



INSTRUCTIONAL MATERIALS UTILIZATION FOR EFFECTIVE TEACHING AND LEARNING OF BASIC TECHNOLOGY IN THE UNIVERSAL BASIC EDUCATION (U.B.E.) PROGRAMME IN NIGERIA

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ABSTRACT

The examined Instructional Materials Utilization for Effective Teaching and Learning of Basic Technology in the Universal Basic Education (U.B.E.) Programme in Nigeria. The paper discusses: concepts of instructional materials, relevance of instructional materials to basic technology, characteristics of instructional materials, strategies for effective use of instructional materials, instructional materials and academic achievement, roles of instructional materials in basic technology in the UBE programme, limitations of instructional materials development, conclusion and recommendations.

Keywords: Instructional materials, utilization, effective teaching, basic science, UBE.

INTRODUCTION

The elevation of human condition is the primary concern of education. Through education people are enabled to develop and be better able to survive in their society. The Society cannot progress as expected without effective educational programme that is planned to provide the necessary skills; cognitive, effective and psychomotor.

In Nigeria the Federal, State and Local Governments, communities and individuals are investing heavily on education. The rationale behind Universal Basic Education launched on 30th of September 1999 in Sokoto is to wipe out illiteracy in no distant time and push the community to greater heights. For Nigeria to attain the desired 100% National literacy, it is imperative that the available infrastructural facilities, teaching and learning materials, as well as qualified teachers must be utilized.

The development of any country is predicted on a sound practical skill acquisition instead of on only theoretical knowledge. There are different areas of study through which these desirable skills and knowledge could be imparted on the students. The National Policy



on Education (FRN, 2004) describes pre-vocational education as the preparatory aspect of vocational training offered to students at the junior secondary level. However, the purpose is to expose students to career awareness -by exploring useable options in the world of work; enabling the youth to have an intelligent understanding of the increasing complexity of technology.

Basic Technology formerly, Introductory technology is one of the compulsory pre-vocational subjects which the students are supposed to take at the JSS level. It is an integrated subject which comprises Woodwork, Metal-work, Technical Drawing, Building construction, Electrical/Electronic etc. One, of the objectives of the universal basic education at the JSS level is to ensure the acquisition of the appropriate levels, of literacy, numeracy, manipulative, communicative and life skills as well as the ethical, moral and civic values needed for laying of solid foundation for life-long learning. For the learner to acquire the appropriate levels of literacy, whether manipulative, communicative and life skills, there is the need to expose the child to appropriate instructional materials to which the child will react, and which will provide an effective communication channels to the child.

It is, therefore, the objective of this paper to discuss instructional materials utilization for the Universal Basic Education; their types, and relevance to the teaching of Basic Technology. The paper also discusses the limitation of instructional materials, improvisation and recommendations.

Concept of Instructional Materials

Instructional materials are means of making teaching and learning process easy, more meaningful and understandable. Materials therefore have to be selected on the basis of criteria.

Instructional materials are said to be communication media that carry information between the instructor and the learner with an instructional intent of facilitating teaching. In doing this, the teacher has to think of the most resources available to drive home his/her points. The teacher in handing any topic should think of how effective the topic could be presented and what is used for its illustration (Enaigbe, 2009). The present of actual object models having specimens make a topic sufficiently concrete to be understood (Enaigbe,



2009). Bassey (2009) noted that student learn better with application of adequate instructional materials which helps them to participate effectively in the learning process. Teachers are expected to teach their subject with the help of any materials sought to develop some meanings through significant symbols.

Instructional materials are all the things teachers use to aid the learners in their learning process. They are the means being used to enhance effective teaching and learning. Obaru & Okoh (2009) regard instructional strategies and materials as “all the things the teachers utilize to interactively enhance, motivate and facilitate teaching and learning in an attempt to ensuring the achievement of a set objectives.”

