IMPROVISATION OF INSTRUCTIONAL MATERIALS IN THE TEACHING OF BIOLOGY IN SENIOR SECONDARY SCHOOLS IN EKITI STATE.

Olatunbosun Segun Mobolaji (Ph.D); Otoide Titilayo Folayemi &
Abidakun Ojo Titus
Department of Science Education, Ekiti State University,
Ado-Ekiti, Nigeria
smolatfrank@gmail.com

Abstract

Instructional materials are materials used to make teaching effective and hold learners' attention during classroom activities. Improvised instructional materials are usually low cost/affordable materials used in place of the expensive ready-made/ imported equipments for effective teaching and learning. The paper focussed on the importance of improvised instructional materials for the teaching of Biology in secondary schools in Ekiti state, identified some of the problems militating against improvisation in the state and highlighted the basic considerations in improvisation. Some of the instructional materials that can be improvised as substitution for ready-made/ imported equipments were also listed, and further recommendations were made on how improvisation of these learning materials can be made possible for biology teaching/learning activities in Ekiti State secondary schools.

Key Words: improvisation, instructional materials, affordable, expensive, ready-made equipment, biology teaching/learning.

Introduction:

Science education must seek to permit the individual to develop to the fullest his capacities for adjustment and continuous change in order that he may meet the problems of his day and solve them successfully when they arise. Biology, the study of living things is a science which has developed methods of its own. The structural complexity of the organisms themselves, the multiplicity of functions occurring simultaneously in organism's body and the inter-relationship between the organisms and their environment have led to methods of study unique to this particular science – biology. Bremner (2000) stated that the methods are characterized by the art of scientific investigation in relation to pupils' study of new specimen, the experimental approach to biological science in relation to experiment carried out by the individual study. These are necessary for the effective transfer and permanent communication of biological knowledge.

The Federal Government of Nigeria through the Federal Ministry of Education with the assistance of UNESCO in 1998 established a science equipment centre to provide course for science teachers and laboratory assistants. The provision of this centre though laudable has been inadequate. The Nigerian school system today is experiencing a boost in population giving rise to greater demand for classroom facilities and equipment. Teachers of biology and other sciences therefore have to acquire and develop skills of producing

teaching materials. This is what improvisation is all about. Improvisation becomes imperative in situation where there are scarce resources and facilities.

Improvisation is the process of providing quickly in time of need, using whatever available materials and equipment for facilitating the teaching of biology. Improvised instructional material is an inexpensive method of widening the scope of inquiry. It is a meaningful attempt towards finding suitable substitute or alternative to conventional science materials. Nature presents a rich laboratory because specimens of plants and animals are abundant around us. However, equipment needed for capturing animals, performing physiological experiment, timing experiment or processes as well as some specimens which are available have to be improvised using locally accessible materials. As a proverb says "A picture is worth a thousand words". Instructional materials are learning resources that help in teaching and learning processes, which help the teacher to deliver his lesson during the course of his teaching.

In the National Teachers Institute (2007) manual for the retraining of primary school teachers, these instructional materials are cheaply selected equipments that are introduced in the teaching/learning process in order to enhance effective teaching and learning activities in the classroom. Mapaderun (2002) emphasized that the availability and adequacy of these facilities promote effective teaching and learning activities in schools while their inadequacy affects the academic performance negatively. In a nut shell, improvised instructional materials are teaching materials designed and produced from the available local materials in order to enhance effective teaching and learning in schools.

In view of these the study sought to investigate the improvisation of instructional materials in the teaching of biology in senior secondary schools in Ekiti state

Basic considerations in improvisation

Improvisation according to Igwe (2003), requires a considerable development through imaginative planning and good knowledge. On embarking on any improvisation in the teaching and learning process, certain basic considerations are necessary. Some of these considerations include:

i. The concept to be taught
ii. The objectives of the lesson
iii. The learners' level and academic background
iv. The durability of the improvised materials
v. The cost advantage of the improvised material and
vi. The technical know- how.

Teacher's understanding of concept to be taught and the objective of the lesson will determine the simplicity or complexity of the improvised materials. Knowledge of the learners' level and academic background would help the teacher to design the appropriate improvised materials for teaching the learners. It is also necessary to give consideration to the durability of the improvised materials. A durable material on a long-term basis reduces cost as well as saves time and labour. In the cost advantage, it may be more beneficial to acquire an already existing cheaper factory made material than to spend time and labour to embark on the improvisation of such materials. The technical know- how is the skill needed to carry out the improvisation exercise.

