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Mathematics Text Evaluation for the Intermediate Grades

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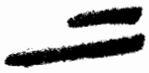
MATHEMATICS TEXT EVALUATION FOR THE INTERMEDIATE GRADES



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CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS USED

One of the most serious problems in recent years in regard to elementary education has not been the availability of mathematics textbooks but the selection of appropriate mathematics textbooks for use in the classroom.

In direct relationship to the selection of mathematics textbooks are the selectors. Spitzer felt that in most circumstances, mathematics textbooks were selected by supervisors, curriculum personnel, or people in an administrative capacity and not by the people who were actually going to use them, the teachers (6:447).

The current trend in selecting textbooks for classroom use in some areas now appears to be in the form of teacher selection committees. Herbert F. Spitzer is quoted as saying, "The membership of the committee should be made up primarily of classroom teachers for they are in the best position to judge the effectiveness of instructional material" (6:447).

This concept of textbook selection is in accordance with Smith who states, "More and more the selection of the books is being placed where it belongs, in the hands of the teachers who are to use them" (24:61).

The need then becomes twofold.

1. To have the teacher carry out the greater responsibility of textbook selection; and,
2. To have some means available to teachers with which to make an intelligent selection of textbooks for their appropriate class or grade level.

I. THE PROBLEM

Statement of the problem. It was felt that the present means for selecting mathematics textbooks for use in the classroom at the intermediate level were inadequate. Therefore, the development of a mathematics textbook evaluation device might benefit those responsible for assisting in the evaluation and selection of mathematics textbooks.

Procedures to be used. The procedures followed in this study included:

1. A review of current literature to discover how mathematics texts are now being selected;
2. The development of an evaluation device to measure mathematics textbooks according to recognized and accepted skills and objectives;
3. A comparison of current mathematics textbooks for the intermediate grades according to the device that was built; and

4. An examination of the results of the study.

Importance of the study. It was felt that a more objective and time saving method for mathematics textbook selection could be found rather than methods which are presently employed.

Limitations of the study. This study was limited to the analysis of mathematics textbooks for grades four, five and six. The reason for this limitation was the fact that when mathematics textbooks are purchased in Yakima, for the intermediate level, one basal series is used.

Teachers who used the measurement device all taught in the Yakima School District and may have had personal preferences because of mathematics textbook similarities to mathematics textbooks previously used.

II. DEFINITIONS OF TERMS USED

Measurement device, or scale. The measurement device or scale produced for the use in mathematics textbook selection is illustrated in Chapter III.

Selectors. Teachers who serve on mathematics textbook committees for the purpose of selecting for adoption mathematics textbooks for a specific school district will be termed as selectors.

Intermediate grades. Grades 4, 5 and 6 of the elementary school.

Equation. An open mathematical sentence with an equal sign (20:432).

Inequalities (or inequation). An open mathematical sentence with an inequality sign.

Logic. Inductive and deductive reasoning. (1) Deductive moves from general statement to a particular instance, while (2) inductive moves from a particular to a general conclusion.

Measurement. Consists in finding the number of standard units there are in an object or thing (3:447).

Notation. System for writing numbers (16:373).

Place value. Is that property of our number system which gives a digit a different value depending upon the position which the digit holds in a numeral (3:449).

Ratio. Quotient of two numbers (20:435).

Set. A collection of objects, things or numbers (3:450).

Bases. A system of numeration is the number of units which must be grouped in a given place in a numeral to equal one in the next place to the left in that numeral (3:443).

Exponent. When a number is to be multiplied by itself a given number of times.

Geometry. Deals with shapes and sizes of objects.

Integers. Numbers less than one indicated by a minus sign.

Prime numbers. Numbers greater than one which are divisible by themselves and one only (5 ÷ 1 = 5).

Composite numbers. Numbers which are divisible by more than one pair of factors, and are not primes (10 ÷ 5 = 2) (10 ÷ 1 = 10).

Pre-evaluative materials. Test given before a unit of study is begun to determine how much a child already knows about the material to be presented and an attempt to take him from that point to the point where the material is understood well at that grade level.

Post-evaluative materials. Test given after a unit of study to determine if the child understands the concepts presented in that unit.

Pictures and illustrations. Pictoral examples presented with a unit of study to aid students in working problems.

Basic laws of arithmetic. The basic laws are commutative, associative and distributive.

