

METHODS OF TEACHING SCIENCE, BASIC TECHNOLOGY AND COMPUTER STUDIES



EDITED BY

Professors: I. O. Abimbola, A. S. Olorundare,
M. O. Fajemidagba, Esther O. Omosewo, S. A. Onasanya,
Dr. M. A. Fakomogbon & Dr. N. A. Adedokun-Shittu

Copyright 2016

All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the permission of the Publisher

PUBLISHED BY

FACULTY OF EDUCATION, UNIVERSITY OF ILORIN, ILORIN, NIGERIA

July, 2016

ISBN: 978-978-954-492-9



Printed by
Haytee Press and Publishing Company Nigeria Ltd
No 2, Mejindadi Street off Taiwo Rd, Ilorin Kwara State, Nigeria.
08038282074, 08033604983
email: tayo_haytee@yahoo.com

TABLE OF CONTENTS

TITLE PAGE.....	i
COPYRIGHT PAGE.....	ii
PREFACE.....	iii
SUB-COMMITTEE ON SUBJECT METHODOLOGY TEXTBOOKS.....	v
TABLE OF CONTENTS.....	vi

TEACHING SCIENCE SUBJECTS: AGRICULTURAL SCIENCE, BIOLOGY, MATHEMATICS, PHYSICS, CHEMISTRY

TEACHING AGRICULTURAL SCIENCE.....	1
------------------------------------	---

CHAPTER 1

LESSON NOTE PREPARATION IN AGRICULTURAL SCIENCE

<i>Jimoh, S.B.</i>	2
--------------------------	---

CHAPTER 2

CURRENT INNOVATIONS IN AGRICULTURE

<i>Jimoh, S.B.</i>	12
--------------------------	----

CHAPTER 3

GUIDING PRINCIPLES FOR SELECTION OF TEXTBOOKS IN AGRICULTURAL SCIENCE

<i>K.O. Afolabi</i>	16
---------------------------	----

CHAPTER 4

PROBLEMS AND PROSPECTS OF AGRICULTURAL EDUCATION IN NIGERIA

<i>K.O. Afolabi</i>	21
---------------------------	----

CHAPTER 5

METHODS OF TEACHING AGRICULTURAL SCIENCE

<i>Jimoh, S.B.</i>	25
--------------------------	----

TEACHING BIOLOGY.....	30
-----------------------	----

CHAPTER 1

AIMS AND OBJECTIVES OF TEACHING AND LEARNING BIOLOGY IN NIGERIA

<i>A.R. Ahmed</i>	33
-------------------------	----

TEACHING COMPUTER STUDIES.....	287
CHAPTER 1	
LESSON NOTE PREPARATION IN COMPUTER SCIENCE EDUCATION	
<i>Prof. M. O. Yusuf, N.A. Adedokun-Shittu Ph.D, and K. J. Muhammad.....</i>	289
CHAPTER 2	
POST ANALYSIS OF OBSERVATION AND PREVIOUS PEER TEACHING EXPERIENCES	
<i>Ogunlade, O. O. Ph.D, Amosa, A. A. Ph.D and Obielodan, O. O. Ph.D.....</i>	298
CHAPTER 3	
CRITICAL EXAMINATION OF THE COMPUTER SCIENCE CURRICULUM	
<i>N.A. Adedokun-Shittu Ph.D, Daramola F. O. Ph.D & K. J. Muhammad.....</i>	305
CHAPTER 4	
INNOVATION IN THE TEACHING OF COMPUTER SCIENCE	
<i>Nafisat Adedokun-Shittu Ph.D, Prof. M. O. Yusuf & O. O. Obielodan Ph.D.....</i>	310
CHAPTER 5	
GUIDING PRINCIPLES FOR SELECTION OF COMPUTER SCIENCE TEXTBOOKS	
<i>Prof. Samuel Onasanya, Emmanuel Adebayo Alimi & Adekola Aderoju.....</i>	314
CHAPTER 6	
PROBLEMS AND PROSPECTS OF COMPUTER SCIENCE EDUCATION	
<i>Amosa, A. A. Ph.D, Abdulrahman M. R., Oladosu, K. K., & Alasan, J. N.....</i>	319
CHAPTER 7	
METHODS OF TEACHING COMPUTER SCIENCE EDUCATION	
<i>Adegbija, M.V.Ph.D, Soetan A.K Ph.D,, Alimi, E.A. & Ibiwonke, E.S.....</i>	324

CHAPTER THREE

GUIDING PRINCIPLES FOR SELECTION OF TEXTBOOKS IN TEACHING AGRICULTURAL SCIENCE IN SECONDARY SCHOOLS

K.O.Afolabi

Introduction

A textbook is a manual of instruction in any branch of study. Textbooks are produced according to the demands of educational institutions. Textbooks and other books used in schools are only published in printed format; many are now available online as electronic books (ebooks).

