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ABSTRACT

One purpose of this study was to examine the adequacy of existing policies regarding the provision of textbooks in a large suburban school district. Another purpose was to determine the cost of meeting a proposed standard for textbook availability, namely, that every student should be provided with copies of the texts he or she uses in all basic academic subjects. Data were gathered from two sources: a survey of teachers and administrators in a sample of 25 schools and an analysis of expenditures for textbooks and other instructional materials. Results showed that needs varied sharply by both grade level and subject matter, with the greatest needs found at the middle or junior high school level. The study also provides descriptive information on textbook usage for classroom and out-of-classroom experiences as well as data on the need for supplementary materials. Extensive tables are included and the appendix offers an alternative cost analysis and a summary of findings. (Author/LD)

DEPARTMENT OF EDUCATIONAL ACCOUNTABILITY

An Evaluation of Textbook Costs, Usage, and Needs

by Joy Frechtling and Steven Frankel

MONTGOMERY COUNTY PUBLIC SCHOOLS
ROCKVILLE, MARYLAND

APRIL 1979

CHARLES M. BERNARDO
SUPERINTENDENT OF SCHOOLS

EXECUTIVE SUMMARY

In March, 1979, the Department of Educational Accountability (DEA) conducted a study designed to provide an estimate of the cost of meeting a proposed standard for textbook availability:

> Every student should have his/her own copies of the texts he/she uses in all basic academic subjects.

Information was gathered from two sources: (1) a survey of the teachers and administrators in a balanced sample of 25 schools which was designed to identify both usage patterns and perceived needs relating to instructional materials; and (2) an analysis of FY78 expenditures for textbooks and other instructional materials.

The results of the cost analysis are summarized below:

- o Using the assumptions set forth in the report, the total value of the textbook inventory needed to meet the proposed standard in the basic academic subjects is $5,244,842.

- o Depreciating hardback textbooks on a straightline basis over five years and paperback texts on a straightline basis over two years, the value of the present inventory of texts in the basic academic subjects is $1,494,249.

- o By subtracting the value of the present inventory from the value of the inventory needed to meet the proposed standard, the value of the additional inventory needed to meet the proposed standard is $3,750,593.

- o Because MCPS must replace depreciated texts at the same time that it will be attempting to increase the size of the textbook inventory, the total cost of reaching the proposed standard is substantially more than the value of the needed additional inventory. Specifically, the cost of building the inventory to the required level over a period of five years is $1,528,686 per year. To then sustain the inventory at the desired level will cost $1,363,660 per year thereafter.

It must be stressed that the above cost projections are based upon a series of assumptions relating to the manner in which the number of texts students need in different subjects was estimated; the manner in which depreciation was computed; the manner in which inflation and enrollment trends were treated; the way costs were computed; and the manner in which the possibility of teachers sharing materials was treated. Changes in any of the assumptions which were used could markedly affect the cost estimates; and, in several places, the report indicates the probable effects of adopting conflicting assumptions. It also must be emphasized that the projected costs relate only to expenditures for the basic academic subjects coming from the 01 Textbook Account. Since expenditures for texts in these subjects have typically consumed about 90 percent of this account, it should be assumed that the total cost of adopting the proposed standard will be from 5 to 10 percent higher than the estimates provided above.

The textbook study also yielded useful findings relating to textbook costs, usage patterns, and perceived needs. Among these were the following:

- o The total cost of the texts needed by students for all of academic subjects are as follows:

elementary school	- $ 28.84 per student
middle/junior high school	- 100.13 per student
senior high school	- 53.65 per student

- o Social studies and science share three distinctions. They are the subjects in which:

  .. Teachers and administrators think the most additional texts are needed.

  .. Textbooks most rapidly become outdated.

  .. The cost of texts are the highest.

- o At all grade levels in MCPS, a multitext approach predominates.

- o Significant numbers of teachers, especially at the elementary level, do not use texts in teaching the basic academic subjects.

- o Workbooks and activity kits are used almost universally across all subjects and grade levels. However, their use is the greatest at the elementary level.

- o Many teachers report wanting additional copies of texts they already have, and copies of textbooks other than those they presently have.

  Where additional copies of texts they already have are wanted, teachers reported that providing them with additional copies would:

  .. Improve the quality and/or variety of classroom instruction.

  .. Reduce the use of supplementary materials.

  Where new series were requested, the qualities most desired were:

  .. Better homework activities.

  .. More complete coverage of topics.

  .. More up-to-date material.

  .. Lower reading levels (junior/senior high only).

Exhibit 1 summarizes textbook needs and costs for meeting the proposed standard. It does not include the calculated value of the present inventory. Exhibit 2 shows the four key assumptions upon which the costing exercise was based.

Exhibit 1

Preliminary Estimate of Costs to Meet Proposed Standard

	Costs Per Student		
	Elementary	Middle/Junior High	Senior High
English/Language Arts (includes Reading)	# H - 1.23 # P - 0.93 $ 8.01 100%	# H - 3.04 # P - 2.79 $ 12.42 107.9%	# H - 1.86 # P - 4.23 $ 12.97 104.0%
Foreign Language		# H - 1.08 # P - 0.67 $ 10.34 49.4%	# H - 1.14 # P - 0.91 $ 12.10 34.4%
Social Studies	# H - 0.68 # P - 0.39 $ 5.63 100%	# H - 2.56 # P - 2.95 $ 39.97 103.8%	# H - 0.88 # P - 1.48 $ 17.04 84.3%
Mathematics	# H - 1.25 # P - 0.47 $ 8.44 100%	# H - 1.51 # P - 0.05 $ 12.22 96.1%	# H - 1.09 # P - 0.21 $ 10.17 77.7%
Science	# H - 0.89 # P - 0.31 $ 6.76 100%	# H - 2.19 # P - 1.13 $ 29.27 97.0%	# H - 1.23 # P - 0.97 $ 19.38 71.5%
WEIGHTED PER PUPIL COSTS	$ 28.84	$ 100.13	$ 53.65
MCPS FY80 Enrollment Projections	45,817	22,395	31,334
Projected System Cost (Valuation of Present Inventory not Considered)	$1,321,362	$2,242,411	$1,681,069
	$1,321,362	$3,923,480	
	$5,244,842		

H = average number of hardbacks used by individual student
P = average number of paperbacks used by individual student
$ = inventory value of books needed to supply an individual student
% = percent of students enrolled in courses in subject area (may exceed 100%)

Note: These represent costs for reaching inventory goals for the basic academic subjects only. These presently consume about 90% of the 01 Textbook Account.

Exhibit 2

Key Assumptions Upon Which the Costing Exercise Was Based

ASSUMPTION #1: Assume, for costing purposes, that the average number of different texts students are presently using in basic academic courses is the best costing element to represent demand. For a class studying a basic academic subject,

DEMAND = (# OF BOOKS INDIVIDUAL STUDENT USES) x CLASS ENROLLMENT

ASSUMPTION #2: In estimating the cost of books:

a) the most recent prices should be used;
b) no allowance for inflation should be made;
c) costs should be developed for broad subject areas (reading/language arts/English, foreign languages, social studies, mathematics, science) within type of school (elementary, middle/junior high, senior high); and
d) costs of different media, in this case hardback books and paperback books, should be treated separately.

ASSUMPTION #3: The cost analysis should not assume that texts will be shared between classes.

ASSUMPTION #4: In determining the value of the present MCPS textbook inventory, hardback books should be depreciated on a straightline basis over five years and paperbacks should be depreciated on a straightline basis over two years. Hardback books purchased prior to FY76, and paperback books purchased prior to FY79 should be valued at zero.

