

GUIDING PRINCIPLES FOR THE SELECTION OF TEXTBOOKS IN CHEMISTRY

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Objectives

After going through this module, you will be able to:

- ✚ define textbooks and supplementary resources;
- ✚ state the importance of textbooks to both the students and the teachers;
- ✚ explain the functions of the agency and committees that are involved in the selection of chemistry textbooks for use in schools; and
- ✚ explain the principles that guide the selection of chemistry textbooks.

Introduction

In the context of this module, textbook is defined as a comprehensive learning resource that is in print or electronic form, or that consists of any combination of print, electronic, and non-print materials collectively designed to support a substantial portion of the curriculum expectations or intended learning outcomes for a specific subject at the secondary school level. Such a resource should be intended for use by an entire class or group of students. Textbooks are often accompanied with supplementary resources that support only a limited number of curriculum expectations, outlined in the curriculum policy document for a specific subject. Such resources may be intended for use by an entire class or group of students. Examples of supplementary resources are glossaries, computer software and instructional guides.

Textbooks have the distinction of being the most dominant teaching tool in science teaching. Textbooks are commonly used as teaching materials, but not the only main material that could be employed to teach. While students can learn in different ways in different environments, learning is not limited to textbooks or in the classroom, but can take place through all sorts of learning materials and learning experiences. However, textbooks are still very important to students' learning because they are not only teaching materials used by teachers, but also self-learning resources for students to prepare before classes or to review what they have learnt in the classroom. Therefore, the manner in which a concept is presented in a textbook is very important to the in-depth learning process of that concept.

In Nigeria, the selection of science textbooks for students' use is not arbitrary. The process of textbooks selection is a responsibility assigned to the Nigerian Educational Research and Development Council (NERDC)—the think tank of the Nigerian education system, by the Federal Ministry of Education.

The Establishment and Functions of the Nigerian Educational Research and Development Council (NERDC)

The Nigerian Educational Research and Development Council (NERDC) is an agency under the Federal Ministry of Education established in 1988 by an enabling Decree No. 53 (now ACT No. 53) which merged four Educational Research and Development bodies into one organisation. The organisations that were merged include: The Nigerian Educational Research Council; Comparative Education Study

and Adaptation Centre; Nigerian Book Development Centre; and Nigerian Language Centre. The mission of the Council is to create an enabling environment in which educational research and development activities will thrive; encourage collaboration with international development partners and to also foster public private partnership in a bid to render educational research and development efforts sustainable and needs driven.

With respect to textbook development, NERDC is mandated to play a key role in book development through the Book Development Centre to ensure a vibrant reading culture among the Nigerian populace and to produce good quality books and materials; and to establish structures that will promote a vibrant reading culture. The NERDC is saddled with the responsibility to:

- Formulate and implement a national policy;
- Undertake and promote book development and local authorship;
- Encourage the expansion of local printing and publishing industry;
- Encourage a reading culture through research and other relevant activities as well as effective book distribution and strengthening of professional association of the book industry in Nigeria; and
- Serve as a centre for the exchange of information on books and related issues (NERDC, 2014).

Information to Book Suppliers/Publishers on the Procedures and Criteria for the Submission of Chemistry Textbooks

The NERDC is expected to set-up textbook selection committees to select textbooks for students' use in each of the science subjects. Membership of the committees should include teachers teaching the subjects. The textbook selection committee should provide transparent, unbiased and fair submission and selection procedures, and thereafter, recommend textbooks in order of priority when selecting textbooks for use in schools.

The submission of chemistry textbooks for evaluation and subsequent selection should follow the procedures outlined in this module. Submissions of textbooks should only be accepted from educational institutions and suppliers or publishing companies that are registered with the Association of Nigerian Publishers. Communication on submissions should be between the Federal Ministry of Education through the NERDC and the suppliers and will not involve authors directly.