II. ORGANIZATION OF THE REMAINDER OF THE THESIS

Chapter I includes the Statement of the Problem, the Procedures to be Used, the Importance of the Study, the Limitations of the Study, and the Definitions of Terms Used. Chapter II reviews the literature and objectives in teaching mathematics in the intermediate grades. It also covers a review of mathematics textbook objectives and devices of measurement now being employed. Chapter III contains an evaluation device employed in a comparative study of the new mathematics textbooks for the intermediate grades. Chapter IV includes the results of the study, the conclusions, and the recommendations of this study.

CHAPTER II

REVIEW OF THE LITERATURE

One educational area that is receiving attention at the present time is mathematics. This is a result of the introduction of new mathematical ideas and interpretations of these ideas which have created a need for a change in published material covering the mathematics curriculum. The publishers of mathematics textbooks have attempted to meet the needs by supplying new materials. The publishers' aim in these new mathematics textbooks is the application of these new concepts and approaches.

This chapter reviews current literature to discover some criteria for selecting mathematics textbooks in an attempt to determine how mathematics textbooks are presently selected in the mathematics area for the intermediate grades. The necessity for the selection of new mathematical materials to comply with the changes occurring in the mathematics field and curriculum nationwide, due to the shortcomings of one basal series, was recognized.

Because of the changes, problems have arisen; the most predominant being that of an appropriate evaluative device. This evaluative device is important not only because of the new mathematical concepts presented but because of specific objectives, which are to be achieved as felt by

the curriculum planners and teachers. In keeping with the general goals of education, the more specific objectives of math instruction should be carefully established. These more specific objectives suggest what the learners should do (skills), know (concepts) and feel (attitudes). The next step is selection of appropriate content, that is specific mathematical ideas, structures, and exercises that are best suited to the attainment of the objectives (14:4).

Johnson and Rising feel that:

> In selecting appropriate goals for mathematics instruction, we must take into account not only the needs of society but also the mathematical needs of our student.
>
> Mathematics instruction today must be broader and more inclusive than in the past if it is to meet the increasing demands being made on the mathematical competence of our students. The mathematics program must do more than develop the basic skills and techniques, although the broader goals of mathematics will include these skills and techniques. In other words, it must develop more than vocabulary, facts, and principles; more than the ability to analyze a problem situation; more than an understanding of the logical structure of mathematics. The mathematics program must in addition, develop students who can use the logic of mathematics to distinguish fact from opinion, relevant from irrelevant material, and experimental results from proven theorems. This program must stimulate curiosity, so that the student will enjoy exploring new ideas and creating mathematics which is new for him even though it has been discovered by others. It must develop the reading skill, motivations, and study habits essential for independent learning of mathematics. In short, the mathematics program must produce students who know how to learn mathematics, enjoy learning mathematics, and are motivated to continue their learning (14:11).

This seems to be substantiated by Garstens and Jackson who relate that a large part of the child's math experience

is spent in learning how to perform certain operations, how to solve particular problems, how to prove specific theorems. They also go on to say that in a good math program, the students should also learn why a specific procedure gives a desired result (11:1).

This is emphasized by Rappaport who states that math should be taught for understanding and not for the sole purpose of learning computational skills. He also goes on to say that a child learns best when he makes his own discoveries. Instead of showing children the "what" and the "how", teachers should conduct the mathematics classes in such a way that children will develop insight and will see the relationships that constitute the basic concepts in mathematics. The child who discovers the relationships will also be able to explain the "why" (14:7).

The concepts are relative to the objectives which are being taught. The objectives of a math program are relative to the content of the program to be adopted.

According to Kramer,

> In the evaluation of a text for a math program, the following items should be given consideration with regard to content and expected outcomes of a desirable program:
>
> 1. The pupils are encouraged to discover mathematical principles, patterns, and procedures.
>
> 2. Generalizations are formed inductively and applied deductively.

3. The pupil is guided through necessary stages of development toward the formation of mathematical concepts.

4. Practice exercises are presented after the process to be mastered has been explored meaningfully.

5. In the selection of content the mathematical and social aims are considered.

6. The program is mathematically correct and presents a sequential plan for the introduction of topics which is pedagogically sound.