Textbooks and their proper use are crucial factors in relation to a student's ability to complete a learning task. No single textbook can be ideally suitable to the interests and abilities of all learners. Choice of textbooks can be a complex and time-consuming matter. Hence, learning how to use and adapt textbooks is an important part of teachers' professional knowledge. The issue of selecting good quality books in secondary schools in Nigeria is vested on different stake holders such as: students, teachers, school committee on library, librarian, experts in a particular discipline, publishers, authors, professional associations and Ministry of Education at federal and state levels among others.

Below are the guidelines for selection of Agricultural science textbooks in secondary schools:

1.Conformity to curriculum policy and scope. This characteristic refers to coverage of the contents and objectives of the National Curriculum. Textbook selectors should thoroughly examine the Agricultural science curriculum before they select a textbook. The curriculum and its objectives should be clear and well defined. Textbooks that are appropriate in content and objectives when compared with agricultural science curriculum should be selected.

2. Coverage

The textbook that is to be chosen should cover reasonable proportion of the syllabus or scheme of work. The content of the textbook must be adequate to suit the syllabus this will prevent students from using two or three different textbooks. When some students use more than one textbook for the same subject, they might get confused because of the different styles or levels that the different authors use.

3. Exercises

Exercises should be provided at the end of each section or chapter, so that the students can test themselves. They will discover whether they understand the concepts of that chapter, or whether they are weak in a particular area and need to revise.

4. Vocabulary/Suitable Language

Having the relevant content is good, but it is useless to the students if the information in the textbook is unclear or difficult to understand. Hence, a simple and clear language should be used to present information in the textbooks.

5. Referencing/References.

Textbooks should have glossary, index, appendix, and table of content. The glossary should have all the terminology used in the chapters. Hence, provide a good and easy source to locate important areas in the textbook. This will provide a quick reference for additional information on the subject.

6. Horizontal and Vertical Alignment of the Text.

Agricultural science textbooks should have horizontal and vertical alignment with other textbooks of the same grade; there should be logical links in the content presented within and among the chapters/units.

7. Acceptability. This characteristic is about students' diverse' environment and socio-economic background. Agricultural science textbooks should contain relevant examples related to students' daily life, quality of paper, printing and binding of the book, authors' credentials and attractiveness of the title makes text books to be acceptable.

8. Text Reliability. It refers to accuracy of the content and data, adequacy of the content, historical correctness of the facts and figures.

9. Cognitive Development and Creative Thinking. This characteristic refers to the nature, relevance and level of learning activities included in the textbook. Activities given in the textbooks are according to students' developmental level and the content is helpful in developing thinking skills in the students.

10. Learning and Assessment. This characteristic refers to difficulty and understanding level of end of chapter assessments and alignment with objectives of the National Curriculum. End of chapter assessments are according to the content matter given in the textbook and to student's mental development level.

10. Bias Free. Good quality textbooks should consider gender equality, exclusion of creeds and areas, and biasness with respect to women, minorities and disable persons.

11 . Accessibility - Before selecting a text, it is important to know what books are currently on the market.

12. Affordability – Agricultural textbooks should be affordable in terms of price

13. Readability:- This is about the clarity and font size used to present informations in the textbooks. In cases where diagrams are required, it is better they are presented in colour so as to distinguish the various parts that are involved in the diagram

Characteristics of Textbook

A good agricultural science textbook has the following characteristics:

Accuracy: The text-books should be accurately written. They should present the subject-matter in such a manner that there is no fault in them. The subject-matter, presented therein should be up to date.

Complimentary: The text-books of different stages should be complimentary to each other. Text-books that are used in primary classes should have some bearing and connection with the text-books that shall be used by the students in the junior secondary or upper basic classes.

Revision Question: At the end of every chapter of the text-book there should be certain questions that may be used for the revision of the subject-matter. Without these questions the text-books shall not be useful.

Contents Coverage: The textbook should cover the requirements of the syllabus or scheme of work for which it is intended. They should in addition contain ideas and experiments relating to the syllabus.

Illustration: The text-books should contain charts, maps, diagrams etc. as and where required.

Presentation and Lay out: The subject-matter should be presented in a simple and lucid style and clear form. The textbook should be attractive of convenient size and strongly bound.

Currency : A science textbook should present the most up-to-date knowledge on the subject. Recent findings should be included while outdated information should be updated

Suitable Language: The language used in explaining facts in the textbook should be clear and simple enough for the students to read and understand.

Coherence : Explanation on each topic should be set out in a logical order. There should be a sequential development of an idea from simple to complex level.

Bibliography : This is essential, especially for senior secondary and junior secondary levels so that the students will know where to refer for additional information on the subject.