ASSUMPTION #5: Cost projections should not allow for changes across years due to projected changes in enrollment or inflation.

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April, 1979

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Joy A. Frechtling
Steven M. Frankel

Table of Contents

List of Exhibits

CHAPTER I: INTRODUCTION

In March, 1979, the Department of Educational Accountability (DEA) conducted an evaluation of textbooks and instructional materials needs in the Montgomery County Public Schools (MCPS). The evaluation addressed a number of questions regarding current use of textbooks, workbooks, and activity kits; needs for additional texts; and the costs of meeting textbook needs. The purpose of this report is to present preliminary analyses of the findings which will aid the superintendent and the Board of Education in reaching crucial, immediate policy and budgetary decisions. Future reports will present more detailed analyses of the findings, including information on relationships between achievement and textbook usage.

Background of the Study

In meetings on November 14 and 27, 1978, the Montgomery County Board of Education discussed and adopted Resolution No. 807-78, "Request for Information About Textbooks and Other Classroom Materials, and Requesting Development of Board Policy." On January 9, 1979, a research plan for assessing availability and usage of textbooks and supplementary materials in MCPS was presented to the Board of Education. On February 12, the Board of Education approved the study presented by the Department of Education Accountability.

The textbook study has several complementary purposes. First, it determines the costs associated with meeting one specific standard of textbook availability: that each child have his/her own copies of the texts he/she used in basic academic subjects. Second, it describes existing patterns of textbook usage and selected aspects of instructional practices. Third, it examines current needs, both quantitative and qualitative, for textbooks, as seen by teachers, principals, and department heads.

Procedures

The study collected data from two major sources: a survey of schools and an analysis of previous textbook and instructional materials costs. The procedures for each are described below.

SURVEY

The survey was conducted in 25 schools sampled randomly from across the county. The school sample, balanced for administrative areas, was stratified by type of school (elementary, middle/junior, and senior high) and academic achievement as measured by the Iowa Tests of Basic Skills (ITBS).

Three categories of school personnel were included in the survey: teachers, department head/resource teachers, and principals. The teachers were asked to fill out a questionnaire regarding practices and needs in selected subject matters. Department chairmen/resource teachers in the middle/junior and senior

High schools were asked to fill out another questionnaire covering textbook ordering and selection practices in their subject areas. Principals were interviewed to gather a broad, overall picture of each school, its needs, and practices.

ANALYSIS OF COSTS

To complement the school survey and assess its budgetary implications, per unit costs for textbooks and materials of instruction were determined. To gather the data, the expenditures of the Montgomery County School System for FY78 (the latest year for which complete data are available) were examined for the two budget accounts--textbooks (account #01) and materials of instruction (account #03). These accounts include the following type of items:

> Textbooks: textbooks from the approved lists plus supplementary materials correlated with those approved texts such as filmstrips, records, tapes, kits, transparencies, workbooks, ditto masters, manuals, teacher guides, answer books, solution keys, practice sets, tests, programmed supplements, and shorthand dictionaries.
>
> Materials of Instruction: printed instructional materials such as filmstrips, tapes, and activity kits, and a full range of non-print instructional materials and supplies such as balance beams, calipers, sponge balls, glass tubing, binders, blotters, clip boards, blackboard pointers, pencil sharpeners, staplers, crayons, and pencils.

From these accounts, estimates of per unit costs were determined for each major instructional item. The instructional items of central interest were textbooks (hardback and paperback), workbooks, and activity kits. The estimates were gathered by school level, and where possible, subject matter. Two basic procedures were used to derive the per unit measures, depending upon the form in which information was available. For textbooks, where purchase information was computer accessible, all orders for FY78 in the textbook account were examined. For workbooks and activity kits, it was necessary to examine a random sample of purchase orders to obtain an estimate of system costs.

CHAPTER II: GENERAL DESCRIPTIVE FINDINGS

General descriptive findings are presented below for three areas:

- o Current usage patterns
- o Additional needs for texts
- o Costs for textbooks and instructional materials

Current Usage Patterns

Teachers in the survey were asked about their current practices regarding use of textbooks and instructional materials. This information was gathered to provide general descriptions of current practices and specific information required for the development of projected cost estimates. Responses for selected items will be discussed here. Specifically, these data on current usage are presented for:

- o Number and variety of materials used in basic academic areas,
- o Homework practices, and
- o Across year correlations in textbooks used.

NUMBER AND VARIETY OF MATERIALS USED

Teachers were asked to indicate the types of materials used in delivering instruction in their subject areas. Specifically, usage patterns regarding textbooks (hardback and paperback), workbooks, and activity kits were examined. Exhibits 1, 2, and 3 present their responses.

The data show that hardback texts are widely used by teachers at the middle/junior high and senior high school levels. At the elementary level, however, the use of hardback textbooks is not as frequent. For reading/language arts, the percent of teachers who do not use hardback textbooks is 22.4; for social studies, 58.5; for mathematics, 37.3; and for science, 35.4. Where hardback textbooks are used by teachers, a multitext approach predominates and individual students use more than one textbook during the school year.

The exhibits also show that workbooks and activity kits are used almost universally by teachers across grades and subjects and that two to three activity kits are used per class. Deviations from this generalization are found only for social studies at the elementary and senior high school levels and mathematics at the senior high level. The finding that teachers make such extensive use of workbooks and activity kits is not surprising. It is of interest, however, to investigate why this is so. In the survey, therefore, teachers were specifically asked why workbooks were needed. Exhibit 4 presents the teachers' responses.

Exhibit 1

Percent of Teachers Using Hardback Books, Paperback Books, Workbooks, and Activity Kits at Each School Level and Average Number Used

	Hardbacks		Paperbacks		Workbooks		Activity Kits	
	% of Teachers Using Materials	Average Number Used	% of Teachers Using Materials	Average Number Used	% of Teachers Using Materials	Average Number Used	% of Teachers Using Materials	Average Number Used
Elementary	65.0	2.32	30.9	1.59	83.7	1.59	96.9	3.50
Middle/Junior	91.7	2.63	54.2	2.00	97.0	2.00	97.0	2.70
Senior	86.8	1.98	56.1	2.59	86.4	2.59	91.2	3.40

Exhibit 2

Percent of Teachers Reporting Using Each Type of Material
by School Level and Subject Matter

	Percent Using											
	Hardbacks			Paperbacks			Workbooks			Activity Kits		
	Elem.	Mid/ Jr.	Sr.	Elem.	Mid/ Jr.	Sr.	Elem	Mid/ Jr.	Sr.	Elem.	Mid/ Jr.	Sr.
English/Language Arts/Reading	77.6	83.0	81.8	40.3	78.7	87.9	86.6	95.5	86.4	97.1	96.0	87.5
Foreign Language	-	91.7	95.2	-	41.7	61.9	-	100.0	93.7	-	100.0	100.0
Social Studies	41.5	92.3	51.9	24.5	82.1	52.5	66.6	100.0	66.6	97.1	92.9	100.0
Mathematics	62.7	100.0	97.7	28.9	5.1	14.0	84.6	92.9	66.6	92.3	100.0	100.0
Science	65.6	93.5	100.0	18.9	48.4	48.6	80.0	100.0	93.7	100.0	100.0	80.0

Exhibit 3

Average Number of Textbooks (Hardback and Paperback)
and Workbooks Used by an Individual Student
by Grade Level and Subject Matter

