

Basic Technology Textbooks in Nigerian Secondary Schools: A Quality and Content Analysis

Blessing F. Adeoye and Oladiran S. Olabiyi
University of Lagos, Nigeria

Abstract

The textbooks used in basic technology courses in Nigerian secondary schools serve several important purposes. They define the boundaries of content, the order in which specific topics are taught and their presentation. They are also a source for problem-solving, explanation-giving, and a means of connecting students with emerging technologies. This study explores five basic technology textbooks used in Nigerian schools to determine the extent to which they reflect national educational policy objectives and enable student learning. The analysis suggests that, while there are similarities in topics covered and overall content, the textbooks differ substantially in how they approach the subject matter. Some textbooks are long, well-indexed, and comprehensive. Others are shorter and more concise, emphasizing select topics while mentioning others briefly. Overall, the five textbooks responded well to the objectives found in the Nigerian guidelines on education. The researchers recommend that technology textbooks contain supplementary materials—for example, activity manuals, websites, and CD-ROMs—to make learning more effective. Review panels including teachers, educators, and curriculum content specialists should be periodically constituted to review basic technology textbooks.

Background: Technical and Vocational Education in Nigerian Secondary Schools

Nigeria, a country on the West Coast of Africa, with an estimated population of 140 million, is the most populous of all sub-Saharan African nations. It occupies a landmass of about 923,768 square kilometers; its population is very ethnically diverse, with more than 270 different ethnic groups. Nigeria is one of the emerging democracies in Africa, having had continuous democratic political governance since 1999. Nigeria is bordered by the Republics of Benin, Niger and Cameroon to the west, north and east, respectively.

Nigerian society like other societies is a learning society and the learning process is constantly changing. At times education proceeds on its own dynamics. Also, as in other parts of the world, Nigeria is making serious efforts to establish and systematically improve the teaching of technical and vocational education and training (TVET).

Technical and vocational education systems in Africa differ from country to country and are delivered at different levels in different types of institutions, including

technical and vocational schools (both public and private), polytechnics, enterprises, and apprenticeship training centers. In West Africa in particular, traditional apprenticeship offers the largest opportunity for the acquisition of employable skills in the informal sector. In Ghana, the informal sector accounts for more than 90 percent of all skills training in the country. In all of Sub-Saharan Africa, formal TVET programs are school-based. In some countries, training models follow those of the colonial power. In general however, students enter the vocational education track at the end of primary school, corresponding to 6 – 8 years of education as in countries like Burkina Faso and Kenya, or at the end of lower or junior secondary school, which corresponds to 9 – 12 years of what is called basic education in countries like Ghana, Nigeria, Mali and Swaziland. The duration of school-based technical and vocational education is between three and six years, depending on the country and the model. In an attempt to expose young people to pre-employment skills some countries like Ghana, Senegal and Swaziland have incorporated basic vocational skills into their lower or junior secondary school curriculum (Meeting of the Bureau of the Conference of Ministers of Education of the African Union [(COMEDAF II+) 2007]).

There are five types of TVET institutions in Nigeria outside the universities: the pre-vocational and vocational schools at post-primary level; and technical colleges, polytechnics and technical teacher education colleges at the post-secondary level. Pre-vocational education conveys basic vocational skills for primary school pupils. Vocational schools also impart vocational skills but focus on the secondary school age group. The technical colleges teach elementary level vocational skills. The polytechnics and technical teacher education colleges are the main tertiary-level TVET institutions with the latter focused on producing instructors for TVET institutions (African Economic Outlook 2008).

As noted in the African Economic Outlook (2008), instances of technical training pre-date modern education in Nigeria. The apprenticeship system had long trained youth in smiting, weaving, pottery, wood-carving, farming, basketry and a multiplicity of other local handicrafts, prior to independence. The Yaba College of Technology, established in 1932, was Nigeria's earliest formal TVET institution at the tertiary level. For many, the history of TVET in sub Saharan Africa and in Nigeria is dominated by a lack of effectiveness (African Economic Outlook 2008). Some of this is seen in the lack of funding and low teaching salaries, which are more constraining for TVET than for the rest of the educational system. TVET is looked down upon in Nigerian society as a low-status track. Vocational schools are mainly operated by state governments with little participation by the federal government. TVET constitutes only about 1 per cent of total educational enrolment with female participation averaging about one third. Informal TVET in Nigeria is pervasive but poorly documented.

