

**METHODOLOGY AND MATERIALS USED IN TEACHING BIOLOGY AND
HEALTH SCIENCE IN SECONDARY SCHOOLS IN PANKSHIN
EDUCATION ZONE OF PLATEAU STATE**

BY

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Abstract

The study was designed to determine the methodology and materials used in teaching biology and health science in secondary schools in Pankshin education zone of Plateau State. The methods that were always used by the teachers include demonstration, textbooks, and lecture. Those that were never used included, fieldtrips, projects, experiment and resource persons. In addition, the materials that were always used include chalkboard, textbooks and diagrams, while those never used were, the radio, television, microscope, and audio tape.

Introduction

The important parts in the process of teaching Biology and Health Science are the methods of teaching and materials employed in the teaching. The teaching method is even more vital when it concerns secondary school students, because the students at this stage are in an impressionable condition.

Teaching method was described by Pollock and Oberteuffer (1974), as the formal structure of sequence of acts commonly denoted by instruction. Similarly, Udoh, Amusa, Sohi, and Agbade (1985) opined that teaching

method means an organized, orderly, and systematic way of achieving a given purpose or objective in the teaching learning process. They further explained that method, as applied to health science is concerned with the best way to provide learning experience so that student's behaviour will be modified or changed for improving their health as well as that of other people.

Also, material was defined by Udoh, Fawole, Ajala, Okafor and Nwana (1987) as everything and anything in the student's environment, which

contributes to learning process, and an aid to teaching. Materials, according to them, could be physically manipulated, shown or pointed at to facilitate learning. In addition, Pollock and Oberteuffer (1974) described materials as resources used during teaching to enhance learning. Therefore materials can be regarded as everything in the pupil's environment that can be used during teaching to enhance learning and which could be physically manipulated or displayed.

As observed by Ademuwagun and Oduntan (1986) good teaching methods and materials promote effective Biology and Health Science knowledge as well as scientific accuracy. Nwana and Agusiogbe (1991) pointed out that teachers need to acquire a good knowledge of current methods and materials to acquire a good knowledge of current methods and materials for teaching science, because, according to them, no matter how simplistic a content might seem, it is the method and materials that determine the effectiveness of learning.

To further explain the importance of methods and materials, Pollock and Oberteuffer (1974) explained that methods and materials enable the students to discover new knowledge and to practice and sharpen cognitive skills as well as formulate concepts and principles in their own words.

This study focused on the determination of the methods and materials used by teachers in secondary schools for teaching Biology and Health Science in Pankshin education zone of Plateau state, Nigeria.

Statement of the Problem

Teaching method and materials do provide effective education in Health Science and Biology. An appropriate method used will allow the learners to get more involved in the teaching learning process (Opara, 1993). But Nwana (1992) regretted that some teachers tend to stress specific techniques that encourage memorization of facts rather than strategies that provide clear understanding of concepts to the students. Nwana further stressed that the more abstract a technique is, the less effective it would be in producing the effect. It becomes necessary, therefore, to study the types of methods and materials used in teaching Biology and Health Science in Secondary Schools in Pankshin education zone towards gaining better insight into the situation.

Purpose of the Study

The specific purpose of the study were;

1. to find out the frequency of use of methods for teaching Biology

2. to find out the frequency of use of methods or teaching Health Science
3. to determine the frequency of use of materials for teaching Biology
4. to find out the frequency of use of materials for teaching Health Science.

Research Questions

In order to give direction to the study, the following research questions were formulated:

1. What is the frequency of use of methods for teaching biology?
2. What is the frequency of use of methods for teaching Health Science?
3. What is the frequency of use of materials for teaching Biology?
4. What is the frequency of use of materials for teaching Health Science?

Methodology

A survey research design was used. According to Kerlinger (1997), a survey design gathers data at a particular point in time with the intention of describing the nature of existing conditions. It was therefore, considered appropriate for the study.

The researcher randomly picked five districts in Pankshin education zone

Kadung, Leaving out Tal, Wokkos, Chip and Pai districts.

The stratified sampling technique was used in the selection of schools so as to have fair representation of secondary schools within Pankshin education zone. There were a total number of twenty-two secondary schools in Pankshin education zone. Seventeen secondary schools out of the twenty-two were randomly selected. In all the seventeen secondary schools selected, two subject teachers (one Biology teacher and one Health Science teachers) were sampled in each school. This gave sample size of thirty-four. Thus, the population of the study consisted of thirty-four (34) teachers teaching either Biology, Health Science or both in secondary schools within Pankshin education zone.