According to Buseri & Dorgu (2011) who defined instructional materials as the process of providing or constructing adequate and necessary learning resources for effective teaching in the school system. The purpose of teaching is to facilitate positive changes in behaviour and this is the best way by which Basic Technology students’ could be helped to learn effectively is to make the teaching learning process a pleasurable activity through the use of appropriate learning resources. Teaching resources is the judicious arrangement of teaching process to achieve the desired goals and objectives. Adeboye & Afolabi (2009) assert that assessment of teaching resources as a crucial issue which must be carefully examined by the teachers depending on the form of teaching resources, the teacher must determine whether such resources will be used on individual or group basis. Since poorly organized teaching resources can cause disorderliness in the classroom, the teacher must organize the resources in such a way that it will enhance optimum learning.

In many secondary schools, instructional materials are not available while resources available in some secondary schools are poorly utilized. Instructional materials are essential and significant tools needed for teaching and learning of Basic Technology in junior secondary schools in other to promote the efficiency of Basic Technology teachers and improve students’ performance. It makes learning more interesting, practical, realistic and appealing. It also enables both the teachers and students to participate actively and effectively during lesson sessions. It gives room for acquisition of skills and knowledge and develops self- confidence and self- actualization.



Teaching brings about understanding which involves a teacher, a learner and subject matter and teaching materials. Therefore, to bring about learning, the teachers need to engage in certain activities such as talking, demonstration, and give instruction etc. All these are the various strategies to bring about learning (Adediran, 2014). Basic Technology teachers need to use different instructional strategies to ensure that students' centered method is used in the classroom for creativity, innovative and critical thinking purpose in students. Classroom teaching is likely to be more effective when it is formed by an understanding of how students learn. It is therefore important that, the major implications of instructional strategies be reflected in classroom practice.

Instructional strategies involve resolution of problems, active practice participations of learners in the teaching process and emphasis on process rather than products of learning. Some of these strategies and approaches according to Osakwe (2009) are categorized under conventional and innovative appraises, instructional strategies which are classified under conventional are mostly those routine, well-knowing ones which teachers use predominantly. They are usually teacher-centered with little or no activities for students. These include teaching method like lecture, story-telling, recitation, etc. On the other hand, the innovative strategies include those ones that are much more recent which are predominantly learner-centered. These include questioning, inquiry/problem solving, role-play and dramatization (Adediran, 2014).

Akinleye (2010) attested that effective teaching and learning requires a teacher to teach the students with instructional materials and use practical activities to make learning more meaningful, logical, realistic and pragmatic. Instructional materials are indispensable to the effective teaching and learning activities. Teaching aids are always useful in supporting the sense organs. Despite the fact that instructional materials are essential tools that can make learning practical and knowledge acquisition easier, they are not readily available in Nigerian secondary schools, leading to low level of performance of learners in government examinations (Oluwagbohunmi & Abdu-Raheem 2014). He encouraged teachers to improvise teaching aids because they are in great measure enhance learners' full participation in the lesson, gives room for inquiry, problem-solving, discussion and clarification of issues and ideas among students and the teacher.



Therefore, Ogbondah (2008) advocated for teachers' resourcefulness and also encouraged them to search for necessary instructional materials through local means. Oso (2011) also agreed that the best way for teachers to make use of their manipulative skills is to improvise so as to achieve their lesson objectives at least to a reasonable extent. also identified the importance of instructional materials as making learning concrete and real, substitute one thing for another, allows the students' to participate in the production of materials, economical and more teacher-students' resource oriented. Improvisation of locally made teaching aids could assist to improve quality of graduates turn out from schools and standard of education generally. Abdu-Raheem & Oluwagbohunmi (2014) also asserted that the idea that resourceful and skillful teachers should improvise necessary instructional materials to promote academic standard in Nigerian secondary schools.

Agun (2007) reported that students in a completely materials based environment score significantly lighter than their counterparts in a class that had only the blackboard. In using local resources as instructional materials for teaching, the learning main goals are:

- To improve the lot of the society through proper preparation of students for future accomplishment.
- To make the students aware of the duty they owe the society.
- To prepare them well enough to discharge their duties to the betterment of their environment and the society, making in general variety of ways of teaching and the use of instructional materials bridge the gap when they present more concrete aids which influence the meanings.

The importance of relic to teaching needs not to be our emphasis as it makes teaching and learning easier, more effective, immediate and meaningful efforts should therefore be stepped up to provide improvised materials very abundantly in our schools. More so that emphasis nowadays is placed on relating to what is taught to the world view of the learners Akinyemi (2008). It is therefore important to improvise for the following reasons:

- To provide students a cognitive bridge between abstraction and reality of knowledge
- To widen the scope of inquiring.
- To develop students with the necessary process and practical skills.