The following submission procedure should be adapted for use in the submission of chemistry textbooks by suppliers/publishers for onward evaluation:

- (i) The suppliers have to submit a minimum of five copies of a printed textbook, manuscript or set of teaching and learning materials to the Office of the Chief Education Officer (CEO) of the NERDC through the Federal Ministry of Education, who is responsible for the Textbook Catalogue. The CEO will distribute the materials to the relevant subject panels/committees. It is important to note that, textbooks should not be handed directly to any member of the Panel/Committee.
- (ii) No submission will be accepted directly from an author or individual person not representing a registered bookseller or publishing company, locally or abroad.
- (iii) Copies submitted for evaluation purposes should be marked as inspection copies and will remain the property of the evaluators. Should suppliers want the submission

copies to be returned, it should be requested. The Federal Ministry of Education/NERDC will not take responsibility for losses that may occur.

(iv) A separate submission letter for every title/series should accompany the materials and should clearly state the purpose and grade(s) intended. It should also indicate the standard specification details of the final product:

- title (and series, if applicable) and author
- subject, phase and grade
- year published/revised
- ISBN number
- type of paper/material to be used
- typeface
- binding
- format
- retail price (VAT inclusive).

(v) To ensure that books are durable, to prevent continuous re-supply and to be fair to all suppliers, all books submitted should meet the following minimum requirements:

- Paper: All textbooks should be printed on at least Bond 75 gm. paper. Super 60 (60 gm) should not be used.
- Binding: Textbooks/workbooks up to 120 pages – saddle-stitched in the centre of the pages. More than 120 pages – only thread-sewn. No books with perfect binding(pages glued) should be submitted.

(vi) The following are specific requirements for manuscripts:

- The text should be typed, finally edited and provided with page numbers.
- The name(s) of the author(s) should be provided.
- A single dummy copy to exemplify the format of the book, binding, quality of paper and typeface should accompany the submission.
- The information listed under submission procedure (iv) above should be provided.

(vii) Approval of all materials submitted in manuscript form is preliminary. The material is subject to final verification of agreements between the supplier and Panel/Committee. Copies of the printed book should be submitted before the title can be placed on the Textbook Catalogue.

(viii) The deadline for submissions may be a week before the starting date of the specific Panel/Committee meeting two times per year. Confirmation of the judgment of the various evaluators will normally be reached during the next Committee meeting. Suppliers can thus expect feedback only after the meeting; following the submission date (five months later). It is therefore important to keep reliable records of materials submitted and received.

(ix) Textbooks evaluated and rejected may only be re-submitted if revision was done according to the suggestions by the Committee. Such a re-submission will be regarded as a first submission and all procedures will apply.

(x) All the textbooks should be judged according to the needs of the chemistry syllabus and school level for which it is intended. Suppliers should ensure that the textbooks submitted are in line with the content of the syllabus and the basic policies of the Ministry of Education to prevent unnecessary submissions.

(xi) It is advisable that a single book should be developed to fully cover the syllabus of a particular school level, i.e. for Senior School 1 or 2/3, and not two or three books to be used jointly for one level (Ministry of Education, 2007).

Criteria for Evaluating Contents of Chemistry Textbooks

The feedback mechanism established by the NERDC, provides the Committees opportunity to evaluate the submitted textbooks. The NERDC is expected to employ the service of the same Committee to select textbooks for students' use in each of the science subjects, in this case, chemistry textbooks. Membership of the committees should include teachers teaching the subjects. The textbook selection committee should provide transparent, unbiased and fair selection procedures, and recommend textbooks in order of priority when selecting textbooks for use in schools.

The NERDC has a responsibility to provide a list of recommended textbooks and to ensure that schools have appropriate textbooks to use when they implement chemistry and other subject curricula. While schools can make reference to the NERDC list of recommended textbooks when selecting textbooks and learning materials, it is not a compulsory requirement. Teachers can exercise their professionalism to prepare or select textbooks or curriculum resources that are not on the list of recommended textbooks in order to meet students' learning needs. Before the selection of any form of teaching/learning materials, the school should take into consideration factors that are most favourable to student learning, as well as the quality of the textbooks, the school curriculum and students' learning needs.

Before schools select printed textbooks either from the list of recommended textbooks by the NERDC or the subject teachers, the schools should work out a set of pre-determined criteria for selecting textbooks suitable for their students. The selection criteria may include the quality, language level, instructional and assessment strategies, durability, suitability for students use, among others. Teachers should exercise their professional judgment when selecting textbooks, and assign a weighting factor to each of the criteria items according to their importance. Throughout the selection process, the same set of pre-determined criteria should be adopted to avoid double standards. There are varieties of textbook evaluation instruments or tools that textbook selection committees can either adopt or adapt to select textbooks. A sample of evaluation tool considered appropriate for chemistry textbooks is provided in Appendix 1.