The instrument used was a structured questionnaire on methodology and materials used in teaching Biology and Health Science; it was designed by the researcher. Section 'A' dealt with personal data of the respondents. Section 'B' focused on pertinent questions on frequency of use of methods for teaching Biology and Health Science by Secondary School teachers. This section which has a total number of thirty-six items had four options to each question with

dealt with the frequency of materials used by Biology and Health Science teachers. This section had a total number of fifty-two items with four options: always, sometimes, occasionally and never.

The face and content validity of the questionnaire were established through expert judgement by two senior lecturers in the departments of Physical and Health Education and one senior lecturer in the department of education foundations, Federal College of Education, Pankshin.

Research Question 1

What is the frequency of use of methods for teaching Biology? The data that answered research question 1 are contained in table 1.

In order to establish the reliability of the instrument, the test-retest method was employed using Biology and Health Science teachers in Mangu education zone of the state. The spearman rank order correlation technique was used which yielded reliability coefficient of 78.

Results

In presenting the major findings study, the answers to the research questions are presented first using frequencies and percentages. The findings are hereby presented in the tables below.

Table 1: Frequency of Methods Used in Teaching Biology

Teaching Methods	Always		Sometimes		Occasionally		Never	
	F	%	F	%	F	%	F	%
Lecture method	18	52.94	5	14.70	5	14.70	6	17.64
Group method	18	52.94	3	8.82	11	32.35	2	5.88
Demonstration	25	73.52	2	5.88	4	11.76	3	8.82
Games	0	0.00	17	50.00	10	29.14	7	20.58
Simulation	0	0.00	0	0.00	19	55.88	15	44.11
Dramatization	24	70.58	7	20.58	0	0.00	0	0.00
Field trips	0	0.00	0	0.00	0	0.00	33	97.05
Assignment	11	32.35	0	0.00	22	64.70	1	2.44
Project	0	0.00	0	0.00	0	0.00	34	100.00
Discussion	16	47.05	6	17.64	5	14.70	6	17.64
Discovery	0	0.00	0	0.00	2	5.88	32	94.11
Experiment	0	0.00	0	0.00	0	0.00	33	97.05
Resource Persons	0	0.00	0	0.00	15	44.11	17	50.00
Textbooks	0	0.00	0	0.00	23	67.64	10	29.41

Table 1 indicates that demonstration method was used always by 61.76%, dramatization by 70.58%, and lecture method by 52.94% of the respondents

who teach Biology. The table also showed that project method was never used by 100%, experiment and fieldtrips by 97.05% of the respondents.

Research Question 2

What is the frequency of use of methods for teaching health science?

The data that answered question 2 are presented in table 2.

Table 2: Frequency of Methods Used by Health Science Teachers

Methods	Always		Sometimes		Occasionally		Never	
	F	%	F	%	F	%	F	%
Lecture	20	58.82	6	17.64	6	17.64	2	5.88
Group	0	0.00	6	17.64	6	17.64	22	64.70
Demonstration	21	61.76	8	23.52	3	8.82	2	5.88
Games	4	11.76	17	50.00	10	29.41	2	5.88
Simulation	19	55.88	3	8.802	4	11.76	8	23.52
Dramatization	25	73.52	0	0.00	5	14.70	4	11.76
Fieldtrips	0	0.00	0	0.00	2	5.88	32	94.11
Assignment	27	79.41	3	8.82	2	5.88	2	5.88
Project	0	0.00	0	0.00	1	2.94	33	97.05
Discussion	27	70.58	4	11.76	3	9.82	0	0.00
Discovery	0	0.00	0	0.00	3	8.82	31	91.17
Experiment	29	85.29	0	0.00	4	11.76	1	2.94
Resource person	0	0.00	0	0.00	1	2.94	33	97.05
Textbooks	29	85.29	2	5.94	3	8.82	0	0.00

Table 2 shows that the teaching method that were always used include experiment 85.29%, textbooks 85.29%, and assignment 79.41%. The table also shows that there were some

methods that were never used which included project 97.05%, resource person 97.05%, and field trip 94.11% of the responses, respectively

Research Question 3

What is the frequency of use of materials for teaching Biology?