In public institutions, teaching materials are considered less adequate and the teachers are less competent than their private sector counterparts, although there are substantial variations in quality (African Economic Outlook 2008). Private institutions

have more useful programmes with trained and experienced staff and higher quality equipment. Students in private schools learn practical skills in metalwork, woodwork, electricity, petroleum technology and refining, automobile, carpentry, painting etc. Foreign companies, such as Shell, Leventis and UAC, among others, offer technical training courses for their employees.

In 1982, the new educational system was established, which consists of 6 years primary, 6 years secondary, and 4 years tertiary. In 1999, compulsory and free basic education was launched in schools by the then President of Nigeria (President Olusegun Obasanjo), which is 9 years duration comprising of 6 years of primary education and 3 years of junior secondary education.

According to the Education for all (2000), gross primary school enrollment has declined in Nigeria from approximately 86.2 percent in 1993 to 70.3 percent in 1996. Dropout rates for both males and females in primary school remained high, around 10 to 15 percent between 1990 and 1994 for each level of education. Only 64 percent of the students in primary school completed grade five, and only 43.5 percent continued on to junior secondary school. Also, the report revealed that school quality has reportedly deteriorated in Nigeria, and recent school reforms have been slow to take effect. Teachers are not well trained and are poorly paid, making them less motivated and contributing to poor or irregular school attendance among children.

Among the goals of secondary education according to the National Policy on Education (FGN 2004) are to:

- (i) provide all primary school leavers with the opportunity for education of a higher level,
- (ii) provide trained manpower in the applied science, technology and commerce at sub-professional grades,
- (iii) provide technical knowledge and vocational skills necessary for agricultural, industrial, commercial and economic development.

These goals are still valid today. To achieve the goals, the junior secondary education is both pre-vocational and academic, and is meant to be tuition free, universal and compulsory; however, many students apply to technical schools today when they cannot gain admission to non-technical higher institutions. In fact, they have to pay higher schools fees in all higher institutions and the education is not compulsory at that level. It was meant to teach basic subjects such as basic science, mathematics, and English language, which enable students to acquire further knowledge and skills. All students in junior secondary school are expected to take a minimum of ten and maximum of thirteen subjects. Basic technology is one of the core and compulsory subjects offered at junior secondary school level.

In the junior secondary curriculum basic technology includes a broad range of fields of study and subjects such as auto mechanics, applied electricity, building, ceramics, metal work, woodwork, plastics, rubber, food preservation, storage, technical drawing and other miscellaneous topics. The basic technology course is meant to provide a holistic view of

technology to students. The subject guidelines and contents have been carefully structured into a teaching sequence, which consists of clear explanations and descriptions of how results are obtained by using different tools, machines and materials. Basic technology is also a skill development course, which aims at providing students with technical literacy for everyday life. According to Nigeria's Federal core curriculum, the objectives of basic technology are to:

- (i) provide pre-vocational orientation for further training in technology;
- (ii) provide basic technological literacy for everyday living; and
- (iii) stimulate creativity.

Basic technology at this level is also meant to provide basic knowledge about industrial technology. It is designed to develop in students an appreciation of technology and an interest in specific areas of industrial technology. On completion of junior secondary school, according to FGN (2004), students are streamed into: (i) senior secondary school; (ii) technical college; (iii) an out-of-school vocational training center; and (iv) an apprenticeship scheme. This is based on results from the Junior Secondary School Certificate Examination (JSSCE), whose purpose is to determine their academic ability, aptitude and vocational interests.