However, general characteristics chemistry textbooks should possess are highlighted and discussed below:

Quality

The contents must be of sound scholarship and must have contemporary relevance. The content must be presented in an adequate depth and complexity for the students' levels and should build on students' previous knowledge and skills. Graphics, such as charts, diagrams, and illustrations and photos should be used where appropriate to support students' understanding of the contents.

Reference to Use of Technology

The contents must reflect the uses of technology and be supported with student online access it related to the all the topics where appropriate, and allow

students to use and develop these skills. For instance, for contents on the periodic table, hyperlinks could be included in the textbooks for students to use to access online resources that provide further details and explanations on the properties of the elements in the periodic table.

Health and Safety

As a laboratory-based subject, adequate attention to safe practices must be reflected through appropriate warnings and information in the chemistry textbooks; portrayal or pictures of students in learning, working, and playing situations; and the suitability of the learning activities should be evident in the textbooks, so that students can imbibe safety culture.

Environmental Responsibility

The contents must reflect concepts of environmental responsibility, where appropriate, within the context of the senior secondary education. In addition to chemistry textbook contents that related to solid waste, it should be integrated in the content for students to understand the environmental damage and health hazard such non-biodegradable wastes pose to the environment and human lives when such synthetic plastics are not appropriately disposed.

Language Level

The language used must be appropriate for the reading level of the students for whom the chemistry textbooks is designed. The textbook must also be written in a style appropriate for learning chemistry. Language, symbols, and technical terms that are peculiar to chemistry must be used in contexts that students would understand. Etymological approach to learning chemical terminologies for easy and adequate comprehension of such terms.

Instructional and Assessment Strategies

The content must support a broad range of instructional strategies and learning styles. The activities must be appropriate for the skills and knowledge described in the curriculum or learning expectations. The activities must also provide opportunities for students to engage in higher-order thinking and problem solving, to apply concepts and procedures, and to communicate their understanding. There should be a range of tasks – that is, open-ended tasks, teacher-directed tasks, and tasks for students to do independently. The content and activities should be appropriate for students from diverse backgrounds and at different levels of physical ability. It should include, as appropriate, ways of helping students make connections within and between subject contents learning areas in the previous class, between the subject content and the community. The connections between instructional strategies and assessment should be meaningful and should be consistent with the assessment strategies for the subject.

Bias

The content must be free from racial, ethno-cultural, religious, regional, gender-related, or age-related bias; bias based on disability, sexual orientation, socio-economic background, occupation, political affiliation, or membership of a specific group; and bias by omission. The content of chemistry textbooks should present more than one point of view, and be free from discriminatory, exclusionary, or inappropriately value-laden language, photographs, and illustrations.

Suitability for Student Use

Textbooks must be intended primarily for use by students, rather than for use by teachers. The organization should be logical and easy to follow; so as to promote ease of comprehensibility.

Durability

Textbooks must be constructed of high-quality materials sufficiently durable to support frequent use by many students. For print materials, the size, weight, and shape of the textbook should be such that the textbook is easily transported with little risk of damage.

Conclusion

Textbooks are one of the diverse tools for the implementation of the curriculum objectives. In Nigeria, for the great majority of students, as well as their teachers, the textbook is the only accessible and affordable curriculum resource. Consequently, textbooks are the primary instruments that promote understanding-based learning and teaching of chemistry.

This chapter discussed the importance of textbooks to the learning of chemistry, and the expected guidelines the NERDC should adopt or adapt as criteria for submission of textbooks and the evaluation instrument for chemistry textbook selection for use in the Nigerians schools. This reliable and efficient process of accreditation of the textbooks is required to keep a check on purely commercial interests and to promote genuine creative textbook writing in the country that will promote authentic learning experiences.