The data that answered this research question are contained in table 3.

Table 3: Frequency of Materials Used by Biology Teachers

Materials	Always		Sometimes		Occasionally		Never	
	F	%	F	%	F	%	F	%
Diagrams	33	97.05	1	2.94	0	0.00	0	0.00
Models	27	29.41	5	14.70	2	5.88	0	0.00
Books	34	100.00	0	0.00	0	0.00	0	0.00
Radio	0	0.00	0	0.00	2	5.88	32	94.11
Television	0	0.00	0	0.00	0	0.00	33	97.05
Overhead								
Transparencies	0	0.00	0	0.00	3	8.82	31	91.17
Slides	0	0.00	0	0.00	0	0.00	34	100.00
Film strips	0	0.00	0	0.00	0	0.00	34	100.00
Flash cards	0	0.00	0	0.00	2	5.88	32	94.11
Microscope	31	91.17	0	0.00	3	8.82	0	0.00
Flannel graphs	0	0.00	0	0.00	0	0.00	34	0.00
Bulletin Boards	0	0.00	0	0.00	0	0.00	34	100.00
Video tapes	0	0.00	0	0.00	0	0.00	33	97.05
Audio tapes	0	0.00	0	0.00	0	0.00	34	100.00
Life specimen	0	0.00	32	94.11	1	2.94	1	2.94
Preserved								
specimen	0	0.00	33	97.05	1	2.94	0	0.00
Flannel graph	0	0.00	0	0.00	0	0.00	34	100.00
Magnetic board	0	0.00	0	0.00	0	0.00	34	100.00
Chalk board	34	100.00	0	0.00	0	0.00	0	0.00
Charts	23	67.64	8	23.52	1	2.94	0	0.00
Apparatus	3	8.82	24	70.58	7	20.58	0	0.00

Table 3 indicates that the materials that were always used were textbooks 100%, chalkboard 100%, and diagram 97.05%. The table also reveals that there are some materials that were

never used which include: slide, filmstrips, flannel graph, bulletin boards, audio tapes, and magnetic board as indicated by all the respondents.

Research Question 4

What is the frequency of use of materials for teaching health science?

The data that answered this research question are shown in table 4.

Table 4: Frequency of Use of Materials in Teaching Health Science

Materials	Always		Sometimes		Occasionally		Never	
	F	%	F	%	F	%	F	%
Diagrams	32	94.11	0	0.00	2	5.88	0	0.00
Models	24	70.58	5	14.70	5	14.70	0	0.00
Books	25	73.52	3	8.82	6	17.64	0	0.00
Radio	0	0.00	0	0.00	0	0.00	34	100.00
Television	0	0.00	0	0.00	0	0.00	34	100.00
Overhead								
Transparency	0	0.00	0	0.00	0	0.00	34	100.00
Slides	0	0.00	0	0.00	10	29.41	24	70.58
Filmstrips	0	0.00	0	0.00	25	73.53	9	26.47
Flash cards	0	0.00	0	0.00	0	0.00	34	100.00
Microscope	0	0.00	0	0.00	0	0.00	34	100.00
Flannel Graphs	0	0.00	0	0.00	0	0.00	33	97.03
Bulletin board	0	0.00	0	0.00	0	0.00	34	100.00
Video tape	0	0.00	0	0.00	6	17.64	28	82.35
Audio tapes	0	0.00	0	0.00	0	0.00	34	100.00
Life specimen	0	0.00	0	0.00	32	94.11	2	5.88
Preserved								
specimen	0	0.00	25	73.52	7	20.58	2	5.88
Flannel graph	0	0.00	0	0.00	0	0.00	34	100.00
Magnetic board	0	0.00	0	0.00	0	0.00	34	100.00
Chalkboard	34	100.00	0	0.00	0	0.00	0	0.00
Charts	27	79.41	6	17.64	1	2.94	0	0.00
Apparatus	0	0.00	27	79.41	6	17.64	1	2.94

Table 4 reveals that the materials that were always used include chalk board (100%), diagrams (94.10%) and charts (74.4%). The table also shows that there were methods never used by the teachers which include: radio,

Discussion

The methods that were mostly used by biology teachers were demonstration, dramatization and lecture methods.

television, overhead transparency, flash cards, microscope, bulletin board, audio tapes, flannel graphs, and magnetic boards as indicated by all the respondents.

