

Evaluating and Comparing the Textbooks of General Science: A Comparative Study of Published Textbooks in Pakistan

By

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1. Introduction

This is the age of science and technology. No nation can progress in this age without being active and competent in the field of science and technology. The textbooks of General Science are a key tool in developing scientific ideas and clarifying scientific concepts in the minds of students at early stages of education. Science textbooks are primary sources used by science educators throughout the world to guide them in teaching the content and skills prescribed in the curricula. Since teachers use textbooks as curriculum guides and sources for preparing lessons, the quality of textbooks will have a great impact on the quality of their instruction (Lemmer et al., 2008; Newton and Newton, 2006; Ogan-Bekiroglu, 2007; Reys and Reys, 2006; Brandt, 2005).

It is therefore imperative that they should use the best science textbooks available (Roseman, Kulm and Shuttleworth, 2001). These are the textbooks that develop or destroy the interest of students in a particular subject. Hoodbhoy (2012) has also mentioned this problem in one of his articles. He blamed poor quality textbooks as the main agent of making the Pakistani students the “science-phobic”. Therefore, very much care and attention should be provided to the development of textbooks of this and other science subjects. “Schmidt, McKnight, and Raizen (1997) as cited in (Kulm et. al.) identified textbooks as playing an important role in making the leap from intentions and plans to classroom activities, by making content available, organizing it, and setting out learning tasks in a form designed to be appealing to students.”

The quality of a textbook can be defined as its “fitness for purpose” (Sursock, 2001). According to this definition the quality of a science textbook is indicated by its ability to support the learner and teacher in attaining the goals of science education (Kesidou and Roseman, 2002). If this definition is considered, some of the textbooks available in the market are doing this. However, most of the books developed as textbooks are not up to the mark completely.

The Project 2061 of the American Association for the Advancement of Science (AAAS, 2006) executed in the USA found that none of the middle-grade science textbooks was found up to the mark and sufficient for the educational needs of the students. These all books are available in the market and educators in different private educational institutions use them carelessly. The selection of a good textbook for teaching the students is a quite difficult task (NSTA, 2005, as stated in Lemmer et. al. 2008). Many of the educators don't bother to select a suitable textbook which is suitable for their students, or they don't have a suitable tool for assessment and selection of a quality textbook. Swanepoel (2010) discussed this problem and presented a solution for South Africa.

Science education is an important component of education for all learners—notonly for future scientists. Although only a small percentage of students are destined to follow scientific careers, every person needs some understanding of mathematics, science and technology to succeed in today's technologically oriented world (Lederman, 2008; Lisichkin, 2007; Jenkins, 2004). Science education of high quality is,

therefore, essential not only to prepare learners to enter scientific careers but to contribute to providing the country with a scientifically literate population that can “address the global challenges that humanity now faces” (Wieman, 2007, 9). In this regard science education aids the realization of the learner’s potential and contributes to the development of our country’s human resources (Reddy, 2006).

2. Purpose of Evaluation

This study was carried out to evaluate and gradify the currently available published textbooks of General Science for Elementary level. A special tool was constructed using many aspects of textbooks evaluation, to be used in evaluation, comparison and grading of different textbooks. The details of this tool are given next.

This study will help the selectors/educators to select the textbook for teaching in the schools and will help authors/textbook developers in development of higher quality textbooks, which will meet the requirements of the time.

3. Evaluation Criteria

A textbook evaluation criterion was specifically developed for evaluation of textbooks. This criterion included the assessment of different aspects of textbook development that were scaled at a scale from 1 to 5 being 1= *Not at all*, 2= *To little extent*, 3= *To some extent*, 4= *To great extent*, 5= *To maximum extent*. Following twenty-two aspects of textbooks were evaluated in this regard:

1. **Title & Table of Contents:** Title and table of contents are attractive and self-explanatory.
2. **Text:** Size and format of the text is appropriate for age and grade level
3. **Paper & Binding:** The quality of paper and binding is able to withstand wear and tear for a year of schooling
4. **Illustration/Color Scheme:** Illustrations and color scheme in printing is attractive and student friendly
5. **Content Volume:** Content volume provides a whole year worth of learning
6. **Learning Outcomes:** Learning outcomes and objectives are clearly stated in each chapter/unit
7. **Curriculum:** Contents are aligned with the SLOs/objectives given in the National curriculum
8. **Graphics:** Illustrations (pictures, tables, diagrams) are accurate and well integrated into text.
9. **Up-to-date:** Content information is interesting, accurate and up to date
10. **Scientific Ideas:** The content included effectively demonstrates/clarifies the related concepts/ideas
11. **Thought Provoking:** Content and activities are helpful to enhance curiosity, critical thinking and problem solving skills.
12. **Higher Order Thinking:** Content also includes material for satisfaction of higher order thinking of students
13. **Interesting:** Content and illustrations are clear, engaging and interesting for students
14. **Language:** Language is relevant, clear and appropriate according to age and grade level
15. **Language Errors:** Textbook is free from grammatical, spelling, and punctuation errors.
16. **Non-discriminatory:** The content and illustrations are free from discrimination on the grounds of gender, age, race, religion, sect, locality, culture and disability.
17. **Assessment:** Assessment activities are aligned with SLOs/ objectives of the curriculum
18. **HOTS Assessment:** Assessment activities for assessment of Higher Order Thinking Skills
19. **Variety of Assessment:** A variety of assessment strategies/ activities are used to assess knowledge, skills & attitudes.
20. **Directions for Teachers:** Comprehensive guidelines/ directions for the teachers are added.
21. **Ending:** Glossary, references, Authors’ Description and National Anthem are added.
22. **Price:** The price of the manuscript is reasonable

4. List of Textbooks Evaluated

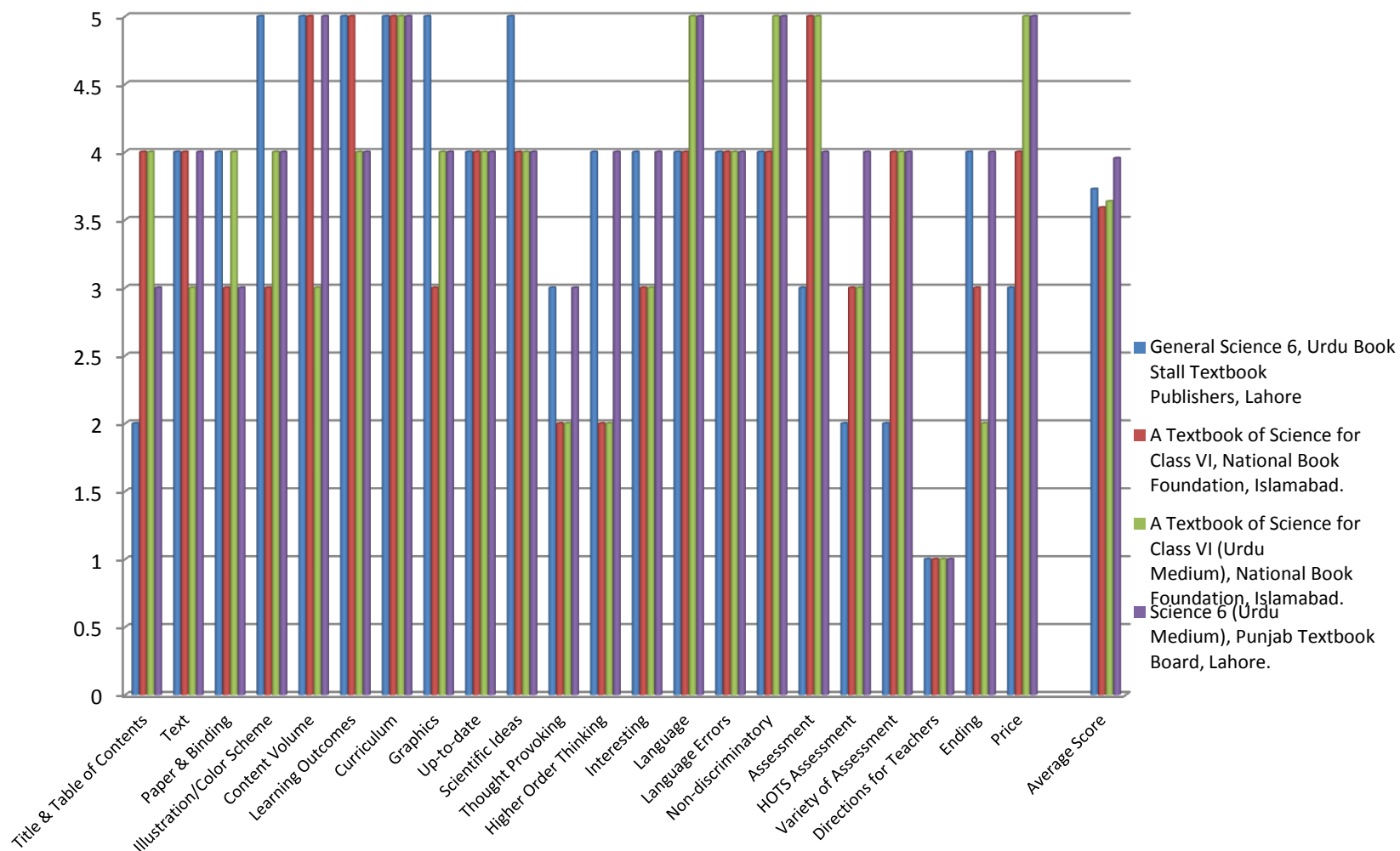
Following textbooks from different authors/publishers were evaluated:

- Book 1. General Science 6, *Urdu Book Stall Textbook Publishers, Lahore.*
 Book 2. A Textbook of Science for Class VI, *National Book Foundation, Islamabad.*
 Book 3. A Textbook of Science for Class VI (Urdu Medium), *National Book Foundation, Islamabad.*
 Book 4. Science 6 (Urdu Medium), *Punjab Textbook Board, Lahore.*

Evaluation Results (Textbook-Wise)

S.N	Aspect of Textbook evaluated	Book 1	Book 2	Book 3	Book 4
1.	Title & Table of Contents	2	4	4	3
2.	Text	4	4	3	4
3.	Paper & Binding	4	3	4	3
4.	Illustration/Color Scheme	5	3	4	4
5.	Content Volume	5	5	3	5
6.	Learning Outcomes	5	5	4	4
7.	Curriculum	5	5	5	5
8.	Graphics	5	3	4	4
9.	Up-to-date	4	4	4	4
10.	Scientific Ideas	5	4	4	4
11.	Thought Provoking	3	2	2	3
12.	Higher Order Thinking	4	2	2	4
13.	Interesting	4	3	3	4
14.	Language	4	4	5	5
15.	Language Errors	4	4	4	4
16.	Non-discriminatory	4	4	5	5
17.	Assessment	3	5	5	4
18.	HOTS Assessment	2	3	3	4
19.	Variety of Assessment	2	4	4	4
20.	Directions for Teachers	1	1	1	1
21.	Ending	4	3	2	4
22.	Price	3	4	5	5
23.	Total Score	82	79	80	87
24.	Average Score	3.73	3.59	3.64	3.95

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Graphical comparison of scaled score of evaluated textbooks.

5. Conclusion

The results of the evaluation of the books revealed that not any one of the evaluated textbooks got full scores indicating that not even a single textbook is of ideal quality. The maximum score obtained by the book was 87 which is an indication of lower degree of quality of textbook. This study also indicated the books that are higher in quality and can be taught in schools, which were:

1. Science 6, *Punjab Textbook Board, Lahore*. (For Urdu Medium Students)
2. General Science 6, *Urdu Book Stall Textbook Publishers, Lahore*. (For English Medium Students).

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