Review Questions

1. What are textbooks and supplementary resources?
2. State the importance of textbooks to chemistry students and teachers.
3. Briefly explain the functions of the government agency saddled with the responsibility of recommending textbooks for use in schools.
4. Highlight the procedures for the submission and evaluation of textbooks for adoption

References

- Ministry of Education (2007). *Guide for the submission and evaluation of textbooks and teaching and learning materials (including digital content)*. Namibia: National Institute for Educational Development (NIED).
- Nigerian Educational Research and Development Council (2014). *About NERDC*. Retrieved May 15, 2016 from <http://www.nerdc.ng/about-nerdc/>

Appendix 1

Textbook Evaluation Instrument

All the four categories of physical characteristics, content, pedagogical aspect and language level should be completed to contribute to the final mark. Using a scale from 1 (poor) to 5 (excellent), each member of the Committee is to rate each category based on its accompanying description. Rather than assign numerical value to an item that does not apply to the textbook under consideration, simply mark N/A (not applicable) and such item should not be used in the calculation of the sub-total of that category. After completing the form, tally the ratings, so you can determine which of the textbooks receive the highest marks.

Subject:.....

Book Title:.....

Author(s):.....

Publisher:.....

1. Physical Characteristics		1	2	3	4	5
1.1	Durability: Quality of paper and binding. Is it likely that the book will be usable for 5 years? Paper: Bond 75/80 gsm. Binding: thread sewn/saddle stitch					
1.2	Typeface and size: Is the font type, including captions and labeling of illustrations clear and large enough for students intended?					
1.3	Layout and appearance: Is the book aesthetically appealing? Look at general layout, width of margins, etc.					
1.4	Cost: Is the cost reasonable compared to similar textbooks?					
Sub-total						
$\% \text{ Mark} = \frac{\text{sub-total} \times 100}{20}$						
2. Contents		1	2	3	4	5
2.1	How consistent is the approach used in the book with the syllabus?					
2.2	To what extent are relevant knowledge objectives catered for in the book?					
2.3	To what extent are relevant skills objectives catered for in the book?					
2.4	To what extent does the content reflect current knowledge and culture?					
2.5	Is the content of the book factually accurate?					
2.6	How free is the book of biases unacceptable to teachers, learners, communities and Ministry of Education policies?					
2.7	To what extent do the materials reflect the contributions and perspectives of various ethnic and cultural groups where appropriate?					
2.8	Is the book free of gender stereotypes?					
2.9	To what extent does the textbook encourage a positive attitude towards gender?					

2.10	To what extent does the book encourage a positive attitude towards environmental issues?					
2.11	To what extent does the book encourage a positive attitude towards population issues?					
Sub-total						
$\% \text{ Mark: } = \frac{\text{sub-total} \times 100}{55}$						
3. Pedagogical Aspects		1	2	3	4	5
3.1	To what extent is the content of the book likely to be clearly understood by the students who will be using it?					
3.2	How helpful are the tests and other assessment devices (such as practice exercises, end-of-chapter questions, etc) in the book likely to be to the teacher?					
3.3	How helpful are the tests and other assessment devices (such as practice exercises, end-of-chapter questions, etc) in the book likely to be to the students?					
3.4	Does the design of the textbooks allow teachers to use them differently according to the needs of different learners?					
3.5	Is the primary instructional pattern likely to help the students to achieve the syllabus objectives?					
3.6	Is the book of an appropriate length?					
3.7	Is the use of the book or material easily manageable by the teacher?					
3.8	Does the book include activities/experiments that students are capable of performing/carrying out and will find stimulating, interesting and rewarding?					
3.9	Does the book use appropriate tables, diagrams, charts, sketches and photographs to explain the content?					
3.10	Does the book contain a table of content?					
3.11	Does the book contain an adequate index?					
3.12	Is special equipment which is not readily available at all schools required in order to be able to use the book?					
Sub-total						
$\% \text{ Mark: } = \frac{\text{sub-total} \times 100}{60}$						
4. Language Levels		1	2	3	4	5
	Is the book written at an appropriate reading level for the students who will be using it?					
	Is the book written at an appropriate comprehension level for the students?					
	Are technical words or terminologies and critical concepts defined in a glossary or explained when they are first introduced in the text?					
Sub-total						

$$\% \text{ Mark: } = \frac{\text{sub-total} \times 100}{60}$$

Categories	1	2	3	4
Totals				
%				

Evaluator's Name: _____ Final Mark: = $\frac{\quad}{150}$