Subject Area	Elementary	Middle/Junior High	Senior High
English/Language Arts (includes Reading)	H - 1.23 P - 0.93 W - 1.93	H - 3.04 P - 2.79 W - 2.82	H - 1.86 P - 4.23 W - 1.77
Foreign Language	- - -	H - 1.08 P - 0.67 W - 1.20	H - 1.04 P - 0.91 W - 1.18
Social Studies	H - 0.68 P - 0.39 W - 1.11	H - 2.56 P - 2.95 W - 1.91	H - 0.88 P - 1.48 W - 0.78
Mathematics	H - 1.25 P - 0.47 W - 1.13	H - 1.51 P - 0.05 W - 1.50	H - 1.07 P - 0.21 W - 1.33
Science	H - 0.89 P - 0.31 W - 1.20	H - 2.19 P - 1.13 W - 2.10	H - 1.23 P - 0.97 W - 1.31

H = hardbacks
P = paperbacks
W = workbooks

Exhibit 4

Reasons for Use of Workbooks: Percent of Sample Teachers Choosing Each Alternative Rationale

	Percent
Provides in-class activities not in text	65.6
Workbook supplements text	65.6
Provides information not in text	44.2
Provides homework activities not in text	24.8
Text supply is inadequate	6.8

The data show that the most prevalent reasons selected for using workbooks relate to their utility as a supplement to the basic classroom text. It is also clear that workbook use does not suggest that the supply of textbooks is inadequate, but rather that the content of the textbooks may be so. In addition, while workbooks are primarily selected because of their contribution to in-class activities, about one-fourth of the sample indicated that they were useful in providing homework assignments.

HOMEWORK PRACTICES

Several questions regarding homework practices were included in the survey. Data to be reported here focus on three issues--frequency of homework assignments in a selected subject, materials used in homework assignments in this subject, and adequacy of the current textbook supply for homework assignments. Exhibit 5 presents data on the frequency of homework assignments in a single subject by type of instructional material.

These exhibits show that considerable variation exists in the frequency of homework assignments, although very few teachers (2 percent) do not assign such work using at least one of the materials mentioned. Hardback textbooks and worksheets are the most frequently used for this purpose and, on the average, assignments in a subject area are given approximately once a week, using each of these materials.

In response to questions concerning textbook supply, teacher reports indicate that an adequate supply of textbooks exists for such assignments, with 70 percent indicating that the supply provided was sufficient for homework to be assigned to an entire class, and 88.8 percent indicating that the supply provided was sufficient for assignment of homework to instructional groups.

ACROSS YEAR CORRELATIONS AMONG TEXTBOOKS USED

The extent to which textbooks from the same series or publisher are used across grades in the same school was also examined. To investigate this question, teachers and principals were asked to assess the degree to which books used in their subjects correlate from year to year (i.e., are part of the same text series, are written by the same author, or published by the same publisher). Exhibit 6 presents the responses for teachers.

The data indicate that substantial correlations do exist in some areas but there are clearly differences by both grade and subject matter. Year to year correlations for mathematics are generally high, especially at the elementary and junior high levels. Correlations are low for social studies except at the junior high level, and elementary social studies appears to pose special problems. While relatively low figures are also found for several subjects at the senior high level, interpretation of this finding is difficult, as it is not clear that the program of studies at this level requires the same degree of across year coordination as at the earlier grades.

Exhibit 5

Mean Frequency* of Homework Assignments in a Single Subject Area Using Each Instructional Material

Material	Grade Level		
	Elementary	Middle/Junior	Senior
Hardback	2.24	3.52	3.67
Paperback	1.16	1.57	1.97
Workbook	1.22	1.39	1.25
Worksheet	1.92	2.84	2.38

*1 = Never

2 = Less frequent than every 10 days

3 = Once a week to 10 days

4 = Every two to three days

5 = Four or five days a week

Exhibit 6

Percent of Respondents Within Grade Level and Subject Indicating Year to Year Correlation of Textbooks Used

	Elementary	Middle/Junior High	Senior High
English/Language Arts (includes Reading)	72.7	75.0	56.7
Foreign Language	-	90.0	90.5
Social Studies	26.4	64.0	42.0
Mathematics	75.4	82.0	69.8
Science	57.8	50.0	48.5

Additional Needs

The survey also looked at additional needs for textbooks. "Need" was defined in two ways--need for additional copies of texts currently in use, and need for additional series not presently used. Exhibit 7 presents the findings for the overall sample.

[1]

These data show that many teachers report wanting some additional textbooks. While the need is somewhat greater for new textbook series (positive responses ranging from 36.2 percent to 51.0 percent of the teachers surveyed), interest in obtaining additional/replacement copies of currently used series is also present (positive responses ranging from 21.9 percent to 36.6 percent).

Estimates of need by grade level and subject matter also reveal some interesting patterns. Exhibits 8 and 9 present these data.

For the subjects considered--the basic academic subjects--the greatest need for texts is consistently reported for science and social studies. As will be pointed out in the next section of this report, these also are the subject areas in which texts are the most costly.

A need for additional/replacement copies of English/language arts/reading texts was also reported at the senior high level. For new textbook series, needs were reported for mathematics texts at the elementary level and English/language arts/reading at the senior high level.

Principals', department heads' and resource teachers' reports were quite similar. They indicated the following:

- Basal and supplementary social studies texts are needed at all levels
- Science texts are needed in the elementary, middle/junior high, and high schools; and supplementary science texts are needed at the elementary and junior high levels
- English/language arts texts are needed at the elementary and senior high levels; in addition, for the elementary students, more spelling texts are desired
- Mathematics texts are needed in the elementary and senior high schools.

Many reasons were given for needing additional textbooks or series. Exhibit 10 presents the teacher responses. Over half the teachers wanting additional texts felt that increased text availability would improve the quality or variety of classroom instruction and that the need for supplemental materials could be reduced. A little over one-third also felt that additional copies of texts would reduce teacher preparation time and permit increased homework assignments.

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[1] The numbers may be an underestimate of need because teachers who are not at present using textbooks were not asked to indicate needs for additional copies of books or new textbook series.

Exhibit 7

Reported Textbook Needs

Grade Level	Percent Wanting Additional Copies of Series Presently in Use	Average Number of Series Needing Additional Copies	Average Number of Copies
Elementary	36.6	1.83	11.98
Middle/Junior	21.9	2.28	16.97
Senior	36.6	2.22	17.85
	Percent Wanting Series Not Presently Used	Number of Series Needed	Number of Copies
Elementary	51.0	1.95	16.31
Middle/Junior	36.2	2.00	24.86
Senior	43.9	1.99	22.25

Exhibit 8

Percent of Teachers Indicating a Need For Replacement/Additional Copies of Currently Used Series

	Elementary	Middle/Junior	Senior	Total
English/Language Arts/ Reading	34.2 %	22.7 %	63.9 %	40.2 %
Foreign Language		9.1	19.0	15.6
Social Studies	55.9	22.2	35.5	37.6
Mathematics	35	7.7	11.6	20.4
Science	28.9	43.3	31.4	34.0

Exhibit 9

Percent of Teachers Indicating a Need
For New Textbook Series by Grade and Subject Matter

	Elementary	Middle/Junior	Senior	Total
English/Language Arts/ Reading	46.1%	25.0%	54.2%	44.0%
Foreign Language	-	36.4	42.9	40.6
Social Studies	64.7	47.2	61.3	57.4
Mathematics	55.0	28.2	20.9	37.3
Science	47.4	50.0	40.0	45.6

Exhibit 10

Reasons for Wanting Additional Copies of Currently Used Texts

	Percent Selecting Reason
Improve quality of class instruction	63.0
Reduce supplementary materials	55.0
Improve variety of class instruction	51.5
Reduce preparation time	38.0
Increase homework	37.5
Reduce time on a unit	23.0
Other	22.0
Reduce the frequency of assignments requiring use of library	13.5
Decrease homework	3.0

Quality Desired in Additional Texts

Better homework activities	58.2
More complete coverage of topics	55.0
More up to date material	53.1
Lower reading level	47.6
More relevant	40.0
Better written	37.0
Better illustrations	30.0
More homework assignments	31.5
Higher reading level	20.5
Other	11.4
Briefer coverage of topics	5.1

Where new series were asked for, the reason most frequently given was to provide better homework activities. Changes in the content of texts also was rated as extremely desirable. Over 50 percent of the teachers indicating a need for new series indicated that they would like material which is more up to date or has a more complete coverage of topics. This is consistent with the findings reported earlier that workbooks are frequently used because they provide material not available in existing texts. Principals, department heads and resource teachers also pointed out that the introduction of new programs such as the Instructional System in Mathematics (ISM), as well as other curriculum changes, has resulted in some texts no longer adequately meeting current instructional needs.