The curriculum used to teach the subject of 'Basic Technology' was developed by various subject specialists. For instance, those who studied electrical and electronics were asked to write chapters or textbooks related to the subject, those who studied architecture and building focused on related subjects, and those who studied engineering were asked to contribute to engineering related subjects. Most are controlled by Nigerian Educational Research and Development Council (NERDC). The review of the textbook is usually carried out after five years.

The textbooks used in teaching basic technology in schools are an important source of course content. A textbook can be used to define the boundaries of content, the order in which specific topics are taught and, most importantly, how they are presented. In technology classes, a textbook can be a source for problems solving, explanations, and a means of connecting the students with the emerging technologies. For several reasons, it seems that textbooks significantly influence the content and emphasis of courses teaching about technology in classes for elementary teachers.

The Problem, Rationale and Objectives of This Study

The supervision and control of information and ideas found in textbooks, and other printed materials for students, are very important. There is a clear need to carefully analyze textbooks, journals, and other communication media for the purpose of uncovering parts thought to be dated, offensive or irrelevant. Objectionable material may even be considered inappropriate, immoral, or injurious to the national development. Thus an important rationale for a content analysis of textbooks is to improve the quality of the contents conveyed by the schools to students.

While high-quality textbooks and learning materials are especially important for students, they may contain incorrect technology-related information. For instance, many researchers have found that some textbooks contain factually incorrect information. One study found that eight of South Korea's elementary, middle, and high school textbooks contain incorrect information (Schwartzman 2008). Another study reviewed analytical studies about the contents of health textbooks used in elementary, junior high, or high schools in some 14 countries and found that several current textbooks provide insufficient content and contain inaccurate or out-of-date health information (Nomoto, Nonaka, Mizoue, Kobayashi and Jimba 2011).

With few exceptions (Raven 2006), there is no up to date study of the quality of basic technology textbooks used in Nigeria and the extent to which they enable students to acquire the intended curricular contents. There is also a need to examine whether the technology textbooks are: easy to read and easily comprehend, help students develop a basic orientation to the technological world and describe a range of student activities. The analysis reported in this paper attempts to fill these knowledge gaps. The purpose of the current study is not to promote a particular textbook, but rather to determine whether each one meets established quality standards and is suitable for teaching and learning vocational skills. In short, this study explores basic technology textbooks used in Nigerian secondary schools to determine the extent to which they meet the objectives set forth in the national educational policy guidelines and enable effective student learning.

This study initially assumed that basic technology classes have often been taught by teachers with little experience in technology. To the extent this is true, then teachers may utilize technology textbooks to simply "get through" the semester. There are also indications that cultural understandings are embedded within the design of a textbook, which might have been overlooked. Based on these assumptions, this study examines basic technology textbooks as a step in understanding what kind of technology is being taught to secondary schools students in Nigeria.

Literature Review

Usability refers to a measure of the quality of the user experience when interacting with, for example, a website, a textbook, traditional software application, or any device that users can operate in some way or another. It is often the most neglected aspect of a design, yet it is one of the most important aspects (Nielsen 1997a; 1997b). Usability problems may arise due to behavioral and cultural differences of users. In textbooks, variation is found in relation to color, graphics, phrases, icons, character sets, pictures, symbols, date and time format, and so forth (Onibere et al. 2000). Readers from different cultures, age groups, and social backgrounds may understand the same information presented in a textbook in rather different ways (Adeoye 2004). Specific metaphors, symbols, and appearance may be misunderstood and provoke some readers to be confused, or even offended.

The importance of embedding cultural awareness within the design of a textbook should not be overlooked. For learning to be effective, it must be adapted to the cultural context of the learners (Swierczek and Bechter 2008). There are cultural differences in perceptions of technology, the names and usage of technological terms, and the level of technological literacy across cultures (Adeoye 2004). The concept of media culture encompasses not simply symbolic combinations of immaterial signs or capricious currents of old and new meanings, but an entire way of life in which images, signs, texts and other audio-visual representations are connected with the real fabric of material realities, symbols and artificialities (World Youth Report 2003).