7. The spiral plan is followed in the presentation of the content.

8. The program provides for individual differences.

9. Mathematical skills are used in quantitative problem situations which arise in class.

10. Proper motivational techniques are applied in order to arouse the child's interest in mathematics (15:5-10).

The importance of the above comments lies in the fact that the mathematics curriculum should be a challenge to all children. This can only be if the content of the text selected is challenging, motivating and stimulating (21:8).

As Grossnickle and Brueckner state,

Items to be considered in examining and selecting textbooks are:

1. The point of view of the authors, their conception of the functions of the elementary mathematics program and the principles of learning and teaching stressed.

2. Methods of organizing the review of the work of preceding years.

3. The grade placement of subject matter.

4. Use of visual and other learning aids in the presentation of new steps in processes and problems.

5. Consideration of mathematical structure and identification of basic principles or laws.

6. Means provided for evaluating pupils' progress and for diagnosing their learning difficulties.

7. Provision for individual differences in readiness, ability and interests.

8. Illustrations, attractiveness, durability.

9. Guides and helps for teachers (3:361).

Marks, Purdy and Kinney observe the need for new instructional materials to keep pace with the changes that are taking place.

> But how to select the best of these materials, how to adapt them for pupils of varying ability, and how to plan effective classroom practices are problems that have not been completely solved. Some evidence to help solve these problems must be supplied by the teacher, who is in direct contact with pupils and parents, is familiar with the interests and needs of his individual pupils, is in a position to experiment both with materials and with procedures, and can keep parents informed of the nature and purposes of these new developments (17:469).

They continue by stating that

> A concerted and successful effort has been made over the last 25 years to improve textbooks in elementary school mathematics. Some obvious features that have been incorporated are the emphasis on concepts, the writing of textbooks for the primary grades (for many years pupils had no mathematics text prior to grade three), the use of functional pictures and sketches, the introduction of color, the use of readiness experiences prior to the introduction of new topics, systematic reviews of concepts as well as skills, and the inclusion of special experiences for both slow and fast learners (17:470).

Johnson and Rising state that

> The mathematics textbook is a major factor in determining what mathematics topics are taught and how they are taught. A textbook has often dictated the scope, the sequence, and even the pace of the mathematics program. Thus, the textbook is a powerful means of determining whether the new mathematics is brought into the schools or whether the old is maintained. This is all in addition to its basic function as a learning tool in the classroom. Its importance increases when instruction is inadequate. However, the mathematics curriculum should not be determined by the text; rather, the text should be selected on the basis of prior curriculum decisions (14:248).

They continue by stating

> The superior mathematics textbook offers the following aids to teaching and learning:
>
> 1. It provides most of the content for a course.
> 2. It presents topics in a manner that builds understanding of concepts, structure, problem solving and computations.
> 3. It provides the exercises, the experiences, the directions for attaining mastery through practice, review, application, and thought-provoking questions.
> 4. It provides a means for independent study and, hence, is useful for assignments, make-up work, remedial instruction, and independent study.
> 5. It provides a means of making provision for individual differences.
> 6. It provides a compact reference book which is useful in building the structure of mathematics.
> 7. It provides a basis for achievement testing. Chapter tests, review tests, practice tests, and accompanying semester tests provide ready-made devices for evaluation of content mastery.

8. It brings directly to the student the exposition of the writer or writers, often major figures in mathematics and mathematics education or master teachers.

9. It forms the basis for classroom instruction, which may and should often follow a different but essentially parallel development (14:249-250).

Scott comments

The view of mathematics as an entity encourages the consideration of a total program rather than an intensive concentration upon some isolated segments of a program. In this atmosphere, it is clear that there must be a continuity of learning experience and an orderly sequence of study topics (23:29).

Flournoy presents

A scope and sequence pattern following the spiral formation for the major areas of elementary school mathematics:

1. Number and Numeration.

2. Number Operations and Computational Procedures with whole Numbers.

3. Common Fractions.

4. Measurement.

5. Decimal Fractions and Per Cent.

6. Graphs and Scale Drawings.

7. Geometric Concepts (10:9-13).

Another facet of textbook selection that should not be disregarded is what may be determined as the 'readability' of elementary mathematics books.

Textbook selection committees very often make the assumption that, if a book is written for a specific grade level, children of that grade will be able to read the material. However, this has been found to be an

invalid criterion for judging readability. The committees actually have two factors to consider in judging readability of text material:

1. The reading level of the students who will be using the material, and
2. The reading level of the material (12:466).

Spitzer sets up the following criteria for evaluators for the selection of mathematics textbooks which are stated below without elaboration:

1. Study of the field of arithmetic.
2. Limiting the number of texts to be examined critically.
3. Insuring series rather than single book evaluation.
4. Examination of procedures.
5. Using the representatives of publishing companies.
6. Making a composite rating.
7. Making the final choice.
8. Preparing a final report (6:447-449).