- To provide materials in sufficient quantities thereby enabling students work independently.

Indeed, nature is so rich and all environments are endowed with unlimited natural resources that are available for resources, teachers are to tap from these resources in other to improve the teaching method.

Akinyemi (2008) noted that the basis for success in teaching is resourcefulness to be able to improvise require being resourceful and creative.

There are some steps that should be followed when improvising education materials which include:

- Identify the item to be improvised.
- Design and draw a rough sketch of the item.
- Study and understand the basic principles involves
- Make a list of the material needed.
- Construct the item(s) according to the given procedure to produce prototype (prototype fabrication).
- Test / evaluate by using it
- Massively produced if possible and if necessary.

Relevance of Instructional Material to Basic Technology

The need for instructional materials in Education dates back to ancient times. Since early times, man has made use of instructional materials to give expression to his feelings or demonstrate skills involved in some work. Mathematicians or philosophers traced out diagrams in the dust with a stick to illustrate the development of ideas; cave dweller used pictures to give expressions to their feelings; and son accompany father to the farm and watch him demonstrate skills involved in tillage or weeding. These led to the innovations being made and used today in the teaching-learning process. Okoro (1990) and Mkpa (1989) recommended the use of real objects in life situation for instruction. This implies the use of real objects or representation that will be meaningful to learners.

Teachers are required to employ instructional materials in their teaching in order to make sure that learning is more permanent in the minds of the learners. It is necessary that



teachers, especially Basic technology, teachers use instructional materials so that students can have the opportunity of seeing, hearing and manipulating which contribute to effective learning. Instructional materials enhance teaching and learning activities and consequently the attainment of the lesson objectives

The unique place of instructional materials as integral component of curriculum and instructional has traditionally been grossly misunderstood and correspondingly neglected by teachers of school subject, such as local craft on the basis of these negative attitude towards the use of instructional materials. Instructional materials are useful at different levels of education development be it primary, post primary or tertiary institutions. The fact that Basic technology involves psychomotor domain, practical skills are more important to the learners.

Characteristics of Instructional Materials

Adediran, (2014) opined that learning materials are essential part of practical teachings as such, in classrooms, pictures, charts and drawings should also be clear and neat. He further added that, it is not good for a teacher to plan a lesson without some ideas of how he/she will stimulate or motivate his/her students by using pictorial illustrations (pictures, diagrams and apparatus) or materials illustrations. Graphic materials to be used in classroom should be simple, attractive, large enough and not to be crowded with illustrations and colours. Ajayi (2008) pointed out that good teaching aids must have the following characteristics. This is because the importance of any instructional materials lies in its ability to:

- Appeal to the senses (sound and sight)
- Attract and hold attention
- Focus attention on essential elements to be learned at the proper time.

In order to achieve the above objectives, any materials to be used as teaching aids must satisfy the following characteristics.

Flexibility: In the college or university, the teachers have been taught different ways of teaching, while in the classroom a good teacher will attempt to teach his/her lesson using



a variety of methods and materials. He/she should therefore, select or construct teaching aids that can be instantly modified to suit change in the approaches to construction.

Colour: Since pupils are attracted by bright colours, these should be used in the preparation of teaching also however, too much brightness should be avoided since it may distract students' intention from the objectives of the lesson and the instructional materials.

Simplicity: Teaching aids must be simple and present only a far idea at a time. This is because, students cannot comprehend complex ideas presented to them at a short-time. If pictures are used, they should illustrate only a very far words or actions. If more detailed pictures are used, student will not know that they are to notice.

Visibility: All the smallest detailed to be used in an instructional material should be large enough to be seen by the students in the class. So, such should be placed conspicuously in front of the class to present a clear view to every student.

Ajayi, (2008) added that the characteristics of good teaching aids can be seen under the followings:

- Sufficiency: Teaching aids must be sufficient enough for use.
- Writing and Lettering: The Lettering or writing must be bold, clear, neat and readable.
- Attraction: That the aids must be neat and attractive to arouse the interest of students. All the lettering must be bold and attractive.
- Purpose: The information in the aids must help the students in learning and must be relevant to the lesson.
- Accuracy: They must be accurate in content and language. There should be no mistakes of facts or spelling, that is, misinformation.
- Clarity: All details in the aids e.g. drawings, pictures etc., should be easily seen by the students farther away from it. Aids such as radio, tape and television should be clear enough to be heard by all students.