Indexes : This is important as it aids the reader to locate specific information without reading through the whole text.

Advantages of Textbook.

The use of textbooks in teaching has both advantages and disadvantages, depending on how they are used and the contexts for their use. Among the principal advantages are:

1. Textbooks are especially helpful for beginning teachers and the learners. The material to be covered and the design of each lesson are carefully spelled out in detail.
2. Textbooks provide organized units of work. A textbook provides information on what you need to cover a topic in detail. Hence, guides the teacher as to what should be included in the lesson plan.
3. A textbook series provides you with a balanced, chronological presentation of information.
4. Textbooks also show detailed sequence of teaching procedures that tell you what to do and when to do it.
5. Textbooks provide administrators and teachers with a complete programme. The series is typically based on the latest research and findings on various topics.
6. Good textbooks are excellent teaching aids. They are a resource for both teachers and students.
7. They help standardize instruction. The use of textbook in a programme can ensure that the students in different classes receive similar content and therefore can be tested in the same way.
8. They maintain quality. A well developed textbook may serve primarily to supplement the teacher's instruction as good textbooks are written according to the objectives of the national curriculum.
9. They provide a variety of learning resources. Textbooks are often accompanied by workbooks, CDs and cassettes, videos, CD ROMs, and comprehensive teaching guides, providing a rich and varied resource for teachers and learners.
10. They are efficient. They save teachers' time, enabling teachers to devote time to teaching rather than material's production.

11. They can assist teachers with adequate information. If teachers have limited teaching experience, a textbook together with the teacher's manual can serve as a medium of initial teacher training. In the case of inexperienced teachers, textbooks may also serve as a form of teacher training because they provide ideas on how to plan and teach lessons as well as formats that teachers can use.
12. Textbook writers keep up-to-date with the research in a particular subject area, which means that teachers and students are presented with the most valuable information in that subject field.
13. Commercial textbooks usually have high standards of design and production and hence are appealing to learners and teachers

Disadvantages of Textbooks/Limitation of Textbooks

Text books may be well-written but pose several limitations to the users. For example:

- 1. They may distort content.**

Textbooks often present an idealized view of the world or fail to represent real issues. In order to make textbooks acceptable in many different contexts controversial topics are avoided.

- 2. They may not reflect students' needs.**

Since textbooks are often written for global markets they often do not reflect the interests and needs of students and hence may require adaptation (commercial textbooks)

- 3. They are expensive**

Commercial textbooks may represent a financial burden for students mostly in developing world where ICT and e-learning has not been fully adopted.

Review Questions

1. What is textbook ?
2. Discuss five (5) factors to be considered in selecting good textbooks for senior secondary school in agricultural science
3. State seven (7) characteristics of a good agricultural science textbook
4. List 5 advantages and 3 disadvantages of using textbooks as a professional teacher.
- 5 Evaluate and recommend two agricultural science textbooks to Kwara State Ministry Education for use in next academic session.

References

- Alexander, P. A., & Kulikowich, J. M. (1994). A secondary analysis: Learning from physics text. *Journal of Research in Science Teaching*, 31, 895–911.
- All-Wright, R.L. (1999). What do we want teaching materials for? In R. Rossner & R.Bolitho (Eds.). *Currents in language teaching*. Oxford: Oxford University Press.
- Anaekwe, M.C.; Nzelum, V.N.; Olisakwe, S.I. and Okpala, J.U. (2010). Principle and Methods of Science Education. Sofie Publicity Ltd , Onitsha.
- Ansary, H., & Babaii, E. (2002). Universal Characteristics of EFL/ESL Textbooks: A Step Towards Systematic Textbook Evaluation. *The Internet TESL Journal*, VIII (2). Retrieved June 21, 2005, from <http://iteslj.org/Articles/Ansary-Textbooks>
- BBC (2005) Khan, A.A. *US concern at Pakistan textbooks*. Retrieved July 27, 2009 from http://news.bbc.co.uk/2/hi/south_asia/4167260.stm Mahmood 182
- Cunningsworth, A (1995). *Choosing Your Course Book*. London: Heinmann Educational Books.
- Daily Dawn (2004, April 18) Alam, M. *Our tribal cross. The textbook controversy and the official response Textbook mess - question marks galore Great crosses of Lahor.*
- Daily -The Nation (2004). *Govt. to provide free textbooks from next year.*
- Gillani, W. *Curriculum controversy: Education Ministry and Textbook Board blames each other*
- Government of Pakistan (2007). *National Textbook and Learning Materials Policy and Plan of*
- Journal of Research and Reflections in Education* ,December 2011, Vol.5, No.2, pp 170 -190 <http://www.ue.edu.pk/jrre>
- Nelson, O.O.(2013). Classroom Organization and Management Issues, Principles & Practices. Meks Publishers (Nig).