Importance of improvised instructional materials on biology teaching and learning

According to Johnson (2000), teachers should not take advantage of inadequate facilities and lack of equipment as an excuse to resort to both poor teaching and non teaching, but instead they should learn to improvise instructional materials. In agreement with the submission of Olumorin (2004), the importance of improvisation includes the following among others:

i. It enables the teachers and learners make proper use of their environment. This is because in improvisation of biology learning materials, we mainly make use of the available materials in the environment.
ii. The use of local materials reduces cost in terms of financial expenditure in buying ready-made materials.
iii. The production of instructional materials can lead to the discovery of new knowledge.
iv. When parent or learner or community members assist in improvising a resource material such as donating personal material, this will improve school-community relationship.
v. Improvised materials provide experience not easily obtained through other means and contribute to efficiency, depth and variety of learning.
vi. Improvisation helps to bridge the gap between theoretical knowledge and practicability. That is, it provides cognitive bridge between abstraction and reality to students.
vii. When the teacher and learners succeed in improvising an instructional material, there is a high sense of achievement and they are encouraged to higher exploits. That is, it will generate interest and motivation for indigenous technology.
viii. Improvisation helps to eradicate the menace of lack of or inadequate instructional materials for biology teaching and learning. That is, improvisation undertaken by the teacher will enable him to think and research for cheaper, better and faster methods of making the teaching and learning process easier for learners.
ix. Improvised materials increased interest and high performance in students and teachers; create innovative skills and encourage team work.
x. Improvised instructional materials make teaching biological concepts more interesting to both students and teachers in the classroom.
xi. Talents in the students are discovered during improvisation exercise.
xii. The set out educational goals is achievable through the use of improvised instructional materials in teaching biology.

Problems militating against improvisation of materials

Zarewa (1991) opined that educational authorities might not always able to provide all the materials needed for effective teaching and learning in schools. Hence, the need for teachers and other concerned stake holders in education to take the improvisation of these teaching materials serious. Teachers should be able to design and produce instructional materials from the available local materials around. However, according to Eyiuche et.al (2013), there are several challenges being faced by the teachers. Problems militating against the improvisation of materials include the following among others:

i. Lack of adequate professional training of staff. Improvisation demands adventure, creativity, curiosity and perseverance on the part of the

teacher, such skills are only realizable through well-planned training programmes on improvisation.

ii. Lack of funds. There are some instructional materials that require funding. Improvisation whether they cost less than standardized manufactured ones or not, cost money. This money is usually not readily available for teachers.

iii. Lack of support/assistance from the school authority, parents, community and the government can hinder improvisation of teaching/learning materials.

iv. Improvisation can also expose teacher and students to some-hazards.

Guides on improvisation

When the desirable is not available then the available should becomes the alternative if it performs the same or similar functions as the desirable. It should be borne in mind that resource materials do not achieve any of the attributed values on their own. The usefulness depends on what the teacher makes out of them, that is, the influence made on the students by the teacher with the materials. Hence, the teacher must make sure the improvised materials will;

- Perform the same function as the original material
- Be easy to handle by the users
- Be attractive to the students.

Cheap/Affordable Improvised Biology Teaching Materials as Against Ready-made Equipment

S/N	Ready-made/ Imported Equipment	Affordable Improvisable materials	Uses
1	Funnel	Plastic bottle open at base	For transferring liquid
2	Mounting Needle	Broom stick/Tooth pick	For sub-culture
3	Tripod stand	Unused stove frame	For supporting during heating
4	Bunsen burner	Kerosene stove	Source of heat
5	Round bottom Flask	Electric Bulbs	For measuring liquid volume
6	Indicators	Flower extract (after conducting chemical analysis)	As indicator for acid and base
7	D.N.A model	Stripped cardboard	For illustration in genetic
8	Catching net	Mosquito net, wooden ring/iron, thread and needle	For catching or collecting insects
9	Spatula	Cut handle of table spoon	For putting chemicals into test tube
10	Watch-glass	Cover of Vaseline bottle	For stocking and putting specimens
11	Clinostat	Box cut at one side	For demonstrating direction of plant growth in response to light
12	Test tube holder	Cloths hanger (peg)	For holding test tube

13	Reptile-hook	Metal, iron, eyed-screw, washer-ring bolt and nut, spring	For catching reptiles for studies in biology topics
14	Plant press	Wood/ply wood, khaki cloth, shoe buckles	For drawing moisture or water away from plants
15	Measuring cylinder	Graduated feeding bottle	For measuring liquid volume

Source: African Journal of Materials and Natural Resources. Federal College of Education, Kano.1(1)

Improvised instructional materials help biology and other science students to realize that science has to do with ordinary things and will possibly motivate them to carry out experiments and learning activities themselves using such improvised materials, (Johnson, 2000). Improvised materials are usually simple and may not have perfect finishing, because they are made from local raw resources that are acceptable to students.