One of the major educational resources required for teaching and learning of basic technology in Nigerian junior secondary schools is quality textbooks (FGN 2004). Basic technology requires the use of textbooks to achieve its objectives as enshrined in the national policy on education. A textbook according to Jones (2007) is a book that contains information about a subject that student's study. Also, it is a book that students use regularly during a set of lessons, textbooks treat subject comprehensively and is used by students as a basis for study. To achieve the stated objectives of the subject of Basic Technology, students and teachers need comprehensive textbooks, which will serve as a guide. In some secondary schools in Nigeria, they lack the recommended textbooks. In such contexts, teachers teach either with their notes or end up without the use of any text. Well -organized textbooks thus assist students to effectively comprehend the intended contents of the subject.

Basic technology textbooks are prepared by those who have expertise in particular subjects since they cover different technological areas related to, for example, the automobile, building, metalwork, wood, ceramics, rubber, plastics, electrical and technical drawing. These textbooks are prepared in line with the curriculum content guidelines prepared by the Nigeria Educational Research Development Council (NERDC), which are recommended by the Federal Ministry of Education and various state ministries of education.

According to Abdul-Wahab and Afeti (2009), there is a dearth of textbooks in all developing countries. Students rely mostly on simple handouts or verbal lectures. Many teachers have access to inadequate or outdated resources. Poorly trained teachers are in a weak position to produce the teaching material they are expected to deliver. Imported textbooks are too expensive and not suitable for the curricula. Local capacity for textbook writing is not mobilized. Only a few countries have dedicated technical teacher training institutions (Ivory Coast, Namibia, Ghana, Nigeria, Burkina Faso)

Okoro (1999) found that some textbooks lack the required contents, since authors have not carried out a comprehensive review of a field before writing the textbook. Many textbooks also lack student-centered activities. In some cases authors did not publish their textbooks with reputable publishers and thus received little advice on how the books can be improved to meet subject objectives. With non-reputable publishers, quality suffers. It is pertinent to carry out the analysis of the procedure of writing textbooks used in

teaching textbooks and the level of coverage required when preparing a textbook for both teachers and students use. A detailed and systematic examination of textbooks should help draw relevant conclusions for improvement. It could be further explained to mean the separation of textbook into its components in order to identify what it contains, to examine individual parts, or to study the whole structure.

Methods

Two guides were developed for this study: an interview guide and a textbook analysis guide. The interview guide consists of five items that collect demographic data about the teachers who teach the basic technology courses and about the textbooks they use in their respective schools. The textbook analysis guide consists of 25 items. These items are framed under the following headings: textbook as a material object, the structure of the textbook, the textbook as a product in the market, the textbook as a product of the author's mind, the textbook as a communication tool, the textbook in a social context, and the textbook as a work of art. These two instruments were pilot tested with a group of students and revised several times before being administered.

Two lecturers from the Department of Science and Technology Education analyzed the five basic technology textbooks, applying the revised guides, and specifying the following items and topics:

- i) author(s) and publication year
- ii) country where published
- iii) target country
- iv) topics included
- v) school/grade level
- vi) cultural elements noted

Advanced "power tools" that seek to "open up" a text, initially developed by Williamson (2005), were modified in this analysis. These tools basically involve "taking something apart," in order to understand it better by considering its component parts separately, as well as together. The three components of this strategy included: analyze the text as a material object, analyze the text as a work of art, and analyze and respond to the text from your own personal viewpoint as an individual reader. In addition, other design elements such as images, symbols, language, and icons are incorporated in the analysis.

Table 1 presents basic publication information about the textbooks currently being used in Nigerian Junior Secondary Schools. For each textbook the table lists the author, publisher, the number of pages and the secondary schools that use them. The Federal and the State governments of Nigeria did not require the use of a particular textbook for any school; however, they made recommendations as to the textbooks to be used.

