

An Evaluation of Two Mathematics Textbooks

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Richness in Content

The book, *Algebra: Structure and Method* by Brown, Dolciani, Sorgenfrey, and Cole caters to secondary school mathematics. Houghton Mifflin Company published it in 1990. Its text spans Pre-Algebra, Algebra, and introductions to Probability, Statistics, Geometry, and Trigonometry. While it's intended for high school, its readability based on the Fry Graph is at 8th grade level, which signifies the grade level a reader should have at least attained to comprehend its content.

A correspondence between its text and its intended audience weighs its understandability. If the language is lucid for a person who has, at minimum, grade 8 education, then, it is simple enough for high school students to decode the words. As for the nexus to the students' knowledge, background, and experience, the book makes it a point to provide a bird's eye view of the concept. It also emphasizes important terms in boldface fonts, highlights significant ideas through its *Displayed Material*, enumerates steps to facilitate process, and offers a segment named *Reading Aids/Independent Study* for learning strategies. Furthermore, the scale of complexity for each new topic and for every abstract matter are presented in gradual progression in such a way that students are able to keep track of their own command of the new skill or knowledge. For the struggling and the advanced, it furnishes guided oral and written exercises as well as challenge questions for differentiated learning abilities. To broaden understandability, it imparts exploring the use of computer applications and calculator functions. Irrelevant materials are avoided as evidenced by its terse but comprehensive presentation of single units in a chapter. The only setback in this category is its lack of teacher manual for additional resources.

Delving into the structure pertaining to its worth in the learning of mathematics is the measure of its usability. Beginning with its external attributes, the table of contents clearly conveys a general idea of its coverage. The outline has blue bold-font chapter titles, red bold-font unit headings, plain sub-headings, and at the end of each chapter, are the supplemental items labeled in blue bold-font as *Technology*, *Special Topics*, and *Reviews and Tests*. At the last part of the table of contents, are addendums in black bold-font captions. These are for extra practice, an appendix, glossaries, an index, a portion for acknowledgment, and a section for solutions to exercises. Flipping through the pages, it has an abundance of relevant illustrations, which include colorful graphs, charts, and diagrams supportive of the textual materials. Moreover, the prints are neither too large that it can be mistaken as a children's book nor too small that it can be erroneously taken as a literary novel. It has 12-point font size with manageable sentence and paragraph lengths fit for high school students. The key information is in color fonts for emphasis. In the aspect of "end-of-chapter questions," the literal stage of comprehension is apparent on the oral and written exercises where the students are guided and are expected to exactly follow the steps. As the problems get complicated, the mixed review module, brings the students to the interpretive phase, where they make decisions as to what methods are the most appropriate to obtain the solution. At the applied level of comprehension, the real-life word problems get them to this juncture. In addition to these, there is a glossary of technical terms as well as a listing of mathematical symbols. Although, the concepts are presented in proximity to each other, full solid lines separate the ideas. Intrinsically, terminologies and lessons are constantly reinforced by vocabulary reviews, guided practice, and cues for assimilating what has just been learned. On a disappointing note, its usability is diminished

by the same factor that affected understandability: the absence of a teacher navigational tool.

Enticing students to read the book and keeping them engaged to it determine interest. Its most appealing qualities are the historical and the biographical backgrounds, which can trigger curiosity in the study of Algebra. Apart from these, the career notes do not only show the bearing of mathematics in the students' lives but they make the mathematics meaningful to their future occupational prospects. The cover is also alluring with its vibrant colors and illusive three-dimensional images. However, since its copyright date is 1990, the digital era has since sculpted the dynamics of education in a different perspective. Hence, the book has to update its methods of instructions in order to suit the 21st century requirements for the 21st century students and teachers.

As a whole, *Algebra: Structure and Method*, is high on understandability and usability. Given that it encompasses Pre-Algebra, Algebra I, and Algebra II with introductions on other branches of mathematics, it's a compact book that is straightforward but comprehensive in nature. Its shortcoming on interest isn't a weakness but an improvement that has to be achieved due to the demands of today's digital age.

Opulence in Teaching Strategies

The *Teacher's Wraparound Edition of Mathematics Applications and Connections Course 3* by Collins, Dritsas, Frey, Howard, McClain, Molina, Moore-Harris, Ott, Pelfrey, Price, Smith, and Wilson is aimed at middle school mathematics. It was published in 2001 by Glencoe/McGraw-Hill. From the title itself, the book focuses on teaching mathematics with real life issues on instances as money matters, hobbies, and health via applications and with significant links to other subject areas such as music, geography, science, and

language arts through connections. Even though it's not cited on the title, it also includes integration, which combines the learning of Algebra I with geometry, measurement, statistics, probability, and proportional reasoning. The book may be meant as a teacher guidebook for its student edition but its readability, according to the Fry graph formula, is in sync with its target students: 7th grade.

