant for schools with the same number of lines. Therefore, this cost is fixed and represented lower cost to this school on a per pupil basis than to a school with a lower enrollment. The cost per pupil data was derived by assuming all expenditures were variable since the model utilized did not allow for the consideration of fixed costs.

C Applicability of Data to Other Schools

As a result of the weakness of the model in the area of fixed cost recognition, the data generated in the service area is useful as a reference figure for budgeting purposes for this school and schools of similar size but is not applicable to all schools without a re-examination of the local situation.

Sample School Supply Budget

A sample school supply budget (Appendix IV, pp. 105-112) was prepared based on the cost per pupil per credit course, the cost per pupil for service areas multiplied the 1982 - 1983 actual course and school enrollment. This was prepared

to determine the cost of presenting the program that was indicated as being acceptable by the administrators of this county earlier in this study. Therefore, this was the revenue which was needed by the school for the year 1982 - 1983 in order to continue to present the same program as in previous years.

Comparison of Cost Per Pupil Method to Actual Budget

A comparison (Appendix V, pp. 113) was made between the budget requirements based on cost and enrollment data versus the actual budget allotted to the school determined by the present board of education budgeting methods. This comparison was made in an attempt to determine whether present funding was adequate to finance the actual cost of presenting the courses and operating the school.

The comparison indicated a 25 percent underfunding in the supply budget for this school in 1982 - 1983. If this situation continued, it would result in a possible reduction in expenditure on courses in the school and therefore, a reduction in the quality of the program offered in the school over time.

Reasons for Budget Variation

The 25 percent variation between the cost method budget and the actual budget was the result of numerous factors. If the school was presenting an acceptable program with the actual budget in 1982 - 1983, how can a 25 percent increase be justified? It appeared that the school spending did not

reflect long term program needs but was, out of necessity, only financing immediate course needs. The model for cost analysis made several assumptions regarding the prorating of the cost of certain assets over an acceptable life in order to deliver a curriculum which met Ministry of Education Guidelines. As a result of budget restraints, the cost analysis revealed that textbooks were not being replaced within the five year limit prescribed, equipment was not being serviced as often as required, small equipment was not being replaced at the optimum time, etc. Therefore, the school could continue to present adequate program for a short time on a budget which was below the costed amount but over the long term the quality of the program would decline.

Conclusion

The cost analysis findings satisfied the requirements outline for this portion of this study. A model was designed which generated accurate cost per pupil per credit course data for secondary schools. Data were developed for a sample secondary school in order to examine the adequacy of current supply budgets for a secondary school in the county under examination. The current budget allotment was compared to the budget requirements derived by a budget prepared on the basis of the cost data generated in the study. Therefore, the cost analysis met all the stated requirements of this study.

Secondary School Education Supply Price Index

The cost analysis portion of this study produced cost per pupil data for a base year 1982. It was then necessary to develop a Secondary School Supply Price Index to be used to adjust these costs for inflation each year without the expense of recosting. Subindexes were developed for each major expenditure area within the school in order to obtain an accurate indicator of the effect of inflation on the supply costs within each area for budgeting purposes.

Subindexes

Thirteen subindexes (Appendix VII, pp. 115-121) were developed for this study. They represented the major expenditure areas in the school examined. The items included in the subindexes and the weighting of items were derived from an examination of the actual expenditure patterns exhibited within each area on the Cost Detail Sheets used in the first portion of the study.

A Reliability

In order to ensure a reliability a large number of subindexes were developed. It was difficult to predetermine whether a smaller number of items or groupings would have given the same degree of reliability. Therefore, it was decided to utilize a large number of subindexes to reflect the diverse spending patterns within the school. Each subindex has a base year valuation calculated utilizing 1982 prices. The weightings were determined by actual expenditure

patterns within the departments in the base year. The items list (Appendix VIII, pp. 122-124) developed directly from items listed on the Cost Per Pupil Detail Sheets. It is interesting to note the differing spending patterns outlined for each department. The diverse nature of these expenditure patterns required the preparation of a large number of subindexes rather than one index to reflect the change in supply costs.

B Applicability to Other Schools

It was indicated that the cost per pupil data had limited applicability to other schools. Therefore, any index developed from that data had the same limited applicability. However, the subindex data may have a greater applicability than the cost per pupil data since the items listed in the subindexes are used in most schools and are used in the same expenditure proportions. Therefore, the subindexes should be reliable for other schools offering similar courses.

Full Index

A Secondary School Education Supply Price Index (Appendix IX, pp. 125) was developed by combining the subindexes into a full index. The subindex values for the base year were weighted according to the expenditure pattern exhibited within this school during the base year. This information was obtained from an examination of the 1982 Ordinary Supply Budget for this school.

A Reliability

The wide divergence of spending patterns and the wide range of total value of expenditure between the subindex areas indicate the subindexes may be more reliable as indicators of inflation for budgeting purposes than the full index.

In this school the Technical Subindex is weighted at 26 in contrast to the Family Studies Subindex at 1. An attempt to use changes in the full index to adjust costs in all areas would not be accurate since cost changes in one area do not necessarily reflect cost changes in other areas. If the Technical Subindex decreased and the Family Studies Subindex increased, a full index cost adjustment would not accurately reflect the movement of costs in either area although it would be more accurate in the higher weighted area. The purpose of this study was to finance a program as close as possible to the cost of presenting the program. Adjusting the costs by a full index value may reduce the chance of accomplishing that goal on a long term basis.

B Applicability to Other Schools

The full index developed would be applicable only to other schools with large vocational programs which exhibit spending patterns similar to this school. This Secondary School Educational Supply Price Index would actually be an individual school index with limited usefulness to other schools or boards at this time.

Conclusion

The subindexes developed in this portion of the study satisfied the requirements for the development of an economic indicator to be used to adjust the cost per pupil data to reflect the effects of inflation over time. The cost per pupil per credit course data can be adjusted each year by the amount of increase or decrease indicated by the relevant subindex in order to adjust costs to current levels for budgeting purposes. If the school is provided with funds based on the costs per pupil generated and adjusted each year according to the subindex valuation increase or decrease, it should receive sufficient revenue to continue to present the same level of program as the base year.

# CHAPTER V

## SUMMARY, DISCUSSION AND IMPLICATIONS OF THE FINDINGS

### Introduction

This chapter will review the purpose of this study, the research methods utilized and the findings generated. The implications of the study and possible future research in the area will also be discussed.

### Purpose of the Study

This study was initiated to:

1) Develop a method to obtain a supply cost per pupil for secondary school credit courses.
2) Develop an economic indicator that would reliably reflect the effect of inflation over time on this supply cost per pupil data.

### Research Procedures

#### A Cost Analysis

In order to satisfy the first purpose of this study it was necessary to develop cost analysis methodology which would produce an accurate cost per pupil per credit course. To facilitate this cost analysis, a Cost Per Pupil Per Credit Course Detail Sheet was developed. This detail sheet was designed to collect all the supply costs involved in presenting a secondary school course. It also included prorating methodology with examples to enable all persons who took part in the cost analysis to be consistent in their prorating assumptions.

The actual cost analysis was conducted in one large secondary school in order to obtain cost data for as many courses as possible. The detail sheets were completed by the department heads in the school with guidance and assistance, where necessary, by the researcher. In addition a supply cost per pupil was derived for the administrative, guidance, library, and audio visual areas. This information was prepared by the person in charge of the area analyzed.

The cost data obtained was then used to prepare a sample budget for the school. The budget was developed by multiplying the actual 1982 class and school enrollment figures by the cost per pupil figures generated in the study. This sample budget was then compared to actual 1982 budget amounts to determine if the present level of funding was adequate to permit the predetermined level of program to be delivered in the classroom.

B Economic Indicator

The second purpose of the study was to develop an economic indicator which could be used to accurately reflect the effect of inflation over time on the supply costs derived in the first section of the study.

A variety of supply price subindexes was developed for the base year 1982 in order to obtain reliable information on future supply cost changes. The subindexes were composed of items which represented the four major expenditure components found on the cost detail sheets. Each of the items was

assigned weights based on the 1982 expenditure pattern in that department.

Therefore, Education Supply Price Subindexes were prepared for the base year 1982. These subindexes could be updated yearly and the resulting index variation would be available to be used to adjust the cost per pupil data for future budgeting purposes.

## Findings

### Cost Analysis

The results of the cost analysis indicated a wide variety of cost per pupil per credit course existed in a secondary school. Generally, the costs varied as the result of three major variables. Most courses had a basic cost associated with a textbook and a minimum amount of supplies necessary to reproduce materials for classroom use. Courses which were academic in nature exhibited this basic spending pattern and were the least expensive courses. Courses which were practical in nature required consumable supplies for classroom use. These supplies varied in quantity and price with technical course supplies exhibiting the greatest cost. The use of machines in some courses increased their cost as a result of machine repair and service expenditures. Therefore, courses which relied on textbooks as the main aid in presentation of courses were the least expensive to operate, while courses which required machines and consumable supplies to meet curriculum requirements were the most expensive.

Budget Comparison

For discussion purposes, this study attempted to compare the actual 1982 budget for the school examined with a budget based on actual school and class enrollment multiplied by the cost per pupil data generated in the school. This comparison indicated an approximate 25 percent deficiency in funding. This underfunding is to some extent the result of prorating assumptions built into the cost per pupil data. The funding allotted for 1982 was probably sufficient to meet most of the current supply expenditure requirements but insufficient to replace textbooks and other supply items with extended lives. Therefore, if the program was to be presented at the same quality level in the future, the revenue accruing to the school must be increased to the level indicated by the cost analysis.

Education Supply Price Subindexes

Once the budget was increased to the 1982 level indicated by the cost analysis, a simple method was needed to ensure this same level of expenditure would be funded in the future. Supply Price Subindexes were devised for the thirteen major expenditure areas found in this secondary school for the base year 1982. The prices in these subindexes would be updated yearly and the percentage increase in each area would be generated. This information would then be used to adjust the cost per pupil data within each area for inflation over time. This would ensure funding was available to present the same program as in the base year 1982.

## Discussion and Implications of the Findings

### Funding Requirements

As discussed earlier, the comparison of revenue needed to deliver courses as indicated by the cost per pupil data with the actual budget in 1982 indicated an estimated underfunding of 25 percent. This finding produced several potential options for this school and board to consider.

If the board wished to prevent the quality of the program from deteriorating the full 25 percent budget deficiency would have to be funded.

The prorating assumptions could be re-examined to see if longer life expectancies would be acceptable for textbooks and small equipment thereby reducing the amount of the deficiency.