The result was expected because dramatization involves role-play by students and anything dramatized is hardly forgotten. This affirmed the statement by Bello (1981) that the

method helped students to convert facts or skills drama as well as allows spectators to discuss the theme with the actors. Also, that lecture method provides the opportunity for many students to be taught at the same time apart from the fact that it saves time. In addition, project, experiment and field trips were never used by majority of the teachers. This was not expected because; one would as much as possible have used experiment in biology to make learning meaningful. More so, that science requires a lot of proves, the use of experiment does not need to be contended with.

Another variable studied was materials which provided the following results. It was noted that books, diagrams and chalk board were always used by biology teachers. This result was expected because books serve as materials where information on the subject are gotten. In addition, diagrams are used for illustration to make demonstration of certain concepts that may be difficult to be explained verbally. In the same vein, the chalkboard is one of the materials used at all levels of our educational system for writing key points of topics discussed, drawings, hanging of charts, et cetera; this supports the observation by Nwana and Agusiegbe (1991) that the chalk board was almost a standard equipment for a typical classroom and cheapest material to procure.

It was also revealed that the biology teachers never used slides, film strips, flannel graph, bulletin boards, audio tapes, and magnetic boards. This result was expected due to the fact that film strips require the use of electricity which is completely lacking in some secondary schools and where available, there is constant light failure. In fact all these materials are even costly to be installed but if used for teaching, they help in making learning and teaching simple and meaningful.

On the other hand, the health science teachers always make use of the textbook, experiment and dramatization. This was expected because the use of the textbook corresponds with the didactic method which facilitates memorization that characterizes the method of teaching in most schools. This reflects the findings of Nwana and Agusiegbe (1991), who observed that the textbook is considered to be a method as well as a material in teaching. The use of experiment helps students to find out things for themselves and learning is made real. Furthermore, the dramatic method when used provides the opportunity for visual explanation and is normally found to be an effective way of illustrating what is already known. This also confirmed the statement of Udoh, Fawale, Okafor and Nwana (1987) that the method

stimulates interest which motivates and speeds up learning.

Also, the following methods were never used by the health science teachers. These were project, field trips, and resource persons. This was equally expected because it may be difficult for teachers to bring the students into actual contact with the lives and activities of their neighbours as well as not being able to present the students with real-life problems since these are very necessary when using the method in order to achieve positive results. To add to the above, the fieldstrip was not used by the teachers teaching these subjects because it may not be easy for the trip to fit naturally into the sequence of work the students are doing and may not be accomplished within the allotted time. The use of resource persons was never used due to cost in financing all that may be required to produce and present.

Still on health science teachers, it was discovered that diagrams, chalkboard and charts were always used by them. The result was expected because the chalkboard, diagrams and charts are everyday teaching materials. A serious minded teacher should use them to encourage learning due to their obvious advantages that need not be over-emphasized. On the other hand, the study revealed that radio, television, overhead transparency,

flash cards, microscope, audio tape were never used by health science teachers. This was expected of some and not all. For example, television, microscope and overhead transparency might be very costly to be installed by schools and of course will require the use of electricity and may demand real technical skills to operate. But the radio and flash cards can easily be provided by the teachers. All these materials will contribute to proper learning if available as some produce sound and pictures that help to make learning real and effective.

Summary and Conclusion

The methods that were always used include demonstration, dramatization, textbook and lecture. Those that were never used include: fieldtrips, project, experiment and resource persons. The materials that were always used by the teachers, were, chalkboard, textbooks, and diagrams, while those that were never used, were, the radio, television, microscope and audio-tape.

Based on the above summary, it is concluded that both the biology and health science teachers in the area use almost the same methods and materials for teaching.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. In the interest of progress, the Government are advised to make available enough money through proper allocation of the highest percentage of the budget for educational programme and facilities needed to facilitate learning. This is because, there is no any meaningful development of a country that can exceed the quality of the educational standards of its citizens.
2. The problems of methods and materials in education can be removed by professional associations. It is therefore recommended that associations like Science Teachers Association, (STAN) Nigeria School Health Association, (NSHA), National Association of Health Education Teachers (NAHET), curriculum and instruction materials development unit of the Ministry of Education, be encouraged by Government to organise exhibitions, workshops and symposia for serving teachers to acquire more skills in constructing and improving teaching materials.

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