
Enriching Benefits of Improvisation of Instructional Materials for Biology Teachers and Students

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Abstract: *Instructional materials play mediatory roles between the learner and the Biology content. Such roles are to enable the learner gain understanding, deepen knowledge and develop the right skills and attitude towards the content. In Biology teaching in secondary schools, dearth of instructional materials has been reported. This has necessitated improvisation of these materials. Against this backdrop, the paper explored the enriching benefits of improvisation of instructional materials for Biology teachers and students. Using documentary sources, the paper explained the attribute of improvisation, highlighted its benefits, identified challenges and proffered possible solutions to the challenges of improvisation in secondary schools.*

Key words: *Instructional materials, improvisation, Biology*

Introduction

Instructional materials are meant to mediate between the learner and the content. Learning involves the acquisition of new knowledge, ideas, skills, values and experiences which enable the individual to modify and or alter his actions (NTI Manual, 2006). Learning can be a laborious effort without the mediating function of the instructional materials. Thus, educators are in agreement that instruction materials are a component part of teaching and learning process. In the absence of these materials, effort should be made to improvise.

Improvisation is the act of making teaching and learning materials from locally available resources. Eniaiyegu, (1985) viewed improvisation as the art of substituting for the real thing. Another important view about improvisation is by Alonge (1983) cited in Ahmed (2017) who sees improvisation as not only the production of import substitution of materials or real thing, rather it is an activity in promoting curiosity, alertness, endurance and perseverance, all of which are indispensable to science, scientists and learning as a whole. Johnson (2014), defines improvisation as the process of productive thinking that can generate tangible outcome or product.

From the foregoing, improvisation does not just play the role of substitution for standard materials, or to mitigate the perennial dearth of standard instructional materials in the school system, but constitutes learning in itself. As students engage in improvisation, they develop the skills of inquiry and get more involved in the learning process, and there is the tendency to retain the content for a very long time. Such curiosity is very vital in the learning of sciences including Biology. According to Ifeobu (2014):

The biology curriculum has a spiral arrangement of content. The content of biology curriculum are: Concept of living; Basic ecological concepts; Plant and animal nutrition;

Variations and variability; Evolution and Genetics. Based on this spiral arrangement, the concepts to be taught are arranged in such a way that topics are repeated yearly, throughout the three years of the course; to cover the 62 units in the biology curriculum. Any repeated concept is discussed in greater complexity and depth as the course matures over the three-year period. The contents of the senior secondary school biology curriculum places emphasis on field studies, guided discovery, laboratory techniques and skills (p. 14).

The contents of the secondary school Biology curriculum, therefore, require instructional materials and call for improvisation. This paper explored the enriching benefits of improvisation of instructional materials for both Biology teachers and students alike.

Concept of Improvisation

Improvisation of instructional materials is an attempt to adapt and make use of local resources in the teaching/ learning process when the readymade materials are not available or are in short fall or not within the reach of the users. The improvised instructional materials could be produced by the teacher and the students.

Improvisation in the view of Aremu (1998) is a technique of originating a totally new tool, instrument, materials, device or modifying existing ones for serving a particular purpose. Ahmed (2017) sees improvisation as the process of making equipment and materials by the teacher or by engaging the services of others in the absence of the real or manufactured ones. Wasagu (2000), described improvisation as the act of using alternative materials and resources to facilitate instruction whenever there is a lack of or shortage of some specific first hand teaching aid. Fajola (2008) looked at improvisation from the level of creativity involved. These levels involve substitution and construction.

Substitution in improvisation simply implies the techniques whereby a local material is used in place of a piece of equipment that is not available whereas construction involves making of a new instrument in place of the unavailable original one where substitution is not possible. It is expected that both substitution and construction of improvised instructional materials will meet the demand for the real or original material with as high precision as time, money and other facilities and factors will permit (Mberekpe, 2013). Thus, Vandeh, Gbaa and Awambe (2014) posit that improvisation means:

- a. Substituting one thing with another to serve a unique function;
- b. Altering the shape, size or outlook of something to serve a function other than that originally intended; and
- c. Originating or forming a totally new tool, instrument, material or device to serve a particular function.

According to Fajola (2008), improvisation in the context of biology can be seen as a process of using alternative resources for enhancing biology teaching in the absence or shortage of the real ones. The production of the alternative resources is initiated by the teacher and done either by him or the local craftsmen (e.g. the Carpenter, blacksmiths, welder, etc.). The teacher may also use the students for improvising some of the needed materials or equipment.

Benefits of Improvisation to Biology Teachers and Students

Improvised instructional material is a method or way of minimizing loss of equipment and materials and an inexpensive method of widening the scope of inquiry. Improvised instructional material is a meaningful attempt towards finding suitable substitute or alternative to conventional science materials. According to Ahmed (2017), due to state of our nation's economy, Teachers, students, school authorities and communities should engage in improvising instructional materials in order to: -

- Develop in students and teachers, adequate skill for improvisation. This will generate interest and motivation for indigenous technology.
- Have practical and physical links between science and theory
- Eradicate the menace of lack of or inadequate instructional materials for science
- Sensitize both students and teachers that alternatives for some of the conventional science teaching materials are possible.
- Achieve the set out educational objectives through the use of improvised instructional materials in teaching.