Another frequently selected reason for wanting new series was to obtain books with lower reading levels. Almost 50 percent of the teachers felt this was desirable and principals reinforced this need. The major problem, according to the principals' reports is at the middle/junior and senior high levels, where existing textbook series do not meet the needs of low achieving students.

Costs of Textbooks and Instructional Materials

Raw cost data were gathered for two budgetary accounts: the textbook account and instructional materials account. Budget allocations for these areas over the last five years are shown in Exhibit 11.

Per unit costs were determined for hardback and paperback books, workbooks, and activity kits, using the expenditure data from one of these years, FY78. Highlights of these analyses are presented in this section.

COSTS OF TEXTBOOKS

Exhibit 12 presents textbook costs by subject and level.

These data show that:

- The average per unit cost of a book issued at the elementary level was $4.37 with averages ranging from $2.51 to $6.61 for different subjects. English language arts/reading was the least costly basic academic area; science was the most costly.

- At the secondary level, the average per unit cost was $5.87, with averages ranging from $2.13 to $8.81. As in the elementary grades, for the basic academic subjects, English language arts/reading had the lowest cost; science had the greatest cost.

- The largest FY78 expenditures at the elementary level were in English language arts/reading ($187,339); followed by mathematics ($108,443); social studies ($41,142); and science ($39,848).

- At the secondary level, the largest FY78 expenditures were in science ($136,738); English language arts/reading ($132,582); mathematics ($103,538); and social studies ($99,705).

- About twice as many books were issued at the secondary level (193,395) as at the elementary level (94,442).

WORKBOOKS

Textbook Account

Exhibit 13 presents the cost analysis for workbooks charged to the textbook account by grade level. Information was not available by subject area. The data show that:

- The median costs for workbooks was $1.65 at the elementary level, $2.25 at the middle/junior high level, and $2.97 at the senior high level.

Exhibit 11

Budgets for Textbooks and Instructional Materials Across a Five-Year Period

Fiscal Year	Textbooks (01)*	Per Pupil Allocation	Materials of Instruction (03)*	Per Pupil Allocation
FY 1975				
Elementary	271,579	4.98	719,615	10.50
Middle/Junior	217,199	6.52	542,360	19.00
Senior	257,356	4.02	663,968	20.80
FY 1976				
Elementary	319,141	6.08	869,861	13.96
Middle/Junior	249,199	7.95	683,868	23.37
Senior	281,825	4.90	810,312	24.76
FY 1977				
Elementary	354,939	7.30	889,449	16.06
Middle/Junior	277,926	9.54	783,066	28.26
Senior	324,911	9.54	911,531	29.85
FY 1978				
Elementary	350,060	7.30	893,551	16.86
Middle/Junior	299,817	10.54	791,682	29.67
Senior	626,680	10.54	965,194	31.34
FY 1979				
Elementary	403,321	7.81	855,220	17.42
Middle/Junior	312,334	11.26	748,484	30.65
Senior	359,358	11.26	1,027,463	32.41
FY 1980 (Proposed)				
Elementary	630,295	15.00	877,853	19.16
Middle/Junior	447,900	20.00	748,484	33.71
Senior	626,680	20.00	1,117,056	35.65

*Descriptions of what is purchased in these accounts is included on page 2.

Exhibit 12

Costs of Textbooks by Grade Level and Subject Area
For FY78

Subject	Number of Books Issued From the Division of Supply Management	Total Cost	Average Cost
Elementary			
Art	2	$ 13.20	$6.60
Health Education	331	1,317.28	3.98
ESOL	855	2,418.71	2.51
English/Language Arts	50,587	187,338.69	3.70
Mathematics	22,139	108,442.97	4.90
Music	2,214	11,992.27	5.42
Science	7,079	39,848.41	5.63
Social Studies	7,766	41,142.36	5.30
Special Education	163	461.97	2.83
Reference Books	3,306	19,971.23	6.04
Total Elementary	94,442	$412,677.09	$4.37
Secondary			
Business Education	2,269	16,748.53	7.38
Art	428	1,450.78	3.01
Driver Education	605	4,240.68	7.01
English/Language Arts	38,095	132,583.36	3.48
ESOL	875	3,051.57	3.49
Foreign Language	4,571	27,003.89	5.91
Health Education	396	1,062.32	2.68
Home Economics	986	8,317.75	8.44
Industrial Education	2,800	23,857.19	8.52
Mathematics	13,259	103,538.39	7.81
Music	220	1,011.96	4.60
Reading	262	558.36	2.13
Science	15,513	136,738.46	8.81
Social Studies	13,753	99,705.09	7.25
Special Education	253	1,108.05	4.38
Cooperative Educational Program	229	1,703.52	7.44
Reference Books	4,385	18,105.29	4.13
Total Secondary	98,953	$580,785.19	$5.87
Total Elementary and Secondary	193,395	$993,462.28	$5.14

Exhibit 13

Purchasing and Cost Data on Workbooks From the Textbook Account During FY 1978

	Elementary	Middle/Junior	Senior	K-12
Sample				
Highest Cost Item Included in Analysis	$ 10.70	$ 3.30	$ 5.25	$ 10.70
Lowest Cost Item Included in Analysis	.30	.45	1.35	.30
Median	1.65	2.25	2.97	1.74
Expenditures for MCPS (Estimated)				
Number of items ordered	555	39	48	613
Number of units ordered	7,186	709	1,104	8,652
Cost	$12,386.12	$ 1,533.26	$2,968.67	$16,311.48

- Far more purchases for workbooks occurred at the elementary level than at other levels. Out of the approximately $16,000 spent on workbooks for the county, over $12,000 was spent at the elementary level.

Instructional Materials Account

The costs for workbooks purchased from the materials of instruction account during FY78 parallel those for the textbook account. The data reported in Exhibit 14 show that:

- The median costs of workbooks at all levels was $1.62 with a low of 15 cents and a high of $9.95. Median costs were $1.55 at the elementary level, $2.10 at middle/junior high level, and $2.40 at the senior high level.

- Far more purchases were made at the elementary level than at other levels. Out of the approximately $65,000 spent on workbooks for the county, over $48,200 was at the elementary level.

Out of the total expenditures of $81,884 for workbooks, 80.1 percent was expended from the materials of instruction account and 19.9 percent from the textbook account.

ACTIVITY KITS

Exhibit 15 presents the cost data for activity kits. It shows that:

- The cost of activity kits decreased from the elementary to the senior high school level. Median cost-per-kit values are $93 at elementary, $49.50 at middle/junior, and $38.50 at the senior high levels.

- The range of costs for kits is extremely large, extending from a low of $2.50 to a high of $379.95.

- For the county, more money was spent for kits ($98,027) than for workbooks ($81,884).

- Again, the largest FY78 expenditures for the county were at the elementary level ($67,510).