The Bismarck, North Dakota Elementary Math Guide sets up the following criteria for mathematics textbook evaluation. This same criteria is also used by mathematics textbook selectors in the Bellevue, Washington School District. These follow the general criteria found in the California State Guide. The criteria, without elaboration, are as follows:

I. SCOPE OF CONTENT

A. Problem Solving and Applications

B. Grade Placement and Sequence

C. Nature of Number Systems

D. Systems of Numeration and Notation

E. Geometry

F. Measurement

G. Mathematical Sentences

H. Graphs and Scale Drawings

I. Logic

J. Sets

II. MANNER OF PRESENTATION

A. Pupil involvement and pupil exploration leading to discovery of mathematical principals and procedures.

B. The introduction of processes in meaningful situations that will be clear and obvious to elementary pupils.

C. Opportunities for pupils to discover different ways of performing an operation.

D. The introduction of arithmetical terms with adequate explanation. The terms should be used consistently throughout the text.

E. Opportunities for pupils to experiment and discover many ways to make reasonable estimates of correct answers.

F. Opportunities for pupils to develop effective approaches to problem solving.

G. Opportunities for pupils to check their own work for accuracy.

H. Experience for mental computation.

III. TEACHER'S EDITION

A. Teacher's edition is essential. It shall include: The pupils' text material and

teacher aids; statement of purpose and objectives for each lesson; suggestions for concrete representation when appropriate; adequate information concerning the mathematical background underlying any given lesson; suggestions for presenting each lesson; suggestions for providing for individual differences; suggestions for evaluating pupil progress; an index.

IV. **READABILITY**

Each book of the series shall provide for:

A. A vocabulary which is suited to the grade level for which it is intended

B. A sentence structure that is well adapted for understanding by pupils of the grade level for which it is intended.

C. A clear, concise explanation of mathematical terminology.

V. PROVISION FOR INDIVIDUAL DIFFERENCES

A. Activities designed to meet the normal range of ability within a class.

B. Exercises and problems within a lesson which are graduated toward increasing difficulty.

C. Activities which reinforce concepts developed for the slow learner.

D. Activities designed to challenge the more capable learner.

VI. PRACTICE MATERIALS AND MAINTENANCE

A. Practice material distributed according to age and grade level.

B. Sufficient practice for initial mastery.

C. Practice materials properly distributed for maintenance and reteaching.

D. Sufficient variety of practice materials to stimulate interest.

VII. EVALUATION AND RETEACHING

A. Ample evaluating materials for each aspect of instruction.

B. Periodic testing of large units.

C. Continued reinforcement of learning and thorough review.

D. Diagnostic tests and exercises which point to specific instructional needs and which may refer to content of previous grades.

E. Practical self-checking devices for pupils.

F. Tests and remedial materials which are designed for practical and economical use by teachers and pupils.

VIII. PHYSICAL FEATURES

A. Format.

B. Index, Table of Contents, Glossary, References.

SUMMARY

A review of the literature revealed that the following criteria could be used as guidelines for evaluators in the selection of mathematics textbooks.

CHAPTER III

PROCEDURES

A sample survey was made using twelve teachers, four teacher selectors were chosen from each of the intermediate grades, i.e., grades four, five, and six, of the Yakima Public Schools for the purpose of evaluating textbooks for those grades. The teachers who contributed to this study had not necessarily had previous experience selecting textbooks for those grades, but teachers who were willing to aid in this study. Selectors were also chosen in an attempt to obtain a cross section of the various socio-economic areas of Yakima, with the realization that each selector may not select the same text for his area. This was done to get the viewpoint of teachers working with children with divergent backgrounds and abilities.

Each teacher was asked to complete the survey with a brief explanation given of the purpose of the survey. The teachers were also supplied with the texts which were used in the survey.

The key, 0 - 1, - 2, and - 3, used to rate the topics or subjects is as follows:

0 - Very little or nothing presented on subject.

1 - A small amount of material was presented on this subject.

2 - Subject was presented quite often but was not treated as strongly as selector felt possible.