Table 1: Basic publication information about each technology textbook used in Nigeria secondary schools

	Textbooks	Author(s)	Publisher	Pages	Schools in use
1	Introductory Technology For Junior Secondary Schools.	Godswill Obioma & Chinyere Nwagbara.	NERDC/ Longman	115	<ol style="list-style-type: none"> 1. Straitgate College, Magodo. 2. Majos Int. Sch. Mushin. 3. Lagooz College, Agege. 4. Al-Wasi Children Sch. 5. Jonsong Int. Sch. 6. Prince Heir College. 7. Vivian Fowler Mem. College. 8. Creative Academy Sec. Sch.
2	Basic Technology For Junior Secondary Schools.	Elekwa, Bamiro, Oluyide, Ladoye, Nurudeen, Akuru, Okorie, Onyedinda.	Evans Brothers Limited.	139	<ol style="list-style-type: none"> 1. Stee Int. Sch. Festac Town. 2. Aje Comp. Sch. Yaba. 3. Bariga Grammar Sch. 4. Itire Com. Sch., Surulere Lagos. 5. Brightville College, Oshodi. 6. Girls Jun. Sec. Sch. Obalende. 7. Government College, Ikorodu. 8. Great Esteem Sec. Sch. Surulere. 9. Nigeria Navy Sec. Sch. Ojo. 10. Epe Girls Jun. Sec. Sch. Epe. 11. Aunty Joy Sec. Sch. Ikorodu. 12. Primelight Sec. Sch. Ikorodu. 13. National College, Gbagada Phase 2. 14. Shepherd Arena College, Ojota. 15. Radiant Sec. Sch. Festac Town.
3	New Basic Technology For Junior Secondary Schools.	Olatunji Philip, Owolabi Kayode, Adubi Victor.		300	Wellspring College.
4	Basic Introductory Technology.	P.O. Olawehinmi		190	Glorious Victory Sch. Ejigbo.
5	NERDC Basic Technology 2 for Junior Secondary Schools; UBE edition				Many schools are using this book across the Nigeria

Participants

During the second semester of 2010/2011, student teachers from the Distance Learning Institute, and students enrolled in Educational Technology course at the University of Lagos students, were recruited as participants in this study. Most of the participants (70%) are teachers from secondary schools around Lagos State. Most teach Science and Technology subjects in their schools. They consist of 60% female and 40% male. All of them were enrolled at the University of Lagos Distance Learning Educational Program. They initially came together as a focus group and were asked the following questions about the textbooks they used in their respective schools:

1. What textbooks do you use to teach basic technology in your secondary school?
2. What criteria are used for selecting the textbooks? Who chooses the basic technology textbooks?
3. How would you characterize these textbooks? In what ways are the technology textbooks different from the previous generation of books (written primarily by technology teachers)?
4. What challenges of teaching technology and of teacher knowledge for such teaching are reflected in the selected books?
5. What are the cultural elements observed in the textbooks?
6. What are the effects of the cultural elements on the students?

They are also asked to submit copies of the technology textbooks in use in their respective schools. In total five different books were submitted. To analyze each book the researchers used the guide developed for textbook analysis (see Appendix A).

Results: Analysis of the Five Basic Technology Textbooks

1. Introductory technology for schools and colleges book 1

Authors: O. A. Bamiro, A. O. Oluyide, D.L. Ladoye, A. Nurudeen, I.O. Akuru and O.L. Olopade

Date of publication: 2003; Publisher: Evans Brothers (Nigeria publishers limited, Jericho Ibadan).

Textbook as a material object - The book's target audience is first-year students in junior secondary education (now basic seven). The authors seek to encourage students to understand that they are living in a world of technology where people continue to search for ways and means to make life more comfortable for themselves. They also want students to understand and be able to adapt technology to their own environments and continue to improve upon it. According to these authors, technology involves the academic and practical study of materials, sources of energy and natural phenomena with the ultimate intention of applying this to service of man. The textbook was basically written to introduce students to the technological world at the beginning of their secondary school education. The book was written by several authors, each with an expertise in

a different area of technology. This helps in presenting the topics in a way that make learning pleasurable. Illustrations such as pictures of actual performance of experiments, handling of hand tools, activities in school workshops, and other real situations, were included to attract and motivate students to learn.