When students are involved in the production of improvised instructional materials through their creative ability and imagination, it gives new concept of things outside the range of ordinary experience to the students and makes learning last longer in their memory. For a student to be able to improvise, he/she must be innovative, resourceful and creative in both thinking and manipulative skills (Igwe, 2003). To be creative, is to have capacity for innovation and use same to produce something valuable.

Mberekpe (2013) investigated the effects of student's improvised instructional materials on students' achievement in Biology. This study became necessary because of the unavailability of instructional materials for teaching biology in the secondary schools. The study employed a quasi experimental design, specifically the pretest – posttest non-equivalent group design. The results revealed that students taught using improvised instructional materials performed better than students taught using conventional material; rural students performed better than urban students in biology. These remarkable findings suggest that improvised materials can serve as good alternative to standard instructional materials. It equally shows that when students are involved in improvisation, they tend to perform well. Moreover, the fact that students in rural area performed better than their counterparts in the urban area could be an indication that the rural environment could be richer in materials for improvisation.

Challenges of Improvisation of Biology Instructional Materials

Literature has observed similar pattern of challenges of improvisation of instructional materials. Olibie, Nwabunwanne and Ezenwanne (2013) designed a study to ascertain the challenges of improvising instructional materials by Home Economics teachers at the Upper Basic education level in Nigeria, and as a result identify strategies for enhancing improvisation. The study used survey research design based on two research questions. Findings indicated that some of the challenges faced by the teachers include how to: improvise materials to arouse and sustain learners' optimism and enthusiasm; access expert assistance and technical support; stay informed of innovative developments; have confidence to share ideas with other teachers; interpret research and statistical data; diplomatically handle students' resistance; align improvised materials with curriculum guidelines and timelines; and develop materials to cater for individual

learner's needs in overcrowded classrooms. Although the study focused on Home Economics, similar problem could also be observed in other sciences.

For instance, teachers of Physics another sister subject to Biology have observed some challenges. Utibe-Abasi (2015) investigated the problems faced by Secondary School Physics teachers in improvising instructional materials for effective teaching and learning of Physics in Akwa Ibom State of Nigeria. The findings of the Study revealed the problems faced by Physics teachers during improvisation to include financial constraints, lack of skills and strategies on improvisation, large class size, time constraint, unavailability of tools and lack of exposure on improvisation. The study also showed that these problems faced by teachers were not gender and location sensitive as there was no significant difference in the mean responses of male and female or urban and rural Physics teachers in improvisation of instructional materials. Although the study focused on Physics, similar challenges could also be observed in Biology (Ahmed, 2017).

Strategies for Effective Improvisation of Biology Instructional Materials

In order to succeed in improvisation teachers and students need to be creative and resourceful. Olibie et al (2013) suggest some strategies bothering on teachers' self and group professional development, training, and Internet literacy are capable of enhancing improvisation. According to them, these strategies if implemented might provide the teachers with opportunities to develop more improvisation insights for engaging young people in the highest quality learning activities. Zarewa, (1991) in Ahmed (2017) stated that improvisation helps to change students' attitudes towards science. This portrays that if we can encourage students to partake in the improvisation exercise, they stand a better chance of having a positive attitudinal change towards sciences. Therefore, students should be engaged in the collection, assembling, fixing, etc. of some basic and non-injurious items for improvisation. This will relate the abstracts concept, theories, laws etc. of Biology to the real life situations.

The place of workshops and seminars cannot be over-emphasized. Utibe-Abasi (2015) recommended that seminars and workshop on improvisation be organized for teachers, especially those in sciences in secondary schools by the authorities concerned. When teachers have skills in improvisation they will be able to develop such skills in their students as well. Mberekpe (2013), based on the findings of an experiment conducted, recommended that teaching of Biology in secondary school should be conducted in a manner that students will effectively understand and learn the concept taught through self-made improvised instructional materials.

Suggestions

The following are suggested:

1. The teaching of Biology in secondary school should be practical as the use of improvised instructional materials can play great role in students' achievement.
2. Teacher should try to improvise instructional materials and encourage students to do the same. This will give students enough understanding of Biology concepts as the child's local environment will be used to source for the materials.
3. It is suggested that regular meaningful workshop on improvisation technique for science teachers should be conducted to improve and update their competence in improvisation.

4. At the local education authority level, effort should be made from time to time to organize workshops for Biology teachers on improvisation and needs for the use of instructional materials.

Conclusion

Instructional materials are meant to mediate between the learner and the content. In most cases, these materials are not available, thus necessitating improvisation. Apart from serving the purpose of substitution, improvisation could enrich the creativity and innovation capacity of both teachers and students. It is the conclusion of the paper that both teachers and students should be involved in improvisation. Most importantly, Biology as a practical oriented subject needs to be enriched with lots of materials. Where these are not available for use, teacher and student-made instructional materials can become a vital alternative.

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