3 - Subject was presented in depth and scope to develop a very good understanding by the pupil at his grade level.

A space was provided at the bottom of page one of the evaluation device for selector's comments.

The letters at the top of each column represent the publishers' books which were used. They are as follows: AW - Addison-Wesley, Elementary School Mathematics; Ginn - Ginn & Co., Mathematics We Need; HRW - Holt, Rinehart & Winston, Inc., Elementary Mathematics Patterns and Structure; SB - Silver Burdett Co., Modern Mathematics Through Discovery; SRA - Science Research Associates, Inc., Greater Cleveland Mathematics Program.

The basis for the final text selection by the selectors could be a total point and percentage rating, i.e., text series receiving the highest total number of points and receiving the highest percentage for the combined Topics of Study and Format and Content. A text might also be chosen because it covered some needed topic that is not now being covered.

The final decision for adoption is not that of the "selection committee" (though their recommendations are highly regarded), but is that of one school board member, the super-

intendent of local district, and the executive director of elementary education.

Other factors affecting the outcome of the final selection could be the closeness of final rating score of books; the cost of books; the books which may rate very high in Topics of Study and low in Format and Content, may score high overall but be too inconsistent; whereas, a book which rates equally well in both areas may be more desirable.

On the following pages is a copy of the evaluation device that was used in this study and the tables showing the results.

EVALUATION FORM FOR MATHEMATICS TEXTBOOK SELECTION FOR THE INTERMEDIATE GRADES (4, 5, 6)

KEY: 0 - None 1 - Fair 2 - Good 3 - Very Good

TOPICS OF STUDY	AW	GINN	HRW	SB	SRA
1. Averages					
2. Basic Laws of Arithmetic					
3. Bases--other than ten					
4. Decimals					
5. Equations and Solutions					
6. Estimation and Rounding					
7. Fractions					
8. Geometry					
9. Graphs and Tables					
10. Integers					
11. Measurement					
12. Notation					
13. Number Facts (Primes & Composites)					

EVALUATION FORM FOR MATHEMATICS TEXTBOOK SELECTION FOR THE INTERMEDIATE GRADES (4, 5, 6)
(continued)

TOPICS OF STUDY	AW	GINN	HRW	SB	SRA
14. Number Line					
15. Per Cent					
16. Place Values					
17. Powers of Ten (Exponent)					
18. Problem Solving (Word Problems)					
19. Processes (Add., Sub., Mult., Div.)					
20. Ration and Proportion					
21. Set Concepts					

What other things would you like to see in a mathematics textbook?

CRITERIA FOR TEXTBOOK EVALUATION - FORMAT AND CONTENT

1. ORGANIZATION	AW	GINN	HRW	SB	SRA
A. Table of contents					
B. Index					
C. Glossary					
D. References					
2. PHYSICAL FEATURES AND READABILITY					
A. Attractiveness of text					
B. Mechanical structure (binding, paper, etc.)					
C. Ease of handling					
D. Type size and style					
E. Colors appropriately used					
F. Appropriate spacing of discussion & written exercises					
G. Vocabulary suitable for grade level					

CRITERIA FOR TEXTBOOK EVALUATION - FORMAT AND CONTENT (Cont'd.)

3. MATH AIDS	AW	GINN	HRW	SB	SRA
A. Practice materials & exercises					
B. Evaluative materials (pre & post)					
C. Pictures and illustrations					
D. Continual review & reinforcement exercises					
4. CONTENT AND PRESENTATION					
A. Problems adapted to age & grade level					
B. Problems of increasing difficulty					
C. Meaningful introduction of new processes					
D. Problems presented in sequential order					
E. Problems relative to needs and interests of students					
F. Use of mathematical sentences					
G. Use of logic					

TABLE I

TOTAL POINTS RECEIVED FOR EACH TOPIC AND TEXT BASED ON A MAXIMUM OF 36 FOR EACH TOPIC

TOPICS OF STUDY	AW	GINN	HRW	SB	SRA
Averages	15	20	16	11	0
Basic Laws of Arithmetic	27	27	28	23	20
Bases - other than ten	14	14	17	13	2
Decimals	16	24	30	21	14
Equations and Solutions	28	24	27	21	25
Estimation and Rounding	24	28	19	16	13
Fractions	32	29	30	32	27
Geometry	26	26	26	21	26
Graphs and Tables	18	30	24	22	14
Integers	10	9	7	8	18
Measurement	23	28	26	28	26
Notation	23	24	18	16	13
Number Facts (Primes and Composites)	22	20	25	16	15
Number Line	25	22	15	27	16

TABLE I (Cont'd.)