Courses could be examined to see if the price, quality or quantity of the supply components could be altered to reduce costs and thereby reduce the amount of revenue required.

Since detailed cost information was present, the effect of any of these or other options could be calculated. This was a definite improvement in managerial decision making over the existing method.

### Standard Cost

As indicated previously, the cost per pupil data generated in this study is reliably applicable to the school examined as well as other schools and boards which offer similar courses with similar curricular orientation.

The Ontario Ministry of Education is currently restructuring the Secondary School Curriculum. This policy has been outlined fully in a document entitled OSIS (Ontario Schools Intermediate Senior). This restructuring was partially a reaction to the "back to the basics" movement inherent in current neo conservative philosophy discussed earlier in this study.

Part of this restructuring process includes rewriting curriculum for secondary school courses. Early drafts of these courses indicate a more standardized curriculum in most areas of study. Once the curriculum becomes standardized, it should be possible to itemize supply components necessary to present these courses. The items listed should be common to all schools presenting the course. Therefore, a greater potential will exist to move from a cost analysis which produces a unit cost for a course indigenous to a particular school or board of education, to a standard cost for a course which could have province-wide application. As new curriculum guidelines are produced further cost studies should be attempted in order to investigate the possibility of producing a standard minimum expenditure per pupil which would be necessary to deliver a course as outlined in the Ministry Curriculum Guidelines.

Central Budgeting

The cost per pupil data produced in this study combined with its accompanying supply price index provides the basis for the formulation of a central budgeting system in a board of education. Funding for supply expenditures allocated to the individual secondary schools within a board of education could now be based on the cost per credit data and the actual class and school enrollments in schools. This is a radical departure from the method used at present by most boards of education. The current procedure is more decentralized since a sum of money is allocated to a school for internal division among various departments in the school. There is not, necessarily, a direct relationship between the cost of the courses and the number of students enrolled with the budget received in a department. It may instead be based on historical relationships or internal bargaining.

The major advantage of a central budget system would be that funding would be based on the actual cost of presenting a program over time. There is greater control over the manner in which money is expended. The cost analysis included prorated costs for items such as textbooks and therefore replacement funds should be present. This removes the argument that existing funding only allows for current needs. The cost data would be updated by a supply price index based on the actual items in use in the courses and therefore, should ensure funding is adequate into the future.

As components of the course change, the cost can be updated easily as detailed information on course costs is available on the detail sheets.

The disadvantages of initiating a central system appear to be based on two major arguments. First, the question arises as to the applicability of the costs to all schools in a board of education. Secondly, the centralized system tends to infringe on the prerogative of the principal of the school.

The cost applicability argument has some merit at present since course content and pedagogy tend to differ between schools. This argument may become less relevant if curriculum becomes more standardized. It could also be overcome through research within a board on more standardization of curriculum within their schools.

The second problem is difficult to solve. However, with the current public demand for accountability in educational spending and the problem of optimum use of scarce economics resources, a budget procedure which features adequate control and expenditure justification is becoming increasingly necessary. In the area of finance the prerogative of the administrator may have to be weakened somewhat to provide the accountability necessary to justify expenditure levels necessary to present adequate program.

Further research is needed in the area of central budgeting systems to ascertain the potential effectiveness for financing adequate program in the classroom.

Provincial Funding

If curriculum becomes standardized to the degree that standard cost per course data can be generalized for all courses, it may be possible to more accurately base provincial grants on course enrollments rather than school enrollments. This method would ensure adequate financing for all courses. The impact of this method of funding should be examined further, especially in the area of vocational education which is, out of necessity, becoming more and more expensive to local boards of education. If vocational education is to remain a priority of the provincial government, a change in the method of funding these programs may be necessary to ensure adequate program delivery in the local schools.

User Fees

This study has indicated that user fees are present in the schools under various labels such as activity cards, workbook fees, material fees, etc. In many courses these methods of revenue generation finance a major portion of the cost of the program. This phenomenon needs to be examined further to ascertain whether or not these fees are detrimental to the education system since they may prevent students from enrolling in courses they prefer for economic reasons or whether they should be used to a greater degree to finance high priced program.

The use of the supply price indexes should be examined over time to determine if the same degree reliability can be

achieved through the use of a smaller number of subindexes than indicated in this study. This would facilitate index preparation and therefore make them more user acceptable.

If standardized curriculum becomes a reality in the future, research should be initiated to develop a Provincial Secondary School Education Supply Price Index which could be used province wide with a high degree of reliability.

Cost Benefit Analysis

This cost analysis study made no attempt to examine the benefit derived from the costs incurred in any of the courses examined. However, research should be initiated in this area in light of the changing labour requirements in Ontario. It is evident that the cost of presenting many of the vocational programs in the secondary schools is very expensive. These programs should be examined to ascertain whether the student is receiving training in skills that will be in demand upon entry to the labour force, or whether some of these courses should be replaced by courses with curriculum better suited to the future needs of the economy of the country. This type of analysis would further ensure optimum use of the money available for education.

Conclusion

This study was successful in developing a method for generating a Supply Cost Per Pupil Per Credit Course with an accompanying Education Supply Price Index to be used to reflect the effect of inflation on these costs over time.

# BIBLIOGRAPHY

## A. BOOKS

Brock, H. R., Palmer, C. E. and Sweeney R. B. Cost Accounting Principles and Applications. New York: McGraw Hill 1978.

Burrup, P. E. Financing Education in a Climate of Change Boston: Allyn and Bacon 1977.

Cushing, B. E. Accounting Information Systems and Business Organizations. Don Mills: Addison Wesley 1982.

Garms, W. I., Guthrie, J. W. and Pierce, L. C. School Finance - The Economics and Politics of Public Education. Englewood Cliffs, N. J.: Prentice Hall 1978.

Horngren, C. T. Cost Accounting A Managerial Emphasis. Englewood Cliffs, N. J.: Prentice Hall 1977.

Knezevich, S. J. A Resource Allocation Decision System for Education - Program Budgeting (PPAS). Berkley, CA.: McCutchann Publishing 1973.

Morse, W. J. Cost Accounting Processing, Evaluating and using Cost Data Don Mills: Addison Wesley 1981.

## B. PERIODICALS

Dukiet, Kenneth H. "Instructional Materials and Equipment." School Management. 17:8 October 1973. pp. 10-13.

Finch, James N. "Testing the Cost Yardstick in Cost-Quality Studies." I.A.R. Research Bulletin Columbia University. 8:1 November 1967. pp. 1-9.

Ratsoy, E. W. "Recent Trends in Financing Education." The Canadian School Executive. 3:5 November 1983. pp. 17-19.

Wessell, Helen. "Financing Adequate Education in Art:" A Study of Art Supply Expenditures on the Secondary Level. Art Education. 32:8 December 1979. pp. 16-19.

C. PUBLICATIONS OF THE GOVERNMENT, LEARNED SOCIETIES AND OTHER ORGANIZATIONS

Asimakopulos, A. "The Canadian Consumer Price Index." Canadian Journal of Economic and Political Science. XXIX: 3 August 1963.

Bredeweg, Frank H. Catholic High Schools and Their Finances 1980. Washington D.C.: National Catholic Educational Association 1980.

Brown, Wilfred J. Education Finance in Canada. Ottawa: Canadian Teachers Fedederation 1981.

Doty, Charles R., Project Director and others. Model for Calculating Cost per Pupil for Secondary Vocational, General and Transfer Curricula in Comprehensive High Schools, Shared Time Vocational Schools, and Full Time Vacational Schools Final Report. Trenton NJ: New Jersey State Department of Education 1976.

Duke, Charles R., Project Director, Gasior, Albert G. and others. Model for Cost per Pupil for Vocational Education Programs and Types of Schools. Trenton NJ: New Jersey State Department of Education 1975

Duke, W. R. and others Program Accounting and Budgeting Manual. Edmonton: Alberta Department Education 1972.

Gasior, Albert G. and others. Model for Cost per Pupil for Vocational Education Programs and Types of Schools. Trenton NJ: New Jersey State Department of Education 1975.

Handa, M. L. Manipulating Education Expenditure: Dilemma for the 70's. Toronto: The Ontario Institute for Studies in Education 1972.

Harris, George W. Cost Analysis of Secondary School Vocational Techical Education Programs. Knoxville TN: Tenessee University Bureau of Educational Research and Service 1973.

Jordon, K. Forbis and Alexander, K. Futures in School Finance: Working Toward a Common Goal. Orlando Fla.: Phi Delta Kappa 1974.

Lawton, Stephen B. "Ontario's Approach: Paying School Boards to Save." The Cost of Controlling the Costs of Education in Canada Toronto: The Ontario Institute for Studies in Education 1983.

Program Accounting and Budgeting for Alberta School Systems P.A.B. Classification and Coding Manual. Edmonton: Alberta Department of Education 1980.

MacNab G. L., A Model for Determining Costs of School Programs: Research Paper Ottawa: Ottawa Board of Education 1977.

Morrison, Gregory G. and Strasler, Gregg M. The South Carolina Vocational Education Cost Study. Columbia S.C.: South Carolina State Department of Education Office of Vocational Education 1982.

Research Document. Declining Provincial Support for Financing Education. Toronto: Liberal Policy Research Office 1984.

Rossmiller, Richard A. and Moran, Thomas H. Programmatic Cost Differentials in Delaware School Districts A Study. Gainsville Fla.: National Educational Finance Project 1973.

The 1983 Budget St. Catharines. The Lincoln County Board of Education 1983.

Wasserman, William. Education Price and Quantity Indexes The Economics and Politics of Public Education 12. Syracuse N.Y. Syracuse University Press 1963.

Wilson, R.A.P. Financing Public Education in Ontario 1975. Toronto: Ontario Secondary School Teachers Federation 1975.

THESIS

Atherton, Peter John. "The Impact of Rising Price Levels on Expenditures for School Operations in Alberta 1957-1965." Doctoral Thesis, Edmonton: The University of Alberta 1966.

Myroon, John Lyon. "Unit Cost Analysis of the Educational Expenditures of the County of Thorhild 1967-1968." Masters Thesis Edmonton: The University of Alberta 1969.

Unpublished

Educational Price Index for Lincoln County Board of Education 1978-1982: St. Catharines Lincoln County Board of Education Purchasing Department.

# APPENDIX I

## SECONDARY SCHOOL

## COST PER PUPIL PER CREDIT COURSE

## DETAIL SHEET

School: _____

Department: _____

Course: _____

Phase Load: _____ (Advanced 30, General 25, Shop 20, Basic 15)

Costs to be included: All ordinary supply budget costs other than equipment (over $200)

Note: a) Where a cost applies to more than 1 class, attempt to apportion the cost on a usage basis.

b) If further space is required to complete information for a cost category, please attach a appendix.