Exhibit 14

Purchasing and Cost Data on Workbooks From the Materials of Instruction Account During FY 1978

	Elementary	Middle/Jr.	Senior	K-12
Sample				
Highest Cost Item Included in Analysis	$ 7.29	$ 9.95	$ 5.00	$ 9.95
Lowest Cost Item Included in Analysis	.41	.15	.45	.15
Median	1.55	2.10	2.40	1.62
Expenditures for MCPS--Estimated				
Number of items ordered	1,172	106	166	1,500
Number of units ordered	38,147	3,721	3,522	47,426
Cost	$48,205.39	$6,285.47	$8,761.56	$65,572.65

Exhibit 15

Purchasing and Cost Data on Activity Kits From the Materials of Instruction Account During FY 1978

	Elementary	Middle/Jr.	Senior	K-12
Sample				
Highest Cost Item Included in Analysis	$ 379.95	$ 288.40	$ 100.00	$ 379.95
Lowest Cost Item Included in Analysis	4.50	2.50	5.56	2.50
Median	93.00	49.50	38.50	74.00
Expenditures for MCPS--Estimated				
Number of items ordered	431	153	97	700
Number of units ordered	519	268	225	1,029
Cost	$67,510.11	$19,894.79	$7,066.66	$98,027.06

CHAPTER III: PROJECTED COST OF MEETING A PROPOSED TEXTBOOK STANDARD

The primary objective of this analysis was to answer the following question:[2]

> What would be the projected cost of adopting for MCPS the following standard: that each child have his/her own copies of the texts he/she uses in basic academic subjects?

Assumptions

The analysis presented here of projected costs for meeting this standard rests on a set of explicit assumptions regarding answers to the following questions:

1. In each basic academic subject, how many texts should be allocated to each student for his/her exclusive use?
2. How can the per unit costs of different types of texts be determined?
3. Should it be assumed that books can be shared between classes?
4. What assumptions should be made in relation to the value of texts already in the schools?

This section presents the assumptions selected; provides a brief discussion of competing assumptions which might have been adopted; and indicates the potential effect of these competing assumptions on the final outcome of the costing exercise.

Question #1: In each basic academic subject, how many books should be allocated to each student for his/her exclusive use?

This question addresses the definition of demand to be used in the cost analysis. Different assumptions which could have been adopted include the following:

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[2]It should be noted that the phrasing of the proposed standard does not call for students to be supplied with texts where the teacher has made the decision to use other instructional media in place of texts; and it does not preclude students from being provided with several texts for a given subject. It merely says that where an instructional decision has been made to use basic texts as an integral part of the instructional process in teaching a major subject, a student should have his/her own copies of the books available for use in class or at home without having to share with anyone else.

Alternative #1: Assume, for costing purposes, that each student should be allocated one basic text, per year (elementary) or per semester (secondary), in every basic academic subject for his/her exclusive use. Assume further that this text need not be the same for every student in a class.

Alternative #2: Assume, for costing purposes, that the average number of different text students are presently using in basic academic courses is the best costing element to represent demand. For a class studying a basic academic subject.

DEMAND = (# OF BOOKS INDIVIDUAL STUDENT USES) x CLASS ENROLLMENT

Alternative #3: Assume, for costing purposes, that asking teachers how many texts they think they need for each student is the best indicator of demand.

All three of these approaches have their advantages and shortcomings

The advantages of employing Alternative #1 are that it assumes an equal minimum distribution of resources across the system; it ensures that every student has at least one text to use in every basic academic subject; and yet it does not require that every student be assigned the same book. The disadvantages of this alternative are that it ignores the fact that there is presently a wide variation in the number of different basic texts used by students in different subjects; and that it might seriously impede the development of a true multitext approach, since one book per student would probably prove insufficient to support this strategy. Adopting Alternative #1 would also not recognize the finding, presented earlier in this report, that a significant portion of MCPS teachers are deliberately not using any basic text with their classes; and it might tend to be perceived as signaling disapproval of either this practice, or of the multitext approach.

Alternative #2 assumes that the best indicator of demand is the number of different texts students are presently using in a given course; and that if one multiplies the average number of texts used by single student by the class enrollment, a realistic demand estimate is generated. This approach has the advantage of being based "in reality" since it uses actual data relating to present teaching practices in MCPS as the basis for the demand estimate. Where it departs from the status quo is by substantially increasing the number of copies that teachers will have of each of the books they are presently using.

To illustrate:

> The data show that in the study sample, mean student textbook usage for high school mathematics was 1.09 hardback books and .21 paperback books. Using this method of forecasting demand, one would then say that if the average class size for a high school math class were 28 students, the theoretical textbook allocation for that class would be:

1.09 hardback books x 28 students = 30.24 hardback books
.21 paperback books x 28 students = 5.88 paperback books

It should be emphasized that this is a theoretical allocation, designed for use in a costing algorithm. Adoption of this alternative would not mean that every high school math class would automatically be allocated 30 hardback books and 6 paperback books. Rather, these figures would become the basis for determining the total amount of dollars needed to purchase high school math books; and the allocation of those materials would be the responsibility of individual administrators and teachers who would do their best to ensure that an individual student's needs would be met.

The primary disadvantage of this technique is that it assumes that the present usage data which describes how many books a typical student is now using in each subject represents a satisfactory situation. This may not be the case. As has already been discussed, present textbook utilization in MCPS is far lower in the elementary grades than in the secondary grades; and unfortunately there is no overwhelming evidence that indicates whether this occurs by choice (i.e., elementary teachers use far more workbooks and activity kits) or as a result of past allocation practices.

Alternative #3 has the highest degree of face validity since it would use data, coming from individual teachers, which reflect their opinions as to what they need. However, it also poses some difficulties. First, its use would be viewed by some as representing "pie in the sky," since it assumes a level of resources far above the other two alternatives. Second, there are severe methodological problems encountered in posing the questions needed to gather the prerequisite data since one needs to first ascertain present usage using the type of questions posed for Alternative #2; then one needs to determine what portion of the existing texts the teacher would really like to see replaced by new series; then one needs to determine the number of additional series the teacher would like to use; and finally one needs to determine the number of copies of each series which would constitute the desired mix. A series of questions, many of which were discussed earlier, were included in the questionnaires to permit this type of analysis to be attempted. The word "attempted" is used deliberately, since this analysis poses far more problems than would the other two.

After reviewing the implications of using the three alternative assumptions, it was determined that the one with the most advantages, and the fewest disadvantages, was the second. This decision was based primarily on two factors: the costs resulting from using it fall in between the other two; and it assumes that present teaching practices in MCPS, vis-a-vis the variety of materials an individual student will use, are essentially satisfactory. While it can be argued that selection of this alternative will result in an underestimate of needs (since it does not ensure that every student has at least one text and it does not allow for the fact that some teachers may not have available to them at present the variety of texts they really feel is necessary), these arguments will be countered by those who feel that it represents an overestimate of needed resources when compared to the cost estimates that would probably result from using Alternative #1.[3]

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[3]A brief analysis of the effect of using Alternative #1 in place of Alternative #2 is contained in Appendix A.

ASSUMPTION #1: Assume, for costing purposes, that the average number of different texts students are presently using in basic academic courses is the best costing element to represent demand. For a class studying a basic academic subject,

DEMAND = (# OF BOOKS INDIVIDUAL STUDENT USES) x CLASS ENROLLMENT

Question #2: How can the per unit costs of different types of texts be determined?