TOPICS OF STUDY	AW	GINN	HRW	SB	SRA
Per Cent	9	10	9	11	11
Place Values	27	28	24	28	15
Powers of Ten (Exponent)	14	10	11	10	4
Problem Solving (Word Problems)	29	29	21	27	23
Processes (Add., Sub., Mult., Div.)	33	31	30	31	27
Ration and Proportion	12	18	12	14	3
Set Concepts	21	29	24	20	13
TOTALS	448	480	439	416	325

TABLE II

TOTAL PERCENTAGE RECEIVED FOR EACH TOPIC AND ARITHMETIC MEAN FOR EACH TEXTBOOK SERIES BASED ON A POSSIBLE OF 36 ROUNDED OFF TO NEAREST WHOLE NUMBER

TOPICS OF STUDY	AW	GINN	HRW	SB	SRA
Averages	42	56	44	31	0
Basic Laws of Arithmetic	75	75	78	64	56
Bases - other than ten	39	39	47	36	6
Decimals	44	67	83	58	39
Equations and Solutions	78	67	75	58	69
Estimation and Rounding	67	78	53	44	36
Fractions	89	81	83	89	75
Geometry	72	72	72	58	72
Graphs and Tables	50	83	67	61	39
Integers	28	25	19	22	50
Measurement	64	79	72	78	72
Notation	64	67	50	44	36
Number Facts (Primes and Composites	61	56	69	44	42

TABLE II (Cont'd.)

TOPICS OF STUDY	AW	GINN	HRW	SB	SRA
Number Line	69	61	42	75	44
Per Cent	25	28	25	31	31
Place Values	75	78	67	78	42
Powers of Ten (Exponent)	39	28	31	28	11
Problem Solving (Word Problems)	81	81	58	75	64
Processes (Add., Sub., Mult., Div.)	92	86	83	81	75
Ration and Proportion	33	50	33	39	8
Set Concepts	58	81	67	56	36
ARITHMETIC MEAN PERCENT	59	64	58	55	43

TABLE III

TOTAL POINTS RECEIVED FOR EACH TOPIC AND ARITHMETIC MEAN FOR EACH TEXTBOOK SERIES BASED ON A POSSIBLE OF 36 FOR EACH TOPIC - FORMAT AND CONTENT

1. ORGANIZATION	AW	GINN	HRW	SB	SRA
A. Table of Contents	27	23	27	22	18
B. Index	28	22	30	30	0
C. Glossary	0	10	30	31	0
D. References	14	13	6	11	3
2. PHYSICAL FEATURES AND READABILITY					
A. Attractiveness of text	24	27	24	28	15
B. Mechanical structure (binding, paper, etc.)	28	28	29	30	27
C. Ease of handling	30	28	28	29	27
D. Type size and style	32	28	25	30	28
E. Colors appropriately used	23	24	18	25	18
F. Appropriate spacing of discussion & written exercises	28	23	23	26	19
G. Vocabulary suitable for grade level	25	24	27	26	22

TABLE III (Cont'd.)

3. MATH AIDS	AW	GINN	HRW	SB	SRA
A. Practice materials and exercises	25	27	27	27	24
B. Evaluative materials (pre & post)	27	27	27	25	16
C. Pictures and illustrations	28	23	15	23	14
D. Continual review and reinforcement exercises	30	26	26	24	17
4. CONTENT AND PRESENTATION					
A. Problems adapted to age and grade level	29	26	24	24	23
B. Problems of increasing difficulty	29	25	26	28	25
C. Meaningful introduction of new processes	26	23	23	21	19
D. Problems presented in sequential order	25	25	26	25	23
E. Problems relative to needs and interests of students	26	23	22	24	22
F. Use of mathematical sentences	27	25	25	26	25
G. Use of logic	25	23	25	24	23
TOTALS	556	523	533	559	408

TABLE IV

TOTAL PERCENTAGE RECEIVED FOR EACH TOPIC AND ARITHMETIC MEAN FOR EACH TEXTBOOK SERIES BASED ON A POSSIBLE OF 36 FOR EACH TOPIC ROUNDED OFF TO NEAREST WHOLE NUMBER - FORMAT AND CONTENT