### COST CATEGORIES

A) Texts: (Calculation: Cost of text years of life x phase load = class cost/year) (if class set used class cost/year # classes using text class cost/year)
Assume life of text: Hard Cover 5 years
Soft Cover 3 years

Name - Author - Publisher _____ cost/class

B) Repairs + Services if Applicable Room Cost Centre

(example: Total cost service for room number of classes using room = Cost/Class)

Details Cost/Class

C) Supplies used in Class (Refer to F)

(Paper, Files, Workbooks, Spirit Masters, Shop Supplies)

| Details | Supply Item | # Used | Cost | Cost/Class |
|---|---|---|---|---|

D) Teacher Aids

(Example: Total costs aids for room or program number of classes = Cost/Class)

Details Cost/Class

E) Other Costs

(Films, Software etc.)

(Example Total Cost life of item # classes using item in program = Cost/Class)

Cost/Class

F) Department Supplies Cost Centre

(Where supplies are distributed from central location this may be used in place of C and apportioned to classes on usage basis)
(Example: Total supplies bought by department office classes taught in department = Cost/Class)

Cost/Class

Cost Per Pupil Calculation

Calculation

Total Cost per Class $_____ = $
# students per phase level #

Cost/Pupil/Credit Course

# APPENDIX II

## SUMMARY OF DEPARTMENT SUPPLY COSTS

## PER PUPIL PER CREDIT COURSE

## BASED ON 1982 PRICES

| Department | Course | Cost Per Pupil Per Credit Course |
|---|---|---|
| ART | | |
| | ART 1UO | $ 8.51 |
| | ART 2UC | 25.70 |
| | ART 2UO | 8.51 |
| | ART 3UO | 8.51 |
| | ART 3UP | 6.96 |
| | ART 3UC | 25.70 |
| | ART 4UC | 25.70 |
| | ART 4UD | 5.81 |
| | ART 4UG | 17.19 |
| | ART 4UO | 8.51 |
| | ART 4UP | 6.96 |
| | ART 4US | 8.90 |
| | ART 5AO | 5.81 |
| BUSINESS | | |
| | CED 1UO | 8.76 |
| | CED 4UO | 5.45 |
| | LAW 3UO | 10.54 |
| | LAW 4UO | 7.74 |
| | LAW 3UE | 9.96 |
| | ACC 2UO | 9.77 |
| | ACC 3UO | 9.80 |
| | ACC 4UO | 21.79 |
| | ACC 3UE | 9.80 |
| | ACC 5AO | 7.52 |
| | MKT 3UO | 15.13 |
| | MKT 4UO | 18.42 |
| | BMA 2UO | 19.12 |
| | BMA 3UO | 19.12 |
| | BMA 3UE | 24.58 |
| | COL 2UO | 10.15 |
| | DAT 3UO | 15.13 |
| | DAT 4UO | 15.93 |
| | PRD 2UO | 24.56 |
| | PRD 3UO | 27.61 |
| | PRD 4UO | 24.56 |
| | STE 2UA | 16.30 |
| | STE 2UB | 16.30 |
| | STE 3UA | 17.03 |
| | STE 3UB | 18.52 |
| | STE 4UO | 12.60 |

| Department | Course | Cost Per Pupil Per Credit Course |
|---|---|---|
| BUSINESS Con't | SHD 3UE | $16.80 |
| | SHD 4UE | 18.88 |
| | SHD 4UF | 24.37 |
| | BEG 4UE | 17.03 |
| | TYP 1UO | 11.06 |
| | TYP 2UO | 11.06 |
| | TOP 3UO | 17.97 |
| | TOP 4UO | 18.70 |
| | TOP 3UE | 14.21 |
| | TOP 4UE | 17.03 |
| ENGLISH | | |
| | ENG 1GOE | 10.27 |
| | ENG 1AOE | 6.05 |
| | ENG 2GOE | 6.18 |
| | ENG 2AOE | 10.92 |
| | ARF 3UO | 23.74 |
| | ENG 3UO | 8.31 |
| | ENG 3GOE | 4.92 |
| | ENG 3AOE | 10.34 |
| | ENG 4GOE | 12.76 |
| | ENG 4AOE | 9.22 |
| | THA 3UO | 12.09 |
| | ENG 5AO | 1.06 |
| | ENG 5AE | 1.06 |
| | THA 2UO | 12.09 |
| | THA 3UO | 12.09 |
| | THA 4UO | 12.09 |
| FAMILY STUDIES | | |
| | FAS 1UO | 15.22 |
| | FAS 2UF | 20.10 |
| | FAS 2UT | 3.25 |
| | FAS 3UO | 3.58 |
| | CIP 4UO | 12.49 |
| | FAS 4UO | 6.00 |
| | CFP 5AO | 4.63 |
| GEOGRAPHY | | |
| | GEO 1GCG | 7.49 |
| | GEO 1ACG | 8.04 |
| | GEO 1AEG | 8.04 |
| | GEO 2GO | 7.69 |
| | GEO 2AO | 7.30 |
| | ENS 3UO | 15.62 |
| | GEO 3GP | 11.31 |
| | GEO 3AP | 11.31 |
| | GEO 4GR | 9.07 |
| | GEO 4AH | 7.74 |
| | GEO 5AO | 1.03 |
| | GEO 5AW | 1.03 |

| Department | Course | Cost Per Pupil Per Credit Course |
|---|---|---|
| HISTORY | | |
| | HIS 1GO | $10.50 |
| | HIS 1AO | 10.50 |
| | HIS 2GCH | 4.11 |
| | HIS 2ACH | 4.11 |
| | HIS 3GO | 10.80 |
| | HIS 3AO | 6.00 |
| | HIS 3UO | 11.80 |
| | HIS 4AO | 14.52 |
| | HIS 5AA | 1.50 |
| | HIS 5AC | 1.50 |
| MATHEMATICS | | |
| | MAT 1UR | 3.44 |
| | MAT 1GOM | 5.12 |
| | MAT 1AOM | 5.22 |
| | MAT 1AEM | 5.22 |
| | MAT 2GOM | 5.12 |
| | MAT 2AOM | 5.52 |
| | MAT 2AEM | 5.52 |
| | COF 3AO | 8.07 |
| | MAT 3GO | 5.62 |
| | MAT 3AO | 5.52 |
| | MAT 3AE | 5.52 |
| | COF 4AO | 8.07 |
| | MAT 4GO | 5.62 |
| | MAT 4AO | 5.27 |
| | MAT 5AA | 1.15 |
| | MAT 5AC | 1.15 |
| | MAT 5AF | 1.15 |
| MODERNS | | |
| | FRE 1AO | 10.96 |
| | FRE 1GO | 10.25 |
| | FRE 2A3 | 11.66 |
| | FRE 2AO | 10.96 |
| | FRE 3AO | 11.41 |
| | FRE 3AE | 13.19 |
| | FRE 4AO | 9.03 |
| | FRE 5AO | 9.51 |
| | FRE 5AE | 5.77 |
| | GER 2AO | 7.03 |
| | GER 3AO | 10.51 |
| | GER 4AO | 11.76 |
| | GER 5AO | 9.69 |
| | SPA 2AO | 8.40 |
| | SPA 3AO | 8.69 |
| | SPA 4AO | 10.63 |
| | SPA 5AO | 6.70 |

| Department | Course | Cost Per Pupil Per Credit Course |
|---|---|---|
| MUSIC | | |
| | MUS 1UI | $ 9.17 |
| | MUS 1UV | 6.64 |
| | MUS 2UI | 6.64 |
| | MUS 2UG | 4.10 |
| | MUS 3UI | 6.64 |
| | MUS 2UV | 5.60 |
| | MUS 3UV | 5.60 |
| | MUS 4UV | 5.60 |
| | MUS 5AV | 5.60 |
| | MUS 4UI | 6.64 |
| | MUS 5A1 | 6.64 |
| PHYSICAL EDUCATION | | |
| | PHE 1UF | 11.20 |
| | PHE 2UF | 12.75 |
| | PHE 3UF | 9.97 |
| | PHE 4UF | 11.54 |
| | PHE 1UM | 8.73 |
| | PHE 2UM | 8.17 |
| | PHE 3UM | 8.58 |
| | PHE 4UM | 11.54 |
| | PHE 5AO | 7.25 |
| SCIENCE | | |
| | SCI IGOS | 16.29 |
| | SCI IAOS | 15.89 |
| | SCI 2GO | 13.48 |
| | SCI 2AO | 13.48 |
| | BIO 3GO | 10.83 |
| | PHY 3GO | 8.32 |
| | PHY 3AO | 6.77 |
| | CHE 4GO | 11.65 |
| | CHE 4AO | 13.26 |
| | BIO 5AO | 7.61 |
| | CHE 5AO | 6.94 |
| | PHY 5AO | 5.63 |

| Department | Course | Cost Per Pupil Per Credit Course |
|---|---|---|
| TECHNICAL | | |
| | MSH 1UO | $22.00 |
| | WDW 1UO | 29.28 |
| | DRA 1UO | 6.10 |
| | PAM 1UO | 22.63 |
| | ELE 1UO | 15.00 |
| | AUB 1UO | 30.68 |
| | SHM 1UO | 32.44 |
| | WEL 1UO | 60.06 |
| | AUM 1UO | 31.03 |
| | MSH 2UO | 22.00 |
| | WDW 2UO | 29.28 |
| | DRA 2UO | 6.10 |
| | PAM 2UO | 27.61 |
| | ELE 2UO | 10.99 |
| | AUB 2UO | 20.68 |
| | SHM 2UO | 37.45 |
| | WEL 2UO | 73.15 |
| | AUM 2UO | 29.12 |
| | MSH 3UO | 24.67 |
| | BUC 3UA | 41.28 |
| | BLR 3UA | 13.15 |
| | DRA 3UA | 14.65 |
| | DRM 3UA | 13.15 |
| | PAM 3UA | 40.11 |
| | ELE 3UA | 20.70 |
| | ELT 3UA | 40.36 |
| | AUB 3UA | 79.30 |
| | PLH 3UA | 43.30 |
| | WEL 3UA | 71.63 |
| | AUM 3UA | 42.87 |
| | MSH 4UBC | 26.82 |
| | BUC 4UBC | 46.28 |
| | DRA 4UBC | 12.50 |
| | DRM 4UBC | 13.25 |
| | PAM 4UBC | 41.36 |
| | ELE 4UBC | 22.43 |
| | ELT 4UBC | 46.88 |
| | AUB 4UBC | 39.30 |
| | PLH 4UBC | 66.92 |
| | WEL 4UBC | 80.71 |
| | AUM 4UBC | 33.74 |
| | AUM 4UBC | 31.03 |
| | DRA 1USS | 6.10 |
| | ELE 1US | 15.00 |
| | MSH 1US | 22.00 |
| | WDW 1US | 29.28 |

Course Codes Definition

All courses are identified by an alphabetic and numeric description.