In examining different ways of computing textbook costs, the decision was made to include as many pertinent elements as possible into the process by which unit prices were established for texts. The following assumption was adopted:

ASSUMPTION #2: In estimating the cost of books:

a) the most recent prices would be used;
b) no allowance for inflation would be made;
c) costs would be developed for broad subject areas (reading/language arts/English, foreign languages, social studies, mathematics, science) within type of school (elementary, middle/junior high, senior high); and
d) costs of different media, in this case hard-back books and paperback books, would be treated separately.

Since the most recent prices were available, we felt that their use would be preferable to using an average of all prices paid during the past 12 months for a title, or a similar composite measure. This was particularly true since our preliminary examination of book cost trends showed that inflation has not had a marked effect on costs over the past year. In fact, this observation led to our deciding not to inflate our price estimate by a factor which would reflect the probable prices during the next few years. Evidently competition within the industry has kept the prices paid for large quantities of books fairly stable. However, if prices should climb markedly and if this rise is not offset by drops in enrollment, this decision may lead to costs being underestestimated by a significant amount.

The decision to gather precise cost estimates for subject, grade level, and media combinations was a reflection of the previously discussed variance found in costs between subjects, media, and grade levels.

Question #3: Should it be assumed that books can be shared among classes?

If one assumes that in cases where a series is not used continuously in a classroom it is possible to use judicious scheduling to share sets of books among more than one class, significant cost savings can be accomplished. However, adopting this assumption implicitly requires teachers to modify their instructional approach in order to accommodate the constraint that a series may not always be available when a teacher would really like to use it. In fact, it can be argued that adopting the assumption that sets of books should be shared between classes would be counterproductive to the thrust of the proposed standard, and/or might result in maintenance of the status quo. Given these considerations, the following assumption was adopted:

> ASSUMPTION #3: The cost analysis should not assume that texts will be shared among classes.

Question #4: What assumption should be made in relation to the value of texts already in the schools?

It can be argued that for a cost estimate to be developed which will accurately forecast the costs of raising the overall text inventory to the point where the proposed standard will be met, it is essential for the value of the present book inventory to be established. Using this argument leads to the basic costing function:

COST OF MEETING STANDARD = (DEMAND x UNIT COST) - VALUE OF PRESENT INVENTORY

The manner in which two aspects of this function, demand estimates and unit cost estimates, are being defined have been discussed above. The remaining problem is to determine the manner in which the present inventory will be valued.

There is no uniformity of opinion as to how long a textbook can be expected to last. Personnel concerned with textbook purchasing and replenishment within MCPS provided our staff with estimates of four-six years for a hardback book and one-two years for a paperback book. A small set of publishers contacted suggested that two-three years for a hardback book and one year for a paperback book were more appropriate. Realizing that many texts in MCPS are far more than six years old, and that many paperbacks purchased more than two years ago are still in use, a final assumption was developed:

> ASSUMPTION #4: In determining the value of the present MCPS textbook inventory, hardback books will be depreciated on a straightline basis over five years and paperbacks will be depreciated on a straightline basis over two years. Hardback books purchased prior to FY76, and paperback books purchased prior to FY79 will be valued at zero.

While, a surplus value could have been placed upon materials which exceeded the depreciation period, this was not felt to be desirable given the facts that (1) many of these older books would be badly damaged; (2) others would be obsolete vis-a-vis their content; (3) it would be nearly impossible to verify the inventory value without physically auditing every school and adding that to the inventory maintained by the warehouse; and (4) many of the teachers responding to the survey indicated a need for more recent and relevant materials.

Overall Estimate of Cost of Adopting the Proposed Standard

The cost analysis activity followed the guidelines developed in the previous section. Data collected from the sample of schools provided the demand data used to estimate the number of hardback and paperback books which individual students are presently using in different subject/grade level combinations. When these data were then linked to the unit cost data obtained, from the MCPS purchasing system, again by subject/grade level combinations, the preliminary cost estimate of meeting the proposed standard was developed. That preliminary cost estimate, which does not include an estimate of the valuation of the present inventory of texts, is included as Exhibit 16. It shows the projected cost per student in each grade range, and the total projected costs using the FY80 enrollment estimates.

As shown in Exhibit 16, if the assumptions used in the cost model are accepted, the following are the total values of the inventory needed to sustain the proposed standard using the FY80 MCPS enrollment projections:

elementary	-	$1,321,362
secondary	-	3,923,480
total	-	$5,244,842

It should be emphasized that these figures represent only the value of the texts needed to sustain the proposed standard in what has been referred to in this report as the basic academic subjects. Since, historically, these subjects have consumed about 90 percent of the 01 Textbook Account--with the remaining funds going for purchase in other subject areas and for some of the workbook purchases made each year, the total value of the inventory which would be needed would be in the range of 5.5 to 5.7 million dollars.

Of particular interest in this exhibit are the analyses of the per pupil inventory costs. These figures are particularly useful since they can be multiplied by any set of enrollment projections to arrive at estimated costs for different size populations. These weighted per pupil costs are:

elementary student	-	$ 28.84
middle/junior high student	-	100.13
high school student	-	53.65

The reason for the extremely high value for middle/junior high school students is that this group combines the high enrollment figures in basic academic subjects of the elementary school, with the high per unit textbook costs of the secondary school. As discussed previously, the low costs for elementary

Exhibit 16

Preliminary Estimate of Costs to Meet Proposed Standard

	Costs Per Student		
	Elementary	Middle/Junior High	Senior High
English/Language Arts (includes Reading)	# H - 1.23 # P - 0.93 $ 8.01 100%	# H - 3.04 # P - 2.79 $ 12.42 107.9%	# H - 1.86 # P - 4.23 $ 12.97 104.0%
Foreign Language		# H - 1.08 # P - 0.67 $ 10.34 49.4%	# H - 1.14 # P - 0.91 $ 12.10 34.4%
Social Studies	# H - 0.68 # P - 0.39 $ 5.63 100%	# H - 2.56 # P - 2.95 $ 39.97 103.8%	# H - 0.88 # P - 1.48 $ 17.04 84.3%
Mathematics	# H - 1.25 # P - 0.47 $ 8.44 100%	# H - 1.51 # P - 0.05 $ 12.22 96.1%	# H - 1.09 # P - 0.21 $ 10.17 77.7%
Science	# H - 0.89 # P - 0.31 $ 6.76 100%	# H - 2.19 # P - 1.13 $ 29.27 97.0%	# H - 1.23 # P - 0.97 $ 19.38 71.5%
WEIGHTED PER PUPIL COSTS	$ 28.84	$ 100.13	$ 53.65
MCPS FY80 Enrollment Projections	45,817	22,395	31,334
Projected System Cost (Valuation of Present Inventory not Considered)	$1,321,362	$2,242,411	$1,681,069
	$1,321,362	$3,923,480	
	$5,244,842		

H = average number of hardbacks used by individual student
P = average number of paperbacks used by individual student
$ = inventory value of books needed to supply an individual student
% = percent of students enrolled in courses in subject area (may exceed 100%)

Note: These represent costs for reaching inventory goals for the basic academic subjects only. These presently consume about 90% of the 01 Textbook Account.

students probably reflects their teachers' reliance on other media such as workbooks and activity kits, the lower per unit textbook costs, and the past disparity between their textbook allocations and those made to secondary school students.

It is also interesting to note that middle/junior high school social studies is by far the most expensive program, with a per pupil entitlement of almost $40 being required.

Once the value of the needed inventory is established, the next step is to set a value on the existing inventory. The difference between these figures will then determine the amount of additional funds which will be needed to purchase the additional inventory which will be required to achieve the proposed standard.

The analysis in which a valuation was placed upon the present inventory is shown in Exhibits 17 and 18. As discussed in the previous section, hardback texts were depreciated over five years on a straightline basis and paperbacks were depreciated over two years.