Structure of textbook - The textbook is well organized and divided into chapters. Each chapter is organized around a topic with its subject matter addressed the contents and specific objectives in line with the comparative education studies and adaptation center (CESAC) syllabus. The textbook is written in such a simple language in order to make the book almost self-instructional. Local names and situations are employed where appropriate to enhance relevance. New terminologies are emphasized and clearly explained for ease of understanding. A summary of the important points covered in each chapter is given. The book also lists key words, together with their meaning, at the end of each chapter in order to increase the technical vocabulary of both students and teachers. Some exercises are also provided at end of each chapter to provide quick test that the textbook covered. Such exercises can be done either in class or by each individual student.

Textbook as a product in market - At 141 pages the textbook is neither too long nor too short. The pages include pictures of materials, hand tools and practical demonstration of operations. The textbook is highly technical since the authors are experts in their respective areas of specializations. However some of the contents could be “political” since most authors do not teach in secondary schools and are unfamiliar with the level of understanding and age of the students using the books. The physical form and appearance of the textbook is quite good and attractive to read. The textbook is written to assist students in understanding materials, hand tools, processing of materials. Also it attempts to help students understand the roles technology plays in society and what contributions they could make.

2. Introductory technology for schools and colleges book II

Authors: O.A. Bamiro, A.O. Oluyide, D.L. Ladoye, A. Nurudeen, I.O. Akuru and O.L. Olopade

Date of publication: 1999; Publisher: Evans Brothers (Nigeria publishers limited, Jericho Ibadan).

The textbook was written for students in the second grade of junior secondary schools. The authors believe that lack of a proper technological orientation in Nigeria’s educational program is responsible for the extent to which the country is pinched by an economic recession. The authors also believe that if Nigeria had introduced technical subjects earlier in the secondary school education and the country would not have been spending her scarce foreign exchange in importing goods to the country. The textbook was written with an intention to fill the gap in the country’s educational program that is, inculcating in our teenagers the habit of seeing technology as what they can and should develop on their own with the resources available in our environment. The authors hope that, in reading the textbook, Nigerian youth will adopt a positive attitude towards the

development of technology. The authors provide a useful means of ascertaining the understanding of concepts covered in each unit.

Structure of textbook - The textbook is divided into 18 units. Each unit is organized around a topic with the subject matter and its treatment based upon the contents and specific objectives in line with the Nigeria Educational Research Development Council (NERDC) syllabus prepared to teach basic technology. The textbook was written in a very simple and familiar language. New concepts and technical words used are clearly explained either in the main unit or in the list of new words that follows each unit. The textbook is 151 pages in length. Colored pictures and illustrative diagrams are copiously used to further simplify the understanding of the concepts presented in the textbook. Also, it provides a useful means of ascertaining the understanding of fundamental concepts covered in each unit.

3. Introductory technology for schools and colleges book 11

Authors: O. A. Bamiro, I. Elekwa, C. A. Okolie and A.C. B. Onyedinma

Date of publication: 2005; Publisher: Evans Brothers (Nigeria publishers limited, Jericho Ibadan).

This textbook is the revised version of the previous book II published in 1999. This edition has been informed by the need to take cognizance of the feedback from teachers, students, and other stakeholders involved in the use of the textbook. Also, it responds to the urgent need of the use of computer and information technology. Basic technology in our junior secondary schools was considered essential in the past, it is now compulsory as an instrument for the preparation of our youth to face the unfolding challenges of this digital age. In recognitions of these facts, the authors further simplified and modified the contents of the textbooks. Most of the excellent illustrations of real situations in previous editions are retained while some others have been added to further attract and motivate students.