Ajayi (2008) said that instructional materials help teacher's competence and effectiveness of instruction and class control. It makes the learning environment more attractive, appreciable, conducive, bearable and realistic. The learners' attention is better



controlled and sustained. Section ten in the National Policy in Education stated that objectives of learning materials are to:

- (i) Enhance teaching and improve the competence of teachers
- (ii) Make learning more meaningful for students.
- (iii) Develop and promote the effective use of innovative materials in schools.

In the same line, Buseri & Dorgu (2011) outlined the following reasons for the importance of using teaching aids in teaching and learning process in our educational settings. They aid learning by aiding the sense of seeing, hearing and touching. They direct teaching to its goals, makes lesson become interesting, arouse students' interest and motivate them to learn. Teaching-aids are valuable in the following situations:

- When the object of instruction is either too big or too small to be seen effectively by the students e.g. tractor, plough, ridges, and insect pest.
 - When an object is inaccessible to students, for example, fish pond, dams and irrigation scheme, such should be displayed to the class with models.
 - If an object is too expensive, dangerous or delicate for the students to use, for example a lesson on the treatment or prevention on a certain livestock diseases may involve the use of syringe and drugs, both may be impractical to have in the classroom.
 - When a process being studied is very slow – the teacher may use pictures or diagrams to illustrate the various stages involved, for example plants growth, insect stages – metamorphism, rather than physical observation of plant growth and stages of an insect.

Strategies for Effective use in Instructional Materials

Ikotun (2014) stressed that education must not be productively killed but even more importantly, it should aim at every citizen with the methodology of education that would lead to constant obsession of the locally available resources which will generate better understanding of the environment. Identifying society problem especially with regards to production eschewing superstition and pasty through dispassionate and objective analysis of environmental and societal problem which is turn should lead to rational projection,



development and nation that superstitions beliefs wield a significant amount of influence of the cultural milieu of most Africa rural dweller. This reveals that in most villages superstition constitutes a strong force, which affects the thinking belief and actions of both before of a conflict between education and superstition is generated in his mind thus, the teachers who aims at proper utilization of the instructional materials in teaching should endeavour to bring up her students with a view to purging their superstition beliefs and instantly replacing them with frication education facts.

Instructional Materials and Academic Achievement

There have been several studies on instructional materials and academic achievement. For instance, Isola (2010) conducted a research on the effects of instructional resources on students' performance in West Africa School Certificate Examinations (WASCE) in Kwara State. He correlated material resources with academic achievements of students in ten subjects. Data were collected from the subject teachers in relation to the resources employed in the teaching. The achievements of students in WASCE for the past five years were related to the resources available for teaching each of the subjects. He concluded that material resources have a significant effect on student's achievement in each of the subjects.

In the same manner, Abayomi (2017) carried out a research in Ilorin Local Government Area of Kwara State. She used questionnaires to collect data on the material resources available for the teaching of some selected subjects in ten secondary schools and related these to students' achievements in each of the selected subjects and to the amount of resources available for the teaching of the subjects. Finding showed a significant effect of material resources on the students' academic performance in these subjects.

In the same vein, Nwagu (2010) investigated the effect of instructional resources on the academic achievements of students in Ogun State. Five secondary schools in Abeokuta were used for this study. Questionnaires were designed to elicit responses on instructional materials that were available for the teaching and learning of each of the three school subjects he examined. He collected WASC examination results for five years and compared achievements of students in schools with adequate material resources and achievements of



students in schools with inadequate material resources. He found a significant difference in the achievements of the two sets of students. The schools with adequate instructional materials performed better than those with inadequate instructional materials.

Role of Instructional Materials in Basic Technology in the UBE Programme

Instructional materials are an aspect of the general facilities, which is very vital in teaching and learning Basic Technology. Teachers of Basic technology have the responsibility of sensitizing and stimulating learning process through the effective use of instructional materials. They support activities that have been planned to help learner achieve educational objectives.