In light of understandability, the book adheres to the standards set forth by the reputable professional organization of the National Council of Teachers of Mathematics (NCTM). In this case, it follows the core values outlined on the *Principles and Standards of Mathematics* for 6-8 graders. Therefore, the language of the text matches the students' vocabulary knowledge as well as their conceptual background and experiential circumstances. With a segment on assessment and evaluation, the teacher is able to customize the depth and breadth of content and instruction based on student needs. Besides this, the *5-minute Check* recommended at the start of the lessons probes into the students' current proficiency on the topic. The abstraction that accompanies mathematics is dealt with head on by manipulatives and modeling with its *Hands-On* lab and *manipulative kits*. These help students transform the intangible thoughts into concrete and meaningful thinking. Learning is intensified by applications not only in the form of problem solving but also in the guise of games, classroom activities, and projects whether with pen and paper or with technological softwares. There is a wealth of information for teachers to motivate students, to develop problem-solving skills, to employ technology, to assess both the students and the efficacy of the curriculum, to satisfy multiple intelligences, to manage the classroom, and to learn from classroom vignettes.

On grounds of usability, the consistency of organizational aids throughout the book is prominent. The table of contents exhibits each chapter on a full page with a banner of the chapter project theme. Every chapter delineates the lessons supplemented by *Technology lab*, *Mid-term Self Test*, *Thinking lab*, *Hands-On Lab*, *Integration*, *Study Guide and Assessment and Standardized Test Practice*. All the table of contents pages have eye-catching logos for additional chapter resources enumerated as *Let the Games Begin*, *School to Career*, *Math in the Media*, *Internet Connection*, and *Standardized Practice Test*. For quick data retrieval, the book offers two indices. The front-page index is divided into listings of applications, connections, and integrations while the back page index is a typical listing of subjects found in the book. Moving further on towards the chapters, the method of presenting the concepts in an orderly manner to produce a coherent whole is impeccable. It starts with a section on *Instructional Resources*, which indicates where the materials for teaching can be obtained. This is followed by anticipatory sets involving quick knowledge check up and motivational activity. The lecture initiates with: what the students will learn, when the students can use what was learned, and terms to remember under *Word Wise*. It progresses to true-to-life scenarios where concepts are introduced, followed by various examples and applications. For reinforcement, opportunities for independent practice, extended activities, and study guides are made available. Plus, there is an extensive glossary of terminologies and appendices consisting of tests and selected answers to exercises. Over and above these, students' literal comprehension is examined with its guided practice; their interpretive comprehension is explored via connections; and their applied comprehension is looked into through applications. The book is not just functional but its utility is also timely.

On the question of appeal, the book is equally commendable for interest. The montage of colors, shapes, and movements from the book façade to each leaf within its binder call out for full activity and participation. Hence, it emulates the contemporary attitude of multi-tasking, cultivated in part by the advancement in the information superhighway. Moreover, it encourages teachers and students alike to use mathematics in their own lives. *Let the Games Begin* inculcates mathematics with the virtue of sportsmanship, *Family Activity* involves family members in the study of mathematics. *Cultural Kaleidoscope* opens up a whole world of cultures that are linked to mathematics. *School to Career* connects to the workplace and occupational goals. *Did you know?* provides interesting, out of the ordinary mathematical facts. *Math in the Media* deals with mathematics as it is communicated in different medium. Thus, the book is multicultural, multimedia, multifaceted, and adaptable. It stimulates critical thinking through sensory perceptions, too.

In general, the text rates high on all categories: understandability, usability, and interest. Its strengths emanate from the fact that it teaches, it engages, and it reinforces the learning. Its weakness is the inundation of activities on a page: too many choices for growing adolescents who are still developing their metacognitive and multidimensional abilities. However, the pacing schedule and the teachers' discretion can overcome this diminutive issue.

Using the Textbooks in My Classroom

The books are of dissimilar level. There is no point of comparison in terms of content. *Algebra: Structure and Method* is for high school while *Mathematics Applications and Connections* is for middle school. Despite the discrepancy, the latter can serve as a

teaching framework extended to the high school content area of the former. As a teacher, flexibility in my instructions is a necessity. With *Algebra: Structure and Method*, I can best supplement the deficit on the interest level by incorporating the strategies in *Mathematics Applications and Connections*. Being aware of the need for more teacher resources, I can avail of the benefits granted to members of professional organizations such as the National Council of Teachers of Mathematics. Additionally, my preferred way of teaching the mathematics is reflected in both books - familiarizing with the theories and procedures before venturing into applications and connections. Mutually, the books introduce the concepts and terminologies preceding the exploration of their viability on real world problems and other subject areas.

There is no doubt; the books acknowledge technology as an essential tool for learning the mathematics. With *Mathematics Applications and Connections*, this feature is enhanced. In my classroom, technology will be utilized to introduce a new concept, to render visualization of abstract concepts, to facilitate computation for large numbers and complex problems, and primarily, use it to make mathematics more understandable and pleasurable without overshadowing the learning outcomes.

The adaptations in my classroom will pick up guided practice found in the books for struggling students. Besides this, I will avail of the *Investigations for the Special Education Student* and *Parent and Student Guide Workbook* from *Mathematics Applications and Connections* for the same students. On the other hand, challenge exercises, which were also brought up in the books, will be applied to advanced students. On top of this, *Enrichment Masters* will also be used for them. On diversified learning,

Mathematics Applications and Connections will basically show how to teach the high school content in *Algebra Structure and Method*.

Overall, the textbooks will deliver positive results in my classroom.

Building Ahead

Mathematics content is unchanged but the attitude towards mathematics and the approaches in teaching mathematics are constantly transformed. A textbook can be an agent of these transformations, thus, it should also reflect explorations outside the domains of its own pages. This is building ahead of its time.