Structure of the textbook -The textbook is organized and divided into 19 chapters. Each chapter is organized around a topic and relevant subject matter, based on the contents and specific objectives of the NERDC syllabus on basic technology. The textbook was written in a very simple and familiar language. New concepts and technical words used are clearly explained either in the main unit or in the list of new words that follows each unit. Colored pictures and illustrative diagrams are copiously used to further simplify the understanding of the textbook. Also, it provides a useful and relaxing means of ascertaining the understanding of fundamental points covered in each chapter. New concepts and technical words used are clearly explained either in the main unit or in the list of new words that follows each unit. The textbook is about 151 pages. Book one is a general introduction to some areas within the field of technology. Book two was an improvement upon the contents of book one in the areas of technical drawing, metal work, woodwork, basic electricity, and introduction to computer.

4. Introductory technology for schools and colleges book III

Authors: O.A. Bamiro, A. Nurudeen and I. O. Akuru

Date of publication: 1998; Publisher: Evans Brothers (Nigeria publishers limited, Jericho Ibadan).

Book three introduced students to other areas of technology that deal with technical drawing, motions system, and transmission of electricity, fittings, machine wood working, wood finishing, general wood work and metal work project. The book is organized and divided into 21 chapters around a topic with the subject matter and its treatment based upon the contents and specific objectives in line with the NERDC syllabus prepared to teach basic technology. The textbook was written in a very simple and familiar language.

5. NERDC Basic Technology 2 for Junior Secondary Schools; UBE edition

NERD constituted a panel of reviewers across different subjects, including teachers, teacher educators, and curriculum content specialists, who have considerable experience in textbook development.

This textbook was different from the rest of the textbooks analyzed because it was designed to respond to the ideals of the Millennium Development Goals, goals of Education for all well as the National Economic Empowerment and Development Strategy. The National Council on Education at its meeting in 2005 approved a new Basic Education Curriculum structure for primary and junior secondary schools in line with the Universal Basic Education Programme.

Choosing the right textbook for courses is often not as clear and straightforward as one hoped or assumed. Depending on the students' degree of reliance on the textbook to acquire course content, the wrong one can confound learning, waste class time, skew information, pauperize students (or provide inadequate return on investment), and even sabotage instructional goals. This study revealed important issues to pay attention to when analyzing a technology textbook. The following is the summary of the findings.

Summary

1. Along with many other technology teachers, some of these authors believe strongly that if technology is clearly and correctly explained, students can and will learn basic technology effectively.
2. Analysis of the five basic technology textbooks suggests that while there are many similarities in topics and overall content, they differ substantially in how they approach the subject matter.
3. Some textbooks are long, well indexed, and comprehensive.
4. Some are shorter and more concise, not aiming to cover all bases, but rather giving emphasis to some topics while mentioning others only briefly.
5. Some textbooks are more narrative in their approach to technology.
6. The five books responded well to the objectives as enshrined in the national policy on

education in Nigeria; they enable students to learn effectively.

Below is a summary of the responses to the five questions posed to the participants.

Question 1 - What textbooks are being used for teaching basic technology in junior secondary schools?

Five common textbooks were found in many secondary schools in Nigeria. Although some private schools use additional textbooks, the most popular textbooks have been selected for the purpose of this analysis (See Table 1).

Question 2 - What are the criteria used for selecting the textbooks and who chooses the basic technology textbooks?

Some schools selected the textbooks based on word of mouth as well as testimonies from other schools. It is important to note that these textbooks are not imposed but recommended by the Federal Ministry of Education and the state ministries of education in their respective states.

Question 3 - How can these textbooks be characterized? In what ways are the basic technology textbooks different from the previous generation of books (written primarily by technology teachers)?

The textbooks used by the previous generation were lower quality: they had only black and white illustrations, many of which were unclear. The content areas covered in the earlier books were vocational skills and tools used for vocational work. Information and communication technologies and emerging technologies were missing in most of them. Most recent books are multi-authored texts drawing on expertise in different areas of technology, which helps in presenting topics in a diverse way.

Question 4 - What challenges of teaching basic technology and of teacher knowledge for such teaching are reflected in the selected books?