Instructional materials stimulate learning. Their proper use promotes more meaningful communication and so enhances teaching and learning. Effective uses of materials teaching of Basic technology will encourage interest in learning because students' motivation individualized instruction and instant learning can be assured.

The impacts of instructional materials and strategies depend upon the manner and degree to which they meet the needs of the teachers and students. Instructional strategies and materials are selected based on the provision of accurate materials that will enrich and support the curriculum, taking into consideration the interest, abilities and maturity levels of Basic Technology students. Basic Technology teachers should be encouraged in every way to use instructional materials as it makes learning more concrete and meaningful (Buseri & Dorgu, 2011).

Agina-Obu (2009) submitted that instructional materials of all kinds appeal to the sense organs during teaching and learning. Isola (2010) also described instructional materials as objects or devices that assist the teachers to present their lessons logically and sequentially to the learners. Oluwagbohunmi & Abdu-Raheem (2014) acknowledged that instructional materials are such used by teachers to aid explanations and make learning of subject matter understandable to students during teaching-learning process.

In addition, Enaigbe (2009) stressed the importance of availability of instructional materials to achieve effectiveness in educational delivery and supervision in the school system. Ogbondah (2008) alerted on the instructional materials necessary to compensate



for the inadequacies of sense organs and to reinforce the capacity of dominant organs. He noted that school teachers should try their possible best in the provision of locally made materials in substitution for the standard ones to promote their lessons. Basic materials such as textbooks, chalkboard and essential equipment like computer, projector, bar chart, television and video are not readily available in many schools. Olumorin, Yusuf, Ajidagba & Jekayinfa (2010) observed that instructional materials help teachers to teach conveniently and the learners to learn easily without any problem. They asserted that instructional materials have direct contact with all sense-organs. Kochhar (2012) supported that instructional materials are very significant learning and teaching tools.

According to Akinyemi (2008) asserted that the importance of instructional materials for the successful learning and teaching, opined that learning and teaching are motivated as follows:

- Most of the students are stimulated by aids. They frequently activate the awareness of learning involving sight, sound, smell and taste.
- Teaching aids enhance one's learning.
- Teaching becomes fatigue when a variety of methods and materials are used and the teaching enthusiasm is maintainer.
- Individual differences are most adequate severed by using a variety of teaching aids.
- They help to raise learning from verbalization to true understanding through visual presentation.
- Teaching aids save the time of the teacher and students by providing clear out images and ideas of what is being taught.

It helps to overcome the limitation of sized spaces and time. For example things that are too large or too small to be seen can be reduced or enlarge in model home to the students in drawing or photographs. The development of modern technology and the richness of teacher training programs in modern society have placed within the reach of the teacher a vast way of teaching aids thus providing as escape from verbalization to concretized learning. Teaching aids are materials which make a tremendous enhancement of lesson impart of intelligently used.



Instructional materials restore confidence to the introductory technology teacher. A instructional materials gain the confidence of the learners. Instructional materials ensure better retention and transfer of knowledge. They provide direct experience with reality as well as encourage active participation and skill acquisition especially where students are allowed to manipulate tire materials and equipment.

Limitations of Instructional Materials Development

In realization of the vital role of the teachers in the production of instructional materials, the National Policy on Education (FRN, 2004) stated that teachers will be required to participate more in the production and assessment of educational materials and teaching aids and the evaluation of technical innovations and new techniques. These responsibilities make teacher producers and consumers of instructional materials.

Instructional resources as a way of material design and production possess great challenge as the country (Nigeria) is making attempt gradually to shift emphasis from importation of goods i.e. (reformation age). However, there are a lot of factors militating against improvisation in schools.

Asabia (2009), noted that the instructional materials ensure that the learners see, hear, feel, recognize and appreciate as they learn, utilize the five senses for modalities at the same time. The factors initiating against improvisation are as follows;

- **Lack of Basic Tools:** - Basic tools need to carry out the construction and design of materials are grossly lacking. Most of our schools lack functional technical workshops where there could be found. This has caused a lot of handicap for talented teachers who may want to improvise materials for specific instruction in the classroom.
- **Lack of Training:** - Most of our higher institutions of learning have no provision for improvisation of materials in their curricula. As such students are depriving the opportunity to appreciate the needs for constructing materials from local sources. More importantly, training workshops on improvisation are seldom organized for in-service training for teachers.