E.g. MAT 1AOM breaks down as follows:

MAT - Mathematics
1 - a grade 9 subject
A - advanced level
O - an ordinary or regular course
M - a required Math subject

MAT 1AEM - The letter "E" indicates that this is an enriched level A (advanced course).

ENG 1AOE, MAT 1GOM, SCI 1GOS, etc. - The E, M, S, etc., to the extreme right of the course code indicates that the course satisfies a compulsory requirement.

GEO 1GCG, GEO 1ACG, HIS 2GCH, HIS 2ACH - The letter "C" in each code signifies a Canadian content.

SUBJECT CODE INDEX

| Code | Subject | Department |
|---|---|---|
| ACC | Accounting | Business |
| ARF | Film Arts | English |
| ART | Art | Art |
| AUB | Auto Body | Technical |
| AUM | Auto Engines | Technical |
| BIO | Biology | Science |
| BLR | Blue Print Reading | Technical |
| BMA | Business Machines | Business |
| BUC | Building Construction | Technical |
| CED | Consumer Education | Business |
| CFP | Canadian Family in Perspective | Family Studies |
| CHE | Chemistry | Science |
| CIP | Community Involvement Programme | Family Studies |
| COF | Computer Programming | Mathematics |
| COL | Computer Literacy | Business & Mathematics |
| DAT | Data Processing | Business |
| DRA | Drafting | Technical |

| | | |
|---|---|---|
| DRM | Drafting-Mechanical | Technical |
| ELE | Electricity | Technical |
| ELT | Electronics | Technical |
| ENS | Environmental Science | Geography |
| ENG | English | English |
| FAS | Family Studies | Family Studies |
| FRE | French | Moderns |
| GEO | Geography | Geography |
| GER | German | Moderns |
| HDP | Home Design Planning | Technical |
| HIS | History | History |
| LAW | Law | Business |
| MAT | Mathematics | Mathematics |
| MIS | Man in Society | History |
| MKT | Marketing | Business |
| MSH | Machine Shop | Technical |
| MUS | Music | Music |
| PAM | Patternmaking | Technical |
| PHE | Health and Physical | Physical Education |
| PHY | Physics | Science |
| PLH | Plumbing and Heating | Technical |
| PRD | Printing | Business |
| SCI | Science | Science |
| SHD | Speedwriting (Forkner Shorthand) | Business |
| SHM | Sheetmetal | Technical |
| SPA | Spanish | Moderns |
| STE | Stenography | Business |
| TEC | Technical | Technical |
| THA | Theatre Arts | English |
| TOP | Typing and Office Practice | Business |
| TYP | Typing | Business |
| WEL | Welding | Technical |
| WDW | Woodworking | Technical |

# APPENDIX III

## SUMMARY OF SERVICE AREA SUPPLY COSTS

## PER PUPIL

## BASED ON 1982 PRICES

| Administration | Item | Cost Per Pupil |
|---|---|---|
| | Postage and Shipping | 3.71 |
| | Repair and Maintenance | .95 |
| | Telephone Rental | 3.91 |
| | Long Distance | 1.98 |
| | Student Wages | 2.08 |
| | Supplies and Service Office | 4.10 |
| | Supplies General | 1.91 |
| | Supplies Auditorium | .34 |
| | Principals Discretionary | 1.14 |
| | Interschool Activities | .33 |
| | Trucking | .05 |
| Audio Visual | | 2.50 |
| Library Services | | 4.50 |
| Guidance Services | | .50 |
| Physical Education | | |
| Extra Curricular | | 9.28 |
| Transportation | | .90 |

# APPENDIX IV

## SERVICE AREA BUDGET

## BASED ON COST PER PUPIL DATA AND ACTUAL

## 1982 ENROLLMENT

| Administration | # Pupils | Cost/Pupil | Total |
|---|---|---|---|
| Postage & Shipping | 1520 | 3.71 | 5639.20 |
| Repair & Maintenancee | 1520 | .95 | 1444.00 |
| Telephone Rental | 1520 | 3.91 | 5943.20 |
| Long Distance | 1520 | 1.98 | 3009.60 |
| Student Wages | 1520 | 2.08 | 3161.60 |
| Supplies & Service Office | 1520 | 4.10 | 6232.00 |
| Supplies General | 1520 | 1.91 | 2903.20 |
| Supplies Auditorium | 1520 | .34 | 516.80 |
| Principles Discretionary | 1520 | 1.14 | 1732.80 |
| Interschool Activities | 1520 | .33 | 501.60 |
| Trucking | | | 76.00 |
| TOTAL | | | 31160.00 |
| Audio Visual | 1520 | 2.50 | 3800.00 |
| TOTAL | | | |
| 3800.00 | | | |
| Library Services | 1520 | 4.50 | 6840.00 |
| TOTAL | | | 6840.00 |
| Guidance Services | 1520 | .50 | 760.00 |
| TOTAL | | | 760.00 |

DEPARTMENT BUDGET

BASED ON COST PER PUPIL PER CREDIT COURSE DATA

AND 1982 COURSE ENROLLMENT

Department: Business Education

| Course | # Classes | # Pupils | Cost/Pupil | Total |
|---|---|---|---|---|
| CED 1UO | 3 | 77 | 8.76 | 674.52 |
| CED 4UO | 2 | 47 | 5.45 | 256.15 |
| LAW 3UO | 4 | 121 | 10.54 | 1275.34 |
| LAW 4UO | 2 | 39 | 7.74 | 301.86 |
| LAW 3UE | 1 | 30 | 9.96 | 298.80 |
| ACC 2UO | 3 | 94 | 9.77 | 918.38 |
| ACC 3UO | 2 | 48 | 9.80 | 470.40 |
| ACC 4UO | 1 | 32 | 21.79 | 698.28 |
| ACC 3UE | 1 | 30 | 9.80 | 294.00 |
| ACC 5AO | 2 | 55 | 7.52 | 413.60 |
| MKT 3UO | 2 | 60 | 15.13 | 907.80 |
| MKT 4UO | 1 | 24 | 18.42 | 442.08 |
| BMA 2UO | 3 | 78 | 19.12 | 1491.36 |
| BMA 3UO | 1 | 25 | 19.12 | 478.00 |
| BME 3UE | 1 | 30 | 24.58 | 737.40 |
| COL 2UO | 3 | 80 | 10.15 | 812.00 |
| DAT 3UO | 3 | 66 | 15.13 | 998.58 |
| DAT 4UO | 2 | 35 | 15.93 | 557.55 |
| PRD 2UO | 4 | 108 | 24.56 | 2652.48 |
| PRD 3UO | 2 | 50 | 27.61 | 1380.50 |
| PRD 4UO | 2 | 34 | 24.56 | 835.04 |
| STE 2UA | 2 | 45 | 16.30 | 733.50 |
| STE 2UB | 2 | 45 | 16.30 | 733.50 |
| STE 3UA | 1 | 11 | 17.03 | 187.33 |
| STE 3UB | 1 | 11 | 18.52 | 203.76 |
| STE 4UO | 1 | 10 | 12.60 | 102.60 |
| SHD 3UE | 1 | 30 | 16.80 | 504.00 |
| SHE 4UE | 1 | 30 | 18.88 | 566.40 |
| SHD 4UF | 2 | 33 | 24.37 | 804.21 |
| BEG 4UE | 1 | 30 | 17.03 | 510.90 |
| TYP 1UO | 9 | 241 | 11.06 | 2665.46 |
| TYP 2UO | 3 | 87 | 11.06 | 962.22 |
| TOP 3UO | 2 | 50 | 17.97 | 898.50 |
| TOP 4UO | 2 | 38 | 18.70 | 710.60 |
| TOP 3U3 | 1 | 30 | 14.21 | 426.30 |
| TOP 4UE | 1 | 30 | 17.03 | 510.90 |
| TOTAL | | | | 26680.76 |

Department: Art

| Course | # Classes | # Pupils | Cost/Pupil | Total |
|---|---|---|---|---|
| ART 1UO | 5 | 120 | 8.51 + 8.50 | 1021.20 |
| ART 2UC | 1 | 32 | 25.70 + 10.25 | 822.40 |
| ART 2UO | 2 | 51 | 8.51 + 8.50 | 434.01 |
| ART 3UO | 1 | 33 | 8.51 + 8.50 | 280.83 |
| ART 4UC | 1 | 15 | 25.70 + 10.25 | 385.50 |
| ART 4UD | 1 | 7 | 5.81 + 5.81 | 40.67 |
| ART 4UG | 1 | 3 | 17.91 | 53.73 |
| ART 4US | 1 | 4 | 8.90 + 21.50 | 35.60 |
| ART 4UP | 1 | 17 | 6.96 + 10.25 | 118.32 |
| ART 5AO | 1 | 11 | 5.81 + 21.50 | 63.91 |
| ART 3UC | 1 | 27 | 25.70 + 10.25 | 693.90 |
| TOTAL | | | | 3950.07 |

| | |
|---|---|
| Additional Student Payments | 1020.00 |
| | 328.00 |
| | 433.50 |
| | 280.50 |
| | 153.75 |
| | 40.67 |
| | 86.00 |
| | 174.25 |
| | 236.50 |
| | 276.75 |
| TOTAL | 3029.92 |

Department: English

| | | | | |
|---|---|---|---|---|
| ENG 1GOE | 7 | 138 | 10.27 | 1417.26 |
| ENG 1AOE | 8 | 180 | 6.05 | 1089.00 |
| ENG 2GOE | 7 | 163 | 6.18 | 1007.34 |
| ENG 2AOE | 6 | 156 | 10.92 | 1703.52 |
| ARF 3UO | 2 | 38 | 23.74 | 902.12 |
| ENG 3UO | 2 | 37 | 8.31 | 307.47 |
| ENG 3GOE | 7 | 166 | 4.92 | 816.72 |
| ENG 3AOE | 6 | 162 | 10.34 | 1675.08 |
| ENG 4GOE | 7 | 190 | 12.76 | 2424.40 |
| ENG 4AOE | 6 | 155 | 9.22 | 1429.10 |
| THA 3UO | 1 | 20 | 12.09 | 241.80 |
| ENG 5AO | 4 | 124 | 1.06 | 131.44 |
| ENG 5AE | 1 | 26 | 1.06 | 27.56 |
| THA 2UO-4UO | 2 | 45 | 12.09 | 544.05 |
| TOTAL | | | | 13716.86 |