As shown by these exhibits, the total valuation which is then placed on the existing inventory is $562,312 for the elementary school inventory and $931,937 for the secondary school inventory.

In Exhibit 19, these values are subtracted from the required inventory values depicted in Exhibit 15. In this manner, the total gap between what is needed, and what MCPS already has, is established. As shown in Exhibit 19 3.75 million dollars in additional inventory will be required if the proposed standard is to be met using the assumptions contained in this report.

Exhibits 20, 21, and 22 present an analysis of the investment which would be required over three, four, and five years, respectively, to bring the textbook inventory to the point where the standard can be met. Those exhibits provide two methods of funding the additional dollars: in increasing amounts over the specified period, or in equal size payments. If equal size payments would be desired, the prerequisite budget allocations for the specified period would be as follows:

three years at	$1,963,755 per year
four years at	1,691,836 per year
five years at	1,528,686 per year

Again, this represents only the 01 Textbook Account funds which would be used for the basic academic subjects. Funding the other subjects and workbook needs for all subjects which have come from that account in the past would require that each of the figures be increased by about 10 percent.

Also of interest in these exhibits is the projection that, after the desired level of inventory is achieved in the major subjects, it will cost an estimated $1,363,686 per year, thereafter, to maintain the value of the inventory so that the standard will continue to be met.

Exhibit 17

Valuation of Elementary Textbook Inventory

Year	Expenditures from 01 Textbook Account	Amount Used for Purchasing Hardcover and Paperbook Texts in Basic Subjects[1]	Depreciation Basis	Preliminary Valuation	Additional Deduction for Paperbacks[2]	Final Valuation
FY79	403,321	358,956	80%	287,165	6%	269,935
FY78	350,060	311,553	60%	186,932	21%	147,676
FY77	354,939	315,896	40%	126,358	21%	99,823
FY76	319,141	284,035	20%	56,807	21%	44,878
					TOTAL	562,312

[1]Using FY78 data, it is estimated that 8% of 01 Textbook Account expenditures are used to purchase texts in other subjects, and 3% are used to purchase workbooks. Thus, 89% of the funds can be assumed to be used to purchase hardcover and paperback texts in the basic subject.

[2]An estimated 21% of elementary expenditures went for purchasing paperbacks. For all years except FY79, these must be written off entirely. For FY79, an additional 30% depreciation must be taken on the 21% of the total representing paperbacks. Thus, the additional deduction for FY79 is 6%.

Exhibit 18

Valuation of Secondary Textbook Inventory

Year	Expenditures from 01 Textbook Account	Amount Used for Purchasing Hardcover and Paperbook Texts in Basic Subjects[1]	Depreciation Basis	Preliminary Valuation	Additional Deduction for Paperbacks[2]	Final Valuation
FY79	671,692	577,655	80%	462,124	6%	434,397
FY78	626,382	538,689	60%	323,213	20%	258,570
FY77	602,837	518,440	40%	207,376	20%	165,901
FY76	531,024	456,681	20%	91,336	20%	73,069
					TOTAL	931,937

[1]Using FY78 data, it is estimated that 13.4% of 01 Textbook Account expenditures are used to purchase texts in other subjects, and .3% is used to purchase workbooks. Thus, 86% of the funds can be assumed to be used to purchase hardcover and paperback texts in the basic subjects. Of this, an estimated 21% went for the purchase of paperbacks.

[2]An estimated 20% of secondary expenditures went for purchasing paperbacks. For all years except FY79, these must be written off entirely. For FY79, an additional 30% depreciation must be taken on the 20% of the total representing paperbacks. Thus, the additional deduction for FY79 is 6%.

Exhibit 19

Effects of Including Inventory Valuation
in Cost Estimate of Meeting the
Proposed Standard

	Preliminary Cost Estimate[1] Of Needed Inventory	Present Inventory Valuation[2]	Estimate of Total Amount Required
Elementary	1,321,362	562,312	759,050
Secondary	3,923,480	931,937	2,991,543
TOTAL	5,244,842	1,494,249	3,750,593

[1]See Exhibit 1.

[2]See Exhibit 2.

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Exhibit 20

Three-Year Plan to Reach Inventory Goal

	FY 1980	FY 1981	FY 1982	FY 1983
Value of Beginning Inventory	$1,494,249	$2,744,447	$3,994,645	$5,244,843
Depreciation on Beginning Inventory	388,505	713,557	1,038,608	1,363,660
Addition to Inventory	1,250,198	1,250,198	1,250,198	-
Total Cost by Year	1,638,703	1,963,755	2,288,806	1,363,660
Three-Year Average Cost	1,963,755	1,963,755	1,963,755	-
Maintenance Cost Fourth Year and Thereafter	-	-	-	1,363,660

TOTAL COST OF REACHING STANDARD - $5,891,265

PROJECTED FIVE-YEAR COST - $8,618,585

Note: These represent costs for reaching inventory goals for the basic academic subjects only. These presently consume above 90% of the 01 Textbook Account.

Exhibit 21

Four-Year Plan to Reach Inventory Goal

	FY 1980	FY 1981	FY 1982	FY 1983	FY 1984
Value of Beginning Inventory	$1,494,249	$2,431,897	$3,369,545	$4,307,193	$5,244,841
Depreciation on Beginning Inventory	388,505	632,294	876,082	1,119,870	1,363,659
Addition to Inventory	937,648	937,648	937,648	937,648	-
Total Cost by Year	1,326,153	1,569,942	1,813,730	2,057,518	1,363,659
Four-Year Average Cost	1,691,836	1,691,836	1,691,836	1,691,836	-
Maintenance Cost Fifth Year and Thereafter	-	-	-	-	1,363,659

TOTAL COST OF REACHING STANDARD - $6,767,344

PROJECTED FIVE-YEAR COST - $8,131,003

Note: These represent costs for reaching inventory goals for the basic academic subjects only. These presently consume above 90% of the 01 Textbook Account.

Exhibit 22

Five-Year Plan to Reach Inventory Goal

	FY 1980	FY 1981	FY 1982	FY 1983	FY 1984	FY 1985
Value of Beginning Inventory	$1,494,249	$2,244,368	$2,994,487	$3,744,606	$4,494,725	$5,244,844
Depreciation on Beginning Inventory	388,505	583,536	778,567	973,598	1,168,629	1,363,660
Addition to Inventory	750,119	750,119	750,119	750,119	750,119	-
Total Cost by Cost	1,138,624	1,333,655	1,528,686	1,723,717	1,918,748	1,363,660
Five-Year Average Cost	1,528,686	1,528,686	1,528,686	1,528,686	1,528,686	-
Maintenance Cost Sixth-Year and Thereafter	-	-	-	-	-	1,363,660

TOTAL COST OF REACHING STANDARD - $7,643,430

PROJECTED FIVE-YEAR COST - $7,643,430

Note: These represent costs for reaching inventory goals for the baisc academic subjects only. These presently consume above 90% of the 01 Textbook Account.

As a final note, Exhibits 20, 21, and 22 also examine the total costs of reaching and maintaining the standard over a five-year period. Not unexpectedly, the lowest total investment is made when five years are allocated to meet the standard, with that total investment projected as being $7,643,430, paid out at the rate of $1,528,686 for five years. These figures are therefore our best estimate of the cost of meeting the proposed textbook standard using the assumptions set forth in this report.