Conclusion

Adequate, effective and efficient instructional materials are expected to be used by the teacher to teach topics in biology. Improvised instructional materials should be seen as a variable integral part of teaching. Even when the school budget is sufficient to cater for original materials, commonly available materials can be carefully selected in order to make biology teaching/learning easier. Meaningful improvised instructional materials should be used effectively in teaching biology in Ekiti State secondary schools.

Recommendations

- Government should make improvisation a core course in all fields of sciences by curriculum developers, mount public enlightenment campaign on the importance of improvisation to the society as an integral part of technological development, provide fund/cash to motivate teachers on improvisation and solicit the support of experts within and outside the state to assist the teachers in the improvisation exercise.
- Seminars and workshops should be organized for teachers from time to time to teach on the importance of improvisation.
- School administrators should solicit the support of parents to assist to procure improvised materials or materials meant for improvisation. Provide storage facilities for the improvised materials in order to maximize usage within their life span.
- Government, philanthropists and the Parent Teacher Association (P.T.A) should contribute financially generously to the promotion of improvisation in secondary schools.
- Improvisation should be encouraged and should involve the learner actively since the rule of retention states that people retain more of what they hear, see and do. Hence, students should be engaged in the collection, assembling and fixing of some basic and non-injurious items for improvisation. This will relate the abstracts concept, theories, laws of biology to the real life situations.
- The interest of the learner is captured and held during the process of

improvisation and so will cause them to be able to create and improve on their own ideas, so, improvisation of instructional materials should be done as often as possible.

References

Bremner J (2000). *Teaching Biology*. Cambridge, United Kingdom: Macmillan Publisher.

Eyiuche I.O, C. Nwabunwanne & D.N. Ezenwanne. (2013). Teachers' improvisation of instructional materials for Nigerian Home Economics Curriculum Delivery: Challenges and strategies. *International Journal of Adult Vocational Education and Technology Archive.* 4(4):74-83

Igwe, I.T (2003). Enriching Science Education. The place of improvisation in the classroom. *Science Teachers Association of Nigeria (STAN).* 41st Annual Conference Proceedings. 51-53

Johnson, S.I. (2000). Fundamental of improvisation for school science equipment. In Amina M. A (eds) African Journal of Materials and Natural Resources. Federal College of Education, Kano.(1)1

Mapaderun, O (2002). *Teaching method for Business, Science, Social science and Technical Education.* Ibadan: Holyen Communications.

National Teachers Institute (2007). Improvisation of Instructional Materials. *Manual for the retraining of primary school teachers.* In Amina M. A (eds) African Journal of Materials and Natural Resources. Federal College of Education, Kano.(1)1

Olumorin, B.M (2004). An Investigation of Teachers' Instructional Problems in Sciences. *Benin Journal of Education.* 11(3) 43-54

Zarewa, H. O. (1991). The status of improvisation of science teaching equipment in secondary schools in Soba and Zaria Local government areas of Kaduna state. *Unpublished B.Sc (Ed) project of A.B.U Zaria.*

LOCUS OF CONTROL AS DETERMINANT OF MATHEMATICS LEARNING OUTCOME OF POLYTECHNIC STUDENTS IN SOUTHWEST, NIGERIA

Prof Abiodun A. Popoola and Alaje, Daniel Tunji

Abstract

In the past, students' success in Mathematics has been considered a major responsibility of teachers with little or no emphasis on students' personal interest and commitment to hard work in the pursuit of academic success particularly tertiary institutions. Thus, this paper focuses on the influence of locus of control on Mathematics learning outcome of Polytechnic Students in Southwest, Nigeria. This study adopted a descriptive design of the survey type with the study sample of 1500 students, consisting of National Diploma 1(ND1) Mathematics and Mathematics related students in the Faculty of Science selected from five Polytechnics in South-west, Nigeria. The participating students were tested using Mathematics Performance Test (MPT). Also the