The greatest challenge of many technology textbooks is keeping it current in an ever changing marketplace because constant technological changes. This is true for all the five books analyzed in this study.

Question 5 - What are the cultural elements observed in the textbooks? What are the effects of the cultural elements on the students?

There is no embedded cultural awareness within the design of the textbooks. A combination of line drawings, clip arts and a few photographs from the locality were used. There was no effect of the cultural elements on the students.

Conclusion

The textbooks were classified according to the amount of topic information they contained, the accuracy of the technology information provided, and the ICT priorities conveyed. The findings of the analyses undertaken in this study can be summarized as follows: some current school textbooks provide insufficient content and contain inaccurate or out-of-date technology information. This study found through technology-related content analysis of the school textbooks that textbooks in the Western world cover emerging technology more often than do basic textbooks in Nigeria.

The first assumption that basic technology classes are often taught by teachers with little experience in technology found not to be true based on our analysis. Although many of the authors have experiences in technology, they are not technology teachers. Also, there was no evidence to support the assumption that some cultural awareness is embedded within the design of Nigerian textbooks. Our analysis revealed that majority of the authors has the same cultural orientations with the students who use the textbooks. Although they differ in ethnicity, the differences did not affect the content of their textbooks.

Recommendations

In the overall analysis of the five textbooks, it is clear that the books are similar in their purpose but differ in their design. Most of the books are encyclopedic, including every possible topic that might be covered at senior secondary levels. Basic technology textbooks should be well indexed, and comprehensive. They typically should have supplementary materials such as activity manuals, websites, and CD-ROMS. Also, although most of the textbooks are of high quality standards and met the needs of learners and teachers, just like NERD did, panel of reviewers across the subjects from schoolteachers, educators, and curriculum content specialists should be constituted to review periodically basic technology textbooks.

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Appendix A: Guiding Questions Used for Textbook Analysis

Textbook as a material object

1. Who is the intended audience?
2. What is the author trying to persuade the audience to believe or do?
3. What evidence is used to support the argument of the textbook?

The structure of the textbook

4. Is it well organized?

5. How are the chapters and sections divided?
6. What sort of language and imagery does the textbook contain?

The textbook as a product in the market

7. How long or short is the textbook (and is it too long or too short? Why?).
8. How attractive is the physical form and appearance of the textbook (cover, printing, type-faces, etc.)?
9. Why was this textbook written or published, and how well does it fulfill that purpose for the majority of readers?

The textbook as the product of the author's mind

10. Who was the author?
11. What is the author's personality, attitude and outlook on life and how does it show up in the textbook?
12. What other works has this author published, and how do they relate to this textbook?

The textbook as a communication tool

13. How effective is the textbook in communicating the main idea?
14. How true are the facts in the textbook, or is it purely made-up fiction or fantasy?
15. How effective is the textbook in accomplishing the purpose for which it was created?

The textbook in a social context

16. Whom does this textbook serve best?
17. Does the author speak for the dominant part of society, or was she/he writing with the voice of the majority who are not dominant?
18. Does it lift up the powerless and those who have been pressed down?

The textbook as a work of art

19. Clarity: How clear is the writing? Is it easy to understand or is it confusing and mysterious.
20. Grandeur: How strong, educated, mature and vigorous is the language?
21. Beauty: Is this textbook a pleasure to read? Or, does the author use any annoying or ugly words and expressions where they are not appropriate? Is the imagery lively or boring?
22. Speed: Does the writing in the textbook flow along easily, making it easy to read, or does it drag along with extra words, phrases and sentences?
23. Character: If applicable, how realistic or believable are the characters in the textbook? How is the character of the author reflected in the textbook?
24. Truth: How true are the facts used in the textbook? How well does the author use facts? How well does he/she present sources and proofs for facts, quotes or data cited in the textbook?
25. Gravity: Does this textbook pass the "who cares?" test? Does it change your mind or your feelings, inform you, or make you agree more with the author?