Department: Family Studies

| Course | # Classes | # Pupils | Cost/Pupil | Total |
|---|---|---|---|---|
| FAS 1UO | 3 | 78 | 15.22 | 1187.16 |
| FAS 2UF | 1 | 16 | 20.10 | 321.60 |
| FAS 2UT | 1 | 10 | 3.25 | 32.50 |
| FAS 3UO | 1 | 32 | 3.58 | 114.56 |
| CIP 4UO | 4 | 110 | 12.49 | 1373.90 |
| FAS 4UO | 1 | 16 | 6.00 | 96.00 |
| CFP 5AO | 1 | 26 | 4.63 | 120.38 |
| TOTAL | | | | 3246.10 |

Department: Geography

| | | | | |
|---|---|---|---|---|
| GEO 1GCG | 6 | 144 | 7.49 | 1078.56 |
| GEO 1AE | 6 | 174 | 8.04 | 1398.96 |
| GEO 1AE | 1 | 15 | 8.04 | 120.60 |
| GEO 2GO | 2 | 35 | 7.69 | 269.15 |
| GEO 2AO | 1 | 17 | 7.30 | 124.10 |
| ENS 3UO | 1 | 27 | 15.62 | 421.74 |
| GEO 3GP | 2 | 43 | 11.31 | 486.33 |
| GEO 3AP | 2 | 12 | 11.31 | 135.96 |
| GEO 4GR | 1 | 12 | 9.07 | 108.84 |
| GEO 4AH | 1 | 16 | 7.74 | 123.84 |
| GEO 5AO-5AW | 1 | 25 | 1.03 | 25.75 |
| TOTAL | | | | 4293.83 |

Department: History

| | | | | |
|---|---|---|---|---|
| HIS 1GO | 2 | 33 | 10.50 | 346.50 |
| HIS 1AO | 1 | 33 | 10.50 | 346.50 |
| HIS 2GOH | 7 | 149 | 4.11 | 612.39 |
| HIS 2ACH | 5 | 147 | 4.11 | 604.17 |
| HIS 3GO | 1 | 22 | 10.80 | 237.60 |
| HIS 3AO | 2 | 43 | 6.00 | 258.00 |
| MIS 3UO | 3 | 80 | 11.80 | 944.00 |
| HIS 4AO | 1 | 22 | 14.52 | 319.44 |
| HIS 5AA | 1 | 23 | 1.50 | 34.50 |
| HIS 5AC | 1 | 15 | 1.50 | 22.50 |
| TOTAL | | | | 3725.60 |

Department: Mathematics

| | | | | |
|---|---|---|---|---|
| MAT 1UR | 1 | 9 | 3.44 | 30.96 |
| MAT 1GOM | 7 | 130 | 5.12 | 665.60 |
| MAT AZOM | 6 | 167 | 5.22 | 871.74 |
| MAT 1AEM | 1 | 19 | 5.22 | 99.18 |
| MAT 2GOM | 7 | 185 | 5.12 | 947.20 |
| MAT 2AOM | 6 | 156 | 5.52 | 861.12 |
| MAT 2AEM | 1 | 24 | 5.52 | 132.48 |
| COL 2UO | 3 | 79 | 10.15 | 801.85 |
| COF 3AU | 5 | 139 | 8.07 | 1121.73 |
| MAT 3GO | 6 | 151 | 5.62 | 848.62 |
| MAT 3AO | 5 | 151 | 5.52 | 833.52 |
| MAT 3AE | 1 | 18 | 5.52 | 99.36 |
| COF 4AO | 2 | 49 | 8.07 | 395.43 |
| MAT 4GO | 6 | 159 | 5.62 | 893.58 |
| MAT 4AO | 6 | 167 | 5.27 | 880.09 |
| MAT 5AA | 2 | 64 | 1.15 | 73.60 |
| MAT 5AC | 3 | 93 | 1.15 | 106.95 |
| MAT 5AF | 4 | 121 | 1.15 | 139.15 |
| TOTAL | | | | 9802.16 |

Department: Moderns

| Course | # Classes | # Pupils | Cost/Pupil | Total |
|---|---|---|---|---|
| FRE 1AO | 3 | 90 | 10.96 | 986.40 |
| FRE 1GO | 1 | 30 | 10.25 | 307.50 |
| FRE 2AE | 1 | 14 | 11.66 | 163.24 |
| FRE 2AO | 2 | 47 | 10.96 | 515.12 |
| GER 2AO | | 22 | 7.03 | 154.66 |
| GER 3AO | | 10 | 10.51 | 105.10 |
| GER 4AO | | 5 | 11.76 | 58.80 |
| GER 5AO | | 4 | 9.69 | 38.76 |
| SPA 2AO | | 10 | 8.40 | 84.00 |
| SPA 3AO | | 6 | 8.69 | 52.14 |
| SPA 4AO | | 5 | 10.63 | 53.15 |
| SPA 5AO | | 4 | 6.70 | 26.80 |
| FRE 3AO | 1 | 36 | 11.41 | 410.76 |
| FRE 3AE | 1 | 25 | 13.19 | 329.75 |
| FRE 4AO | 2 | 40 | 9.03 | 361.20 |
| FRE 5AO | 1 | 34 | 9.51 | 323.34 |
| FRE 5AE | 1 | 11 | 5.77 | 63.47 |
| TOTAL | | | | 4034.19 |

Department: Music

| Course | # Classes | # Pupils | Cost/Pupil | Total |
|---|---|---|---|---|
| MUS 1UI | 2 | 37 | 9.17 | 339.29 |
| MUS 1UV | 1 | 18 | 6.64 | 199.52 |
| MUS 2UI | 1 | 19 | 6.64 | 126.16 |
| MUS 2UG | 3 | 60 | 4.10 | 246.00 |
| MUS 3UI | 1 | 30 | 6.64 | 199.20 |
| MUS 2UV | 1 | 11 | 5.60 | 61.60 |
| MUS 3UV | 1 | 5 | 5.60 | 28.00 |
| MUS 4UV | 1 | 4 | 5.60 | 22.40 |
| MUS 5AV | 1 | 4 | 5.60 | 22.40 |
| MUS 4UI | 1 | 11 | 6.64 | 73.04 |
| MUS 5A1 | 1 | 4 | 6.64 | 26.56 |
| TOTAL | | | | 1264.17 |

Department: Physical Education

| | | | | |
|---|---|---|---|---|
| PHE 1UF | 3 | 73 | 11.20 | 817.60 |
| PHE 2UF | 2 | 60 | 12.75 | 765.00 |
| PHE 3UF | 2 | 50 | 9.97 | 498.50 |
| PHE 4UM | 2 | 42 | 11.54 | 484.68 |
| EX-C (F) | | 1520 | 2.47 | 3754.40 |
| TRANS (F) | | 1520 | .36 | 547.20 |
| PHE 1UM | 6 | 148 | 8.73 | 1292.04 |
| PHE 2UM | 5 | 123 | 8.17 | 1004.91 |
| PHE 3UM | 5 | 120 | 8.58 | 1029.60 |
| PHE 4UM | 3 | 74 | 11.54 | 853.96 |
| PHE 5AC | 1 | 23 | 7.25 | 166.75 |
| EX-C (M) | | 1520 | 6.81 | 10351.20 |
| TRANS-(M) | | 1520 | .54 | 805.60 |

| | | |
|---|---|---|
| PHY-F | 2565.78 | |
| EXE-F | 3754.40 | |
| TRANS-F | 547.20 | 6867.38 |
| PHY-B | 4347.26 | |
| EXC-B | 10351.20 | |
| TRANS-B | 805.60 | 15504.06 |
| TOTAL | | 22371.44 |

STUDENT PAYMENT INCLUDED IN TOTAL

| | | |
|---|---|---|
| Term Charges | 7385.00 | |
| Activity Cards | 700.00 | |
| Gate Recepts | 350.00 | |
| BAA-GAA | 2000.00 | 10435.00 |
| TOTAL | | 11936.44 |

Department: Science

| Course | # Classes | # Pupils | Cost/Pupil | Total |
|---|---|---|---|---|
| SCI 1GOS | 6 | 150 | 16.29 | 2443.50 |
| SCI 1AOS | 7 | 177 | 15.89 | 2812.53 |
| SCI 2GO | 7 | 162 | 13.48 | 2183.76 |
| SCI 2AO | 6 | 155 | 13.48 | 2089.40 |
| BIO 3GO | 4 | 87 | 10.83 | 942.21 |
| PHY 3GO | 4 | 102 | 8.32 | 848.61 |
| PHY 3AO | 4 | 107 | 6.77 | 724.39 |
| ENS 3UO | 1 | 27 | 15.62 | 421.74 |
| CHE 4GO | 4 | 101 | 11.65 | 1176.65 |
| CHE 4AO | 4 | 105 | 13.26 | 1392.30 |
| BIO 5AO | 3 | 65 | 7.61 | 494.65 |
| CHE 5AO | 3 | 62 | 6.94 | 596.84 |
| PHY 5AO | 3 | 62 | 5.63 | 349.06 |
| TOTAL | | | | 16475.64 |

Department: Technical

| Course | # Classes | # Pupils | Cost/Pupil | Total |
|---|---|---|---|---|
| MSH 1UO | 2 | 36 | 22.00 | 792.00 |
| WDW 1UO | 2 | 36 | 29.28 | 1054.08 |
| DRA 1UO | 2 | 36 | 6.10 | 219.60 |
| PAM 1UO | 2 | 36 | 22.63 | 814.68 |
| ELE 1UO | 2 | 36 | 15.00 | 540.00 |
| AUB 1UO | 2 | 36 | 30.68 | 1104.48 |
| SHM 1UO | 2 | 36 | 32.44 | 1167.84 |
| WEL 1UO | 2 | 36 | 60.06 | 3162.16 |
| AUM 1UO | 2 | 36 | 31.03 | 117.08 |
| MSH 2UO | 5/6 | 18 | 22.00 | 396.00 |
| WDW 2UO | 5/6 | 15 | 29.28 | 439.20 |
| DRA 2UO | 4/6 | 14 | 6.10 | 85.40 |
| PAM 2UO | 1 | 19 | 27.61 | 524.59 |
| ELE 2UO | 4/6 | 14 | 10.99 | 153.86 |
| AUB 2UO | 5/6 | 16 | 20.68 | 330.88 |
| SHM 2UO | 4/6 | 14 | 37.45 | 524.30 |
| WEL 2UO | 1 | 20 | 73.15 | 1463.00 |
| AUM 2UO | 1 | 20 | 29.12 | 582.40 |
| MSH 3UA | 2 | 25 | 24.67 | 616.75 |
| BUC 3UA | 1 | 23 | 41.28 | 949.44 |
| BLR 3UA | 1 | 23 | 13.15 | 302.45 |
| DRA 3UA | 2 | 40 | 14.65 | 586.00 |
| DRM 3UA | 1 | 22 | 13.15 | 289.30 |
| PAM 3UA | 2 | 27 | 40.11 | 1082.97 |
| ELE 3UA | 1 | 26 | 20.70 | 538.20 |
| ELT 3UA | 2 | 29 | 40.36 | 1170.44 |
| AUB 3UA | 2 | 45 | 79.30 | 3568.50 |
| PLH 3UA | 2 | 28 | 43.30 | 1212.40 |
| WEL 3UA | 2 | 40 | 71.63 | 2865.20 |
| AUM 3UA | 3 | 69 | 42.87 | 2958.03 |
| MSH 4UBC | 2 | 28 | 26.82 | 750.96 |
| BUC 4UBC | 1 | 12 | 46.28 | 555.36 |
| DRA 4UBC | 1 | 19 | 12.50 | 237.50 |
| DRM 4UBC | 1 | 20 | 13.25 | 265.00 |
| PAM 4UBC | 1 | 9 | 41.36 | 372.24 |
| ELE 4UBC | 1 | 21 | 22.43 | 471.03 |
| ELT 4UBC | 1 | 18 | 46.88 | 843.84 |
| AUB 4UBC | 1 | 17 | 39.30 | 688.10 |
| PLH 4UBC | 1 | 22 | 66.92 | 1472.24 |
| WEL 4UBC | 2 | 36 | 80.71 | 2905.56 |
| AUM 4UBC | 2 | 31 | 33.74 | 1045.94 |
| AUM 4UBC | 2 | 36 | 31.03 | 1117.08 |
| DRA 1US | 1 | 19 | 6.10 | 115.90 |
| ELE 1US | 1 | 20 | 15.00 | 300.00 |
| MSH 1US | 1 | 14 | 22.00 | 308.00 |
| WDW 1US | 2 | 29 | 29.28 | 849.12 |
| TOTAL | | | | 42889.10 |

# APPENDIX V

## COMPARISON OF COST PER PUPIL BUDGET TO ACTUAL BUDGET IN 1982

| Department | Cost per Pupil Method | Actual |
|---|---|---|
| Administration | 31160.00 | 34340.00 |
| Audio Visual Services | 3800.00 | 2250.00 |
| Library Services | 6840.00 | 6800.00 |
| Guidance | 760.00 | 625.00 |
| Art | 3950.07 | 2400.00 |
| Business | 26680.76 | 18586.00 |
| English | 13716.86 | 3500.00 |
| Family Studies | 3246.10 | 1900.00 |
| Geography | 4293.83 | 1600.00 |
| History | 3725.60 | 1925.00 |
| Math | 9802.16 | 6400.00 |
| Moderns | 4034.19 | 1950.00 |
| Music | 1264.17 | 1959.00 |
| Physical Education | 11936.44 | 9775.00 |
| Science | 16475.64 | 14820.00 |
| Technical | 42889.10 | 38520.00 |
| TOTAL | 184574.92 | 127358.00 |
| DIFFERENCE | (37224.92) | (25%) |

# APPENDIX VI

BUSINESS EDUCATION COMPONENT — SAMPLE EDUCATIONAL SUPPLIES INDEX

| Item | Item Description | Weight % (Constant) | Base Year 0 Price/Unit | Base Year Index | Year I Price Unit | Year I Index | Year II Price Unit | Year II Index |
|---|---|---|---|---|---|---|---|---|
| 5 | Basic Accounting - D'Amico - Copp/Clark | 10 | 14.36 | 1.436 | 14.95 | 1.495 | 14.95 | 1.495 |
| 6 | World of Computers - Kelly/Wiley | 10 | 15.95 | 1.595 | 16.25 | 1.625 | 16.50 | 1.650 |
| 7 | Professional Appl. in Type. - Farmer-Gage | 10 | 14.95 | 1.495 | 14.95 | 1.495 | 15.50 | 1.550 |
| 8 | Modern Office Prac. Manual - Copp/Clark | 10 | 8.50 | .850 | 8.50 | .850 | 9.00 | .900 |
| 54 | Per Hour Typewriter Service (Tender) | 20 | 29.00 | 5.800 | 32.50 | 6.500 | 33.00 | 6.600 |
| 56 | Typewriter Ribbons - IBM Cart. Doz H8040 | 10 | 14.52 | 1.452 | 13.50 | 1.350 | 13.75 | 1.375 |
| 57 | Spirit Masters 8 1/2 x 11 Box A 1665 | 10 | 11.03 | 1.103 | 11.05 | 1.105 | 11.45 | 1.145 |
| 58 | Duplicating Paper 8 1/2 x 11 - 9M A1825 | 10 | 4.85 | .485 | 5.00 | .500 | 5.15 | .515 |
| 68 | Printerpaper 8 1/2 x 11/M E5310 | 10 | 7.43 | .743 | 7.80 | .780 | 7.95 | .795 |
| | | 100% | | | | | | |
| | Index Value | | | 14.959 | | 15.700 | | 16.025 |
| | Base Year = 100 | | | 100 | | 105 | | 107 |
| | | | | | | (a) | | (b) |

INDEX VALUE COMPUTATION

(a) $\left(\text{Year I } \frac{\text{Index Total - Base Year Index}}{\text{Base Year Index Total}} \text{ Total}\right) \times 100 = \text{Index Change} \qquad \frac{15.700 - 14.959}{14.959} \times 100 = .05$

Base Index + Year I Index Change = Year I Index (100 + 5 = 105)

(b) $\left(\text{Year II } \frac{\text{Index Total - Base Year Index}}{\text{Year I Index Total}} \text{ Total}\right) \times 100 = \text{Index Change} \qquad \frac{16.025 - 14.959}{14.959} \times 100 = .07$

Base Year Index + Year II Index Change = Year II Index (100 + 7 = 107)

# APPENDIX VII

## SECONDARY SCHOOL EDUCATION SUPPLY

## PRICE INDEX SUBINDEX CALCULATIIONS

Weightings are based on the detailed cost sheets developed in various courses. If a department indicated approximately 50% of costs were incurred for texts and 50% for classroom supplies, the weightings were assigned on this basis. The factors were reduced to multiples of 10% to increase the reliability of the index.

Subindex #1: Administration and Guidance Services

| Item No | Item Description | 1982 Prices | Item Weight | Index Value |
|---|---|---|---|---|
| 58. | Spirit Duplicating Paper | 4.85 | 30 | 1.455 |
| 56. | Typewriter Ribbon | 14.52 | 10 | 1.452 |
| 55. | Gestetner Black Mimeo Ink | 6.00 | 10 | .600 |
| 57. | Spirit Masters | 11.03 | 10 | 1.103 |
| 52. | Pens | 1.28 | 10 | .128 |
| 53. | Per hour service on typewriters | 29.50 | 10 | 2.950 |
| 50. | Postage (Letter Rate) | .32 | 10 | .032 |
| 51. | Bus Rental Rates In-city tender | 25.00 | 10 | 2.500 |
| | TOTAL | | 100% | 10.220 |

| | |
|---|---|
| Duplicating Supplies | 50% |
| Office Supplies | 20 |
| Service | 10 |
| Postage | 10 |
| Transportation | 10 |
| Total | 100 |

Subindex # 2: Art

| | | | | |
|---|---|---|---|---|
| 1. | History of Art | 27.50 | 10 | 2.750 |
| 59. | Construction Paper | 2.63 | 10 | .263 |
| 60. | Bristal Board | 2.16 | 10 | .216 |
| 61. | Newsprint | 2.39 | 10 | .239 |
| 62. | Acrylic Paints Black | 3.50 | 10 | .350 |
| 63. | Paint Brushes Grumbacher | 3.84 | 10 | .384 |
| 64. | Tempera Paint | 1.31 | 10 | .131 |
| 65. | Xacto Knives | .84 | 10 | .084 |
| 66. | Glue Fast Bond | .54 | 10 | .054 |
| 67. | Clay B2860 | 10.11 | 10 | 1.011 |
| | TOTAL | | 100 | 5.482 |

| | |
|---|---|
| Texts | 10% |
| Paper Supplies | 30 |
| Art Supples | 60 |
| Total | 100% |

Subindex #3: Audio Visual and Library Services

| Item No | Item Description | 1982 Prices | Item Weight | Index Value |
|---|---|---|---|---|
| 57. | Spirit Masters | 11.03 | 10 | 1.103 |
| 48. | Subscription to Newsweek | 50.00 | 10 | 5.000 |
| 68. | Printer Paper | 7.43 | 10 | .743 |
| 49. | Time Magazine on Microflim | 50.00 | 10 | 5.000 |
| 2. | Statesman Year Book | 45.00 | 10 | 4.500 |
| 3. | Corpus Almanac | 87.00 | 10 | 8.700 |
| 4. | Contemporay Literary Criticism | 51.80 | 10 | 5.180 |
| 58. | Spirit Duplicating Paper | 4.85 | 10 | .489 |
| 69. | Lamp | 8.70 | 10 | .870 |
| 71. | Bookbinding Tape | 2.66 | 10 | .266 |
| | TOTAL | | 100 | 31.847 |

| | |
|---|---|
| Duplicating Supplies | 20% |
| Subscriptions - Print | 10 |
| Subscriptions - Micro | 10 |
| Books | 30 |
| A/V Supplies | 10 |
| Library Supplies | 10 |
| Computer Supplies | 10 |
| Total | 100% |

Subindex #4: Business Education

| | | | | |
|---|---|---|---|---|
| 5. | Basic Accounting | 14.36 | 10 | 1.103 |
| 6. | World of Computers | 15.95 | 10 | 1.595 |
| 7. | Prof. Application in Typewriting | 14.95 | 10 | 1.495 |
| 58. | Spirit Duplicating Paper | 4.85 | 10 | .485 |
| 57 | Spirit Masters | 11.03 | 10 | 1.103 |
| 68. | Printer paper | 7.43 | 10 | .743 |
| 56. | Typewriter Ribbons | 14.52 | 10 | 1.452 |
| 54. | Per hour service on typewriters | 29.00 | 20 | 5.800 |
| 8. | Modern Off. Prac. Teachers Manual | 8.50 | 10 | .850 |
| | TOTAL | | 100 | 14.959 |

| | |
|---|---|
| Texts | 30% |
| Classroom Supplies | 40 |
| Service | 20 |
| Teacher Aids | 10 |
| Total | 100% |

Subindex #5: English

| Item No | Item Description | 1982 Price | Item Weight | Index Value |
|---|---|---|---|---|
| 9. | The Pearl | 1.95 | 10 | .195 |
| 10. | Julius Caesar - Shakespeare | 2.25 | 10 | .225 |
| 11. | More Joy in Heaven | 4.95 | 10 | .495 |
| 12. | Drama for Canada | 5.80 | 10 | .580 |
| 13. | Style and Structure | 10.95 | 10 | 1.095 |
| 14. | Stories to Remember | 7.50 | 10 | .750 |
| 15. | I Heard the Owl Call My Name | 2.95 | 10 | .295 |
| 16. | The Outsiders | 2.25 | 10 | .225 |
| 58. | Spirit Duplicating Paper | 4.85 | 10 | .485 |
| 57. | Spirit Masters | 11.03 | 10 | 1.103 |
| | TOTAL | | 100 | 5.448 |

| | |
|---|---|
| Texts | 80% |
| Classroom Supplies | 20 |
| Total | 100% |

Subindex #6: Family Studies

| | | | | |
|---|---|---|---|---|
| 17. | People, Food, Science | 16.95 | 10 | 1.695 |
| 18. | Families | 15.95 | 10 | 1.595 |
| 58. | Spirit Duplicating Paper | 4.85 | 10 | .485 |
| 57. | Spirit Masters | 11.03 | 10 | 1.103 |
| 72. | Sewing Machine Labour Rate Permit | 21.50 | 10 | 2.150 |
| 73. | Pie Filler | 25.00 | 10 | 2.500 |
| 74. | Eggs | 1.25 | 10 | .125 |
| 75. | Butter | 2.25 | 10 | .225 |
| 76. | Salami | 3.23 | 10 | .325 |
| 77. | Scissors 7" | 1.55 | 10 | .155 |
| | TOTAL | | 100 | 10.356 |

| | |
|---|---|
| Texts | 20% |
| Classroom Supplies | 20 |
| Service | 10 |
| Food Supplies | 40 |
| Textile Supplies | 10 |
| Total | 100% |

Subindex #7: History and Geography

| Item No | Description | 1982 Price | Item Weight | Index Value |
|---|---|---|---|---|
| 19. | Across Canada | 11.96 | 10 | 1.196 |
| 20. | Canadian Oxford School Atlas | 7.20 | 10 | .720 |
| 21. | Through Europe and Asia | 12.00 | 10 | 1.200 |
| 22. | Terestrial Ecology | 9.86 | 10 | .986 |
| 23. | Canadians and Their Governement | 3.95 | 10 | .395 |
| 24. | A Social View of man | 9.95 | 10 | .995 |
| 25. | The Enduring Past | 12.95 | 10 | 1.295 |
| 58. | Spirit Duplicating paper | 4.85 | 10 | .485 |
| 57. | Spirit Masters | 11.03 | 10 | 1.103 |
| 70. | Projection Bak Lamps | 5.70 | 10 | .570 |
| | TOTAL | | 100 | 8.945 |

| | |
|---|---|
| Texts | 70% |
| Classroom Supplies | 30 |
| Total | 100% |

Subindex #8: Mathematics

| | | | | |
|---|---|---|---|---|
| 19. | Math In Action I | 18.20 | 10 | 1.820 |
| 27. | Foundations of Math. Today and Tom. | 20.80 | 10 | 2.080 |
| 28. | Math in Action II | 18.70 | 10 | 1.870 |
| 29. | Foundation of Math. Introduction | 20.80 | 10 | 2.080 |
| 30. | Mathematics for Modern World 3 | 21.20 | 10 | 2.120 |
| 31. | Mathematics for Modern World 4 | 21.20 | 10 | 2.120 |
| 32. | World of Computers | 6.50 | 10 | .650 |
| 58. | Spirit Duplicating paper | 4.85 | 10 | .485 |
| 57. | Spirit Masters | 11.03 | 10 | 1.103 |
| 68. | Printer Paper | 7.43 | 10 | .743 |
| | TOTAL | | 100 | 14.586 |

| | |
|---|---|
| Texts | 70% |
| Classroom Supplies | 20 |
| Computer Supplies | 10 |
| Total | 100% |

Subindex #9: Moderns

| | | | | |
|---|---|---|---|---|
| 33. | Passport Francais I | 6.25 | 10 | .625 |
| 34. | Passport Francais IV | 7.60 | 10 | .760 |
| 35. | Passport Francais V | 7.60 | 10 | .760 |
| 36. | Passport Francais VIII | 12.80 | 10 | 1.280 |
| 37. | German Today I | 16.95 | 10 | 1.695 |
| 38. | A.L.M. Level II | 12.00 | 10 | 1.299 |
| 39. | A First Spanish Reader | 4.20 | 10 | .420 |
| 95. | Chalk White Dustless | 1.80 | 10 | .180 |
| 58. | Spirit Duplicating Paper | 4.85 | 10 | .485 |
| 37. | Spirit Masters | 11.03 | 10 | 1.103 |
| | TOTAL | | 100 | 1.103 |

| | |
|---|---|
| Texts | 70% |
| Classroom Supplies | 30 |
| Total | 100% |

Subindex #10: Music (Instrumental and Vocal)

| | | | | |
|---|---|---|---|---|
| 96. | Instrument Repairs per hour | 40.00 | 10 | 4.000 |
| 97. | E-Flat Alto Sazaphone Reeds | 13.75 | 10 | 1.375 |
| 98. | Drum Sticks Nylon Tip | 6.25 | 10 | .625 |
| 99. | Valve Oil | 11.00 | 10 | 1.100 |
| 40. | First Division - Band Method | 4.95 | 10 | .495 |
| 100 | Violin Strings | 10.65 | 10 | 1.065 |
| 58. | Spirit Deplicating Paper | 4.85 | 10 | .485 |
| 57. | Spirit Masters | 11.03 | 10 | 1.103 |
| | TOTAL | | 100 | 10.248 |

| | |
|---|---|
| Texts | 10% |
| Classrooms Supplies | 20 |
| Music Supplies | 40 |
| Service | 30 |
| Total | 100% |

Subindex #11: Physical Education

| Item No | Item Description | 1982 Price | Item Weight | Index Value |
|---|---|---|---|---|
| 41. | Health Science and You I | 9.75 | 10 | .975 |
| 42. | Your Health and You | 13.20 | 10 | 1.320 |
| 78. | Basketball | 62.91 | 10 | 6.291 |
| 79. | School Park Tape | 28.75 | 10 | 2.875 |
| 80. | Gym Mats | 70.00 | 10 | 7.000 |
| 81. | Badminton Shuttlecocks | 9.83 | 10 | .983 |
| 58. | Spirit Duplicatiing Paper | 4.85 | 10 | .485 |
| 57. | Spirit Master | 11.03 | 10 | 1.103 |
| 82. | 6K Iron Outdoor ShotPut | 7.95 | 10 | .795 |
| 83. | Starting Blanks | 15.95 | 10 | 1.575 |
| | TOTAL | | 100 | 23.402 |

| | |
|---|---|
| Texts | 20% |
| Phe. Supplies | 60 |
| Classroom Supplies | 20 |
| Total | 100% |

Subindex #12: Science

| | | | | |
|---|---|---|---|---|
| 43. | Physical Science | 16.95 | 10 | 1.696 |
| 44. | Introduction to Life | 18.00 | 10 | 1.800 |
| 45. | Matter and Energy | 12.65 | 10 | 1.265 |
| 46. | Chemistry Today | 16.75 | 10 | 1.675 |
| 58. | Spirit Duplicating Paper | 4.85 | 10 | .485 |
| 57. | Spirit Masters | 11.03 | 10 | 1.103 |
| 84. | Earthworms | 6.95 | 10 | .695 |
| 85. | Hyrdrogen Peroxide | 1.33 | 10 | .133 |
| 86. | Beakers | 13.12 | 10 | 1.312 |
| 87. | Triple Beam Balance | 117.00 | 10 | 11.700 |
| | TOTAL | | 100 | 21.864 |

| | |
|---|---|
| Texts | 40% |
| Lab. Supplies | 40 |
| Classrooms Supplies | 20 |
| Total | 100% |

Subindex # 13: Technical Education

| | | | | |
|---|---|---|---|---|
| 47. | Auto. Constructors and Operation | 28.20 | 10 | 2.820 |
| 88. | Acetylene | 56.16 | 10 | 5.616 |
| 89. | Flat Sheet Galvanized Steel | 4.95 | 10 | .495 |
| 90. | Sheet Plywood Fir | 28.00 | 10 | 2.800 |
| 91. | Thumbler Flex Red Body Filler | 66.00 | 10 | 6.600 |
| 92. | Steel H R Flat | .30 | 10 | .030 |
| 93. | Electrodes | 2.38 | 10 | .238 |
| 94. | Stanley Steel Master Claw Hammer | 19.00 | 10 | 1.900 |
| 58. | Spirit Duplicating paper | 4.85 | 10 | .485 |
| 57. | Spirit Masters | 11.03 | 10 | 1.103 |
| | TOTAL | | 100 | 22.087 |

| | |
|---|---|
| Texts | 10% |
| Technical Supplies | 60 |
| Small Tools | 10 |
| Class Supplies | 20 |
| Total | 100% |

# APPENDIX VIII

## SECONDARY SCHOOL EDUCATION

## SUPPLY PRICE INDEX ITEM LIST

A cross section of items used at varying grade levels within cost areas that have easily determined prices

| Item No. | Item Description |
|---|---|
| 1. | History of Art 2nd ed - Janson-Prentice Hall |
| 2. | Statesman Yearbook - MacMillan |
| 3. | Corpus Almanac - Corpus Publishing |
| 4. | Contemporary Literary Criticism - Gale Research |
| 5. | Basic Accounting - D'Amico - Copp Clark |
| 6. | World of Computers - Kelly/Wiley |
| 7. | Professional Applications in Typewriting - Farmer-Gage |
| 8. | Modern Office Practice Teachers Manual - Gage |
| 9. | The Pearl - Steinbeck/Macmillan |
| 10. | Julius Caesar - Shakespeare - Signet Classic |
| 11. | More Joy in Heaven - Callaghann - McClelland Stewart |
| 12. | Drama for Canada - O'Farrell - Academic Press |
| 13. | Style and Structure - Bealey - J.M. Dent & Sons |
| 14. | Stores to Remember - McMaster - Copp Clark |
| 15. | I Heard the Owl Call My Name - Craven-Clark Irwin |
| 16. | The Outsiders - Hinton - Dell Publishing |
| 17. | People, Food, Science - Cote - Ginn |
| 18. | Families - Schlesinger - McGraw Hill |
| 19. | Across Canada - Harshaman - Wiley |
| 20. | Canadian Oxford School Atlas 4th ed - Oxford Press |
| 21. | Through Europe and Asia - Hildebrant - Holt Rinehart |
| 22. | Terrestrial Ecology - Andrews-Prentice-Hall |
| 23. | Canadians and Their Government - Merritt - Dent |
| 24. | A Social View of Man - King - Wiley |
| 25. | The Enduring Past - Trueman - McGraw Hill |
| 26. | Math in Action I - Pogue - Copp Clark |
| 27. | Foundations of Mathematics (Today) - Dottori - McGraw Hill |
| 28. | Math in Action II - Pogue - Copp Clark |
| 29. | Foundations of Mathematics (Intro) - Dottori - McGraw Hill |
| 30. | Mathematics for Modern World 3 - Holt |
| 31. | Mathematics for Modern World 4 - Holt |
| 32. | World of Computers Workbook - Kelly-Wiley |
| 33. | Passport Francais I Morgan - D. C. Heath |
| 34. | Passport Francais IV - Morgan - D. C. Heath |
| 35. | Passport Francais V - Morgan - D. C. Heath |
| 36. | Passport Francais VIII - Morgan - D. C. Heath |
| 37. | German Today I - Various - Houghton Miffen |
| 38. | A-L-M Level II - Shulz Griesbach - Hueber |

39. A First Spanish Reader - Hughes - Dent
40. First Division Band Method (Belwin)
41. Health, Science and You I - Robertson - Holt
42. Your Health and You - Gray - Doubleday
43. Physical Science - Andrews - Prentice Hall
44. Introduction to Life - Wash - Addison Wesley
45. Matter and Energy - McLachlan - Clark Irwin
46. Chemistry Today 2nd ed - Whitman - Prentice Hall
47. Automobile Construction and Operation - Stahn - McGraw Hill
48. Yearly Subscription to Newsweek Magazine
49. Yearly Subscription to Time Microfilm
50. Letter Rate for Postage
51. Bus Rental Rates - In-city Tender
52. Pens A1440 doz.
53. Per Hour Service on Typewriters - St. Cath. Business Machines
54. Per Hour Service on Typewriters - Hamilton Typewriter
55. Gestetner Black Mimeo Ink - A1620 tub
56. Typewriter Ribbons IBM Dozen - H8040
57. Spirit Masters Box 8 1/2 x 11 - 9M A1865
58. Spirit Duplicating Paper 8 1/2 x 11 - 9M A1865
59. Construction Paper B2370 pkg.
60. Bristol Board B2010 pkg.
61. Newsprint A1320 M
62. Acrylic Paint - Black B2805 ea.
63. Paint Brush - Grumbacherr - Box B2050
64. Tempera Paint - Orange - B2235 ea.
65. Xacto Knives - B2198 ea.
66. Glue - Bond Fast 5 oz. Squeeze B2195 ea.
67. Clay - B2860 20 Kg Cone 04 - 2 ctn.
68. Printer Paper 8 1/2 x 11/M E5310
69. Lamp DYV E5170 ea.
70. Projection Lamp Bak E5065 ea.
71. Bookbinding Tape 3" x 15 yd. F6005 roll
72. Sewing Machine Labour Rate Per Hour
73. Pie Filler Apple 6/100 (Hickeson-Langs)
74. Eggs A Large Doz (Avondale)
75. Butter 1 lb. Reg (Avondale)
76. Salami quality 4.4 kg (Hickeson-Langs)
77. Scissors 7" A1505 ea.
78. Basketball Wilson Jet
79. School Pack Tape 1 1/2 x 15 yd case
80. Gym Mats 4 x 4 x 1 1/4 Velcro 4 sides
81. Badminton Shuttle Cocks Carlton International doz.
82. Iron Outdoor Shot 6K ea.
83. Starting Blanks 32 cal Winchester box
84. Earthworms P1600 doz.
85. Hydrogen Peroxide 500 ml
86. Beakers 250 ml 54675-K ea.
87. Triple Beam Balance Ohaus ea.
88. Acetylene 360 cu. ft. cylinder
89. Flat Sheet Galvanized Steel 48 x 96 x 28 ga. lb.
90. Sheet Plywood Fir 4 x 8 x 3/4
91. Tumbler Flex Red Body Filler case

92. Steel HR flat 1.4 x 2 lb.
93. Electrodes 6013 3/32" ea.
94. Stanley Steelmaster Claw Hammer CT 574135 ea.
95. Chalk White Dustless A-1130 Gross
96. Instrument Repairs per hour
97. E-Flat Alto Saxaphone Reeds Grade Strenght #2 ea.
98. Drum Sticks Nylon Tip Size 5A Ludwig (pair)
99. Valve Oil Conn 1oz.
100. Violin Strings Tomastick Superflex (set)

Note: Numbers after items such as A 1440 represent the catalogue numbers for items available from central purchasing.

| Item No. | 1982 Prices | Item No. | 1982 Prices | Item No. | 1982 Prices |
|---|---|---|---|---|---|
| 1. | 27.50 | 34. | 7.60 | 67. | 10.11 |
| 2. | 45.00 | 35. | 7.60 | 68. | 7.43 |
| 3. | 87.00 | 36. | 12.80 | 69. | 8.70 |
| 4. | 51.80 | 37. | 16.95 | 70. | 5.70 |
| 5. | 14.36 | 38. | 12.00 | 71. | 2.66 |
| 6. | 15.95 | 39. | 4.20 | 72. | 21.50 |
| 7. | 14.95 | 40. | 4.95 | 73. | 25.00 |
| 8. | 8.50 | 41. | 9.75 | 74. | 1.25 |
| 9 | 1.95 | 42. | 13.20 | 75. | 2.25 |
| 10. | 2.25 | 43. | 16.96 | 76. | 3.23 |
| 11. | 4.95 | 44. | 18.00 | 77. | 1.55 |
| 12. | 5.80 | 45. | 12.65 | 78. | 62.91 |
| 13. | 10.95 | 46. | 16.75 | 79. | 28.75 |
| 14. | 7.50 | 47. | 28.20 | 80. | 70.00 |
| 15. | 2.95 | 48. | 50.00 | 81. | 9.83 |
| 16. | 2.25 | 49. | 50.00 | 82. | 7.95 |
| 17. | 16.95 | 50. | .32 | 83. | 15.75 |
| 18. | 15.95 | 51. | 25.00 | 84. | 6.95 |
| 19. | 11.96 | 52. | 1.28 | 85. | 1.33 |
| 20. | 7.20 | 53. | 29.00 | 86. | 13.12 |
| 21. | 12.00 | 54. | 29.50 | 87. | 117.00 |
| 22. | 9.86 | 55. | 6.00 | 88. | 56.16 |
| 23. | 3.95 | 56. | 14.52 | 89. | 4.95 |
| 24. | 9.95 | 57. | 11.03 | 90. | 28.00 |
| 25. | 12.95 | 58. | 4.85 | 91. | 66.00 |
| 26. | 18.70 | 59. | 2.63 | 92. | .30 |
| 27. | 20.80 | 60. | 2.16 | 93. | 2.38 |
| 28. | 18.70 | 61. | 2.39 | 94. | 19.00 |
| 29. | 20.80 | 62. | 3.50 | 95. | 1.80 |
| 30. | 21.20 | 63. | 3.84 | 96. | 40.00 |
| 31. | 21.20 | 64. | 1.31 | 97. | 13.75 |
| 32. | 6.50 | 65. | .84 | 98. | 6.25 |
| 33. | 6.25 | 66. | .54 | 99. | 11.00 |
| | | | | 100. | 10.65 |

# APPENDIX IX

## SECONDARY SCHOOL EDUCATION SUPPLIES PRICE INDEX

### SUBINDEX WEIGHT CALCULATION

| Subindex | 1982 Actual Expenditure | % of Total Expenditure |
|---|---|---|
| Administration - Guidance | 34.965 | 24.0 |
| Art | 2.400 | 1.5 |
| Audio Visual and Library | 9.050 | 6.0 |
| Business Education | 18.586 | 12.5 |
| English | 3.500 | 2.5 |
| Family Studies | 1.900 | 1.0 |
| History and Geography | 5.525 | 3.5 |
| Mathematics | 6.400 | 4.5 |
| Moderns | 1.950 | 1.0 |
| Music | 1.959 | 1.0 |
| Physical Education | 9.775 | 6.5 |
| Science | 14.820 | 10.0 |
| Technical | 38.520 | 26.0 |
| TOTAL | 147.390 | 100.0 |

## SECONDARY SCHOOL EDUCATION SUPPLIES PRICE INDEX

### INDEX CALCULATION - BASE YEAR

| Subindex | 1982 Subindex Value | Weight | Index Value |
|---|---|---|---|
| Administration - Guidance | 10.220 | 24.0 | 245.280 |
| Audio Visual - Library | 31.847 | 6.0 | 191.082 |
| Art | 5.482 | 1.5 | 8.223 |
| Business Education | 14.959 | 12.5 | 186.988 |
| English | 5.448 | 2.5 | 13.620 |
| Family Studies | 10.356 | 1.0 | 1.036 |
| History - Geography | 8.945 | 3.5 | 31.308 |
| Mathematics | 14.586 | 4.5 | 65.637 |
| Moderns | 8.508 | 1.0 | 8.508 |
| Music | 10.245 | 1.0 | 1.025 |
| Physical Education | 23.402 | 6.5 | 152.113 |
| Science | 21.864 | 10.0 | 218.640 |
| Technical | 22.087 | 26.0 | 574.262 |
| TOTAL | | | 1697.722 |

1982 Index Value = 100

Weightings are based on the 1982 actual percentage expenditure for supply items in this secondary school. (Refer to Subindex Weight Calculation Table)