- **Technical factors:-** These are related to the technical know-how of teachers and the extent to which improvised materials can achieve accuracy and precision relative to the factory produced materials.
- **Lack of incentives:** - Teachers are not motivated enough to develop the positive attitude required in improvisation. The task of improvisation is demanding. It requires great dedication from teachers, subject government and school administrators (head) have a role to play through motivation of teachers.
- **Teachers' heavy workload:** - Teachers are often over loaded with subject allocation on the time table. This has hindered the improvisation of teaching aids to use.
- **Lack of finance:-** Many school administrators fail to support teachers when the teachers demand for money to embark on improvisation perhaps this is a result of little fund at the disposal of the administrator for the day to-day running of the school.

In a study carried out By Akinsehinde (1994), it was revealed that teachers of technical drawing encounter a lot of difficulties developing instructional material. The few ones available are inadequate. To worsen the situation lack of fund is another inhibiting factor.

A way out of the problem of inadequate instructional materials is to procure science and technology educational materials from government owned science equipment centers. Unfortunately, these centers have their own problems. Osemeikhlan (1989), highlighted certain factors imitating against optimum production of instructional materials by these centers. They include:

1. Limited capacity and versatility of machinery and equipment;
2. Non-availability of a wide range of raw materials; Public service mentality of some of the workers which sometimes retard the pace of which jobs are executed;
3. Some of their methods tend to be labour intensive and not suitable for speedy mass production.

Nnadi (1989), remarked that the use of improvised gadgets can assist in demystifying the unreal "mystery" commonly associated with ready-made or imported equipment.



Conclusion and Recommendations

Since the Universal Basic Education Programme is supposed to take off in September 2000, and junior secondary school in September 2000, one wonders what arrangements the Federal and State governments are making towards the provision of instructional materials for the teaching of introductory technology. There is urgent need for the federal and state governments in Nigeria to start making adequate arrangement for the provision of instructional materials for the take off of the universal Basic Education. Government can establish instructional material resource center in each local Government Area where schools could rent the materials they want.

Teachers should be trained in the area of improvisation so that they can easily make needed materials. Students tend to do better when they master the subject properly through active involvement in improvisation of these resources. Teachers should as well be trained in the use of instructional materials.

REFERENCES

- Abayomi, T. S. (2017). Analysis of gender performance in physics colleges of education, Nigeria. *Journal of Education and Practice*, 4(6). ISSN 2222-288X.
- Adediran, A, A (2014). *Students centred Teaching methods and utilization of instructional strategies for effective social studies teaching*, paper presented at the 58th World Assembly of the international council on Education for teaching (ICET) at the university of Ontario institute of technology, oshacma, ontario, Canada between 15th-20th June, 2014.
- Adeobye, A. and Afolabi, O. (2009). *Instructional Materials and Students' Academic Achievement in Science Subjects*. Jos: Jos University Press Limited.
- Agina-Obu, T.N. (2009). *The Relevance of Instructional Materials in Teaching and Learning in Robert-Okah. I & Uzoeshi, K.C. (Ed). Theories are Practice of Teaching*, Port Harcourt: Harey Publication.
- Agun, A. (2007). *Instructional strategies some essential considerations in Alaezi O. (Eds) Ground work of teaching strategies in Nigeria*, Jos: Fab Anieb (Nigeria) Ltd.
- Akinsehinde, E. (1994). Production and utilization of instructional materials for Technical drawing. *Vocation Journal*, VII, 27-37.



- Akinleye, L. (2010). *Principles and Methods of Teaching*. Accra: Black Mask Ltd.
- Akinyemi, A. K. (2008). Investigation-oriented instructional approaches to the Nigeria Secondary School Science Subject, *Nigeria Journal of curriculum Studies* 2(2) 67-74
- Asabia, D. N. (2009). "An Investigation into the Relationship Between Instructional Resources and Students' Academic Performance in Secondary Schools in Abeokuta Local Government Area of Ogun State of Nigeria". An Unpublished M.Ed Thesis.
- Burseri, J.C and Dorgu