APPENDIX A

Results of Using a Different Standard for Defining Demand

In the previous section, three different assumptions relating to the manner in which demand would be defined for the purposes of the cost analysis were discussed. The alternative which was selected, and which was used in all of the analyses presented thus far, said the following:

> Assume, for costing purposes, that the average number of different texts students are presently using in basic academic courses is the best costing element to represent demand. For a class studying a basic academic subject,

DEMAND = (# OF BOOKS INDIVIDUAL STUDENT USES) x CLASS ENROLLMENT

A potentially less costly alternative, which was rejected because it was felt that it might be counterproductive, was the following:

> Assume, for costing purposes, that each student should be allocated one basic text per year (elementary) or per semester (secondary), in every major subject for his/her exclusive use. Assume further that this need not be the same text for every student in a class.

While the use of this assumption was rejected, it was felt that it might be interesting to examine the results it would yield.

This alternative analysis is shown in Exhibit A-1. Use of this assumption results in being able to meet the proposed standard--as modified by this assumption--by expending approximately 1.1 million dollars on a one-time basis, and about $578,000 per year thereafter. The total inventory value which must be maintained is only $2,220,570, as compared to $5,244,842 under the previous assumption. For all practical purposes, this standard has probably already been met in several basic academic subject matter areas.

The purpose of presenting this alternative analysis is not to recommend it. To the contrary, a rationale for not adopting it has already been presented. However, it does provide a graphic illustration of the manner in which competing assumptions can affect the ultimate cost projection. For this reason alone it is useful. Also, it might suggest a completely different allocation standard, e.g., one calling for each student to have an average of two, or even three, texts in each major subject.

Also, we would warn that the textbook cost figures used in this exhibit are a weighted average of the per unit costs of hardback and paperback texts, respectively. Thus, the analysis assumes that approximately 20 percent of the students in a given subject would receive a paperback as their sole text.

Exhibit A-1

Comparison of Outcomes
If a Different Demand Assumption Was Used

SUBJECT	Costs Per Student: Elementary	Middle/Junior High	Senior High
English/Language Arts (includes Reading)	$ 3.70 100%	$ 2.13 107.9%	$ 2.13 104%
Foreign Language		$ 5.91 49.4%	$ 5.91 34.4%
Social Studies	$ 5.30 100%	$ 7.25 103.8%	$ 7.25 84.3%
Mathematics	$ 4.90 100%	$ 7.81 96.1%	$ 7.81 77.7%
Science	$ 5.63 100%	$ 8.10 97.0%	$ 8.10 71.5%
TOTALS	$ 19.53	$ 28.11	$ 22.22
MCPS FY80 Enrollment Projections	45,817	22,395	31,334
Projected System Cost (Valuation of Present Inventory Not Considered)	$ 894,806	$ 629,523	$ 696,241
	$ 894,806	$ 1,325,764	
	$ 2,220,570		

$ = weighted cost of purchasing an individual text (hardbacks and paperbacks are weighted according to their relative use in the subject area)
% = percent of students enrolled in courses in subject area (may exceed 100%)

Amount of inventory needed using alternative assumption	$2,220,570
Valuation of existing inventory	1,494,249
Remaining inventory to be funded	726,321
Annual amount needed to maintain an inventory at $2,220,570	577,348

Note: These represent costs for reaching inventory goals for the basic academic subjects only. These presently consume about 90% of the 01 Textbook Account.

59

APPENDIX B

Summary of Review of Findings Presented in This Report

This report was submitted for review to all members of the Administrative Team and to Dr. Gabriel Massaro, Mr. Douglas Hall, Mr. Mason Nelson, Mr. Anson Wilcox, and Dr. George Goldsmith. As a function of this review process, a number of questions regarding the survey findings and assumptions used to estimate projected costs were raised. These questions and the responses of the Department of Educational Accountability (DEA) are presented below:

Question #1: The data in Exhibit 3 suggest a surprisingly limited use of hardback and paperback books at the elementary level. Is use of textbooks at this level somehow underestimated?

DEA Response: The DEA is also surprised by the figures for textbooks usage at the elementary level and shares the concern that the data may represent an underestimate of usage in grades kindergarten through six. There is, however, no ready explanation for why such an underestimate might have occurred. If these figures are too low, the consequence would be an increase in the projected costs presented in Chapter III.

Question #2: The cost projections assume that no sharing of texts occurs. This means that copies of both texts used all year long and texts used for a limited amount of time during the school year, e.g., two-three months, would be provided to students for their exclusive use. Is this assumption of no sharing justified? Does its inclusion overly inflate the projected costs of providing needed texts?

DEA Response: As discussed in Chapter III, a number of alternative assumptions could have been made regarding the sharing of textbooks. The assumption selected by DEA of no sharing of textbooks clearly provides a higher estimate of the costs of meeting the proposed standard than would other alternatives. However, if use of the "no sharing" alternative did result in an overestimate of needs, it would follow that the average student-use figures presented in Exhibit 3 would appear to be suspiciously high. This is not the case. In fact, as shown by the first comment, at the elementary level the estimate appears to be suspiciously low. This can only lead us to assume that when responding to the question "How many texts do students in your class typically use in this subject?" most teachers did not include texts used for short amounts of time and therefore amenable to sharing with other teachers. Based on this, we do not feel that adopting the "no sharing" assumption seriously biased the results upwards. However, if requested to do so, we can easily provide alternative costings based on other assumptions, e.g., 10 percent of the texts will be shared by two classes, 20 percent of the texts will be shared by three classes, etc.

Question #3: In calculating the value of the present inventory, straight-line depreciation rates were used for all subjects. Is this straightline approach the best? Do textbooks in all subjects depreciate at the same rate?

DEA Response: Other depreciation rates could have been used; and these might have had significant impact on the cost estimate. We concur that some textbooks, e.g., literature texts, might not become out-of-date as rapidly as others such as science or social studies texts. However, some of the latter may be obsolete in less than the five years allocated for hardbacks. Also, we know that many paperbacks do not last for two years; and that many hardbacks are lost or destroyed in less than five years. Again, we stand by our assumptions, but are willing to cost out alternative depreciation assumptions.

Question #4: The projected cost estimates do not take into account the effects of declining enrollment. Does this provide an overestimate of long-term need?

DEA Response: Two factors were ignored in developing the projected cost estimates: declining enrollments and increasing textbook costs due to inflation. The assumption was tacitly made that these would, to at least some extent, cancel each other out. To the extent that this assumption is incorrect, the cost estimates may be too high or too low.

Question #5: The study does not address either the philosophical basis or empirical soundness of adopting the standard that each child have his/her own copy of the texts he/she uses in basic academic subjects. Is there any evidence to show that any positive educational impact should be expected from its adoption?

DEA Response: In initiating the textbook study, DEA attempted to locate research on textbook usage relevant to possible relationships between either funds allocated for textbooks or textbook usage and achievement. Neither through searches of the ERIC system nor conversations with experts in the field of education and curriculum development were we able to locate such studies. We therefore limited our analyses to describing current usage patterns and the projected costs of meeting the standard described above. We do not consider these analyses to be an evaluation of that standard from an educational standpoint. Given the lack of relevant data on potential impact, the decision regarding either the advisability or the cost-benefits of the standard used here is better left to the judgment of policy makers familiar with the needs of our school system.

Question #6: The study fails to address a number of important decisions regarding alternative funds allocation strategies for meeting the defined needs. For instance, could some of the costs for textbooks be defrayed by using monies from the instructional materials account? Do the projected cost analyses assume that all schools will receive the same amount of money regardless of current need? Do the analyses imply that the same textbook series should be purchased for all students in a given grade or subject matter?

DEA Response: The questions regarding alternative funds allocation strategies specified above are extremely important and will need to be taken into account in developing strategies for filling current needs. The report by DEA does not address these issues. These questions are, we feel, more appropriately the responsibility of administrators in the school system.