1. ORGANIZATION	AW	GINN	HRW	SB	SRA
A. Table of Contents	75	64	75	61	50
B. Index	78	61	83	83	0
C. Glossary	0	28	83	86	0
D. References	39	36	17	31	8
2. PHYSICAL FEATURES AND READABILITY					
A. Attractiveness of text	67	75	67	78	42
B. Mechanical structure (binding, paper, etc.)	78	78	81	83	75
C. Ease of handling	83	78	78	81	75
D. Type size and style	89	78	69	83	78
E. Colors appropriately used	64	67	50	69	50
F. Appropriate spacing of discussion & written exercises	78	64	64	72	53
G. Vocabulary suitable for grade level	69	67	75	72	61

TABLE IV (Cont'd.)

3. MATH AIDS	AW	GINN	HRW	SB	SRA
A. Practice materials and exercises	69	75	75	75	67
B. Evaluative materials (pre & post)	75	75	75	69	44
C. Pictures and illustrations	78	64	42	64	39
D. Continual review and reinforcement exercises	83	72	72	67	47
4. CONTENT AND PRESENTATION					
A. Problems adapted to age and grade level	81	72	67	67	64
B. Problems of increasing difficulty	81	69	72	78	69
C. Meaningful introduction of new processes	72	64	64	58	53
D. Problems presented in sequential order	69	69	72	69	64
E. Problems relative to needs and interests of students	72	64	61	67	61
F. Use of mathematical sentences	75	69	69	72	69
G. Use of logic	69	64	69	67	64
ARITHMETIC MEAN PER CENT	70	66	67	71	52

CHAPTER IV

RESULTS OF THE STUDY, CONCLUSIONS AND RECOMMENDATIONS

I. RESULTS

This chapter contains a review of the results of the study which were as follows.

The maximum total points which could have been received by each mathematics textbook company for Topics of Study were 756. Ginn received the highest total with 480 points and an average per cent of 64; Addison-Wesley was second with 448 points and an average per cent of 59; Holt, Rinehart and Winston was third with 439 points and an average per cent of 58; Silver Burdett was fourth with 416 points and an average per cent of 55; and Science Research Associates had a point total of 325 and an average per cent of 43.

The maximum total points which could have been received by each mathematics textbook company for Format and Content were 792. For this section Silver Burdett was high with 559 points and an average per cent of 71; Addison-Wesley was next with 556 points and an average per cent of 70; third was Holt, Rinehart and Winston with 533 points and an average per cent of 67; fourth was Ginn with 523 total points and an average per cent of 66; and Science Research Associates received a point total of 408 with an average per cent of 52.

The maximum total points for the combined sections, Topics of Study and Format and Content, were 1548. Addison-Wesley received 1004 points of this total; Ginn received 1003 points; Silver Burdett received 975 points; Holt, Rinehart and Winston received 972 total points; and Science Research Associates received 733 total points.

The combined average per cent for Topics of Study and Format and Content for both Addison-Wesley and Ginn was 65; for both Silver Burdett and Holt, Rinehart and Winston was 63; and Science Research Associates was 48.

II. CONCLUSIONS

It would not be practical to adopt a mathematics textbook series on the basis of total points or average per cent. The entire context of the evaluation should be used because an area which may be considered an important part of a district's curriculum may be weakly presented, yet the mathematics textbook series may score high overall. Not only did the study point out the strengths of the textbooks, but very specifically pointed out weaknesses. A mathematics textbook examination, although objectively rated, does bring the textbooks under close scrutiny and comparison to determine the textbooks' strong and weak points. It also allows the teachers to assume their responsibility in the matter of mathematics textbook selection.

III. RECOMMENDATIONS

It is recommended that a method for mathematics textbook evaluation as that presented in Chapter III is practical. It helps to eliminate random selection without any value judgement being made. It also allows teachers an opportunity to observe several available textbooks at one time.

It is also recommended that, because of the closeness of the ratings received by the various mathematics textbooks in this study, rather than a single textbook series adoption, a multiple mathematics textbook series adoption might be considered. This would be more beneficial to a district with varied socio-economic areas, in that the textbooks would allow for more individualization and or grouping. A textbook which rates low on this device, should not be overlooked because it could be used for a specific topic and it might also be used as part of an enrichment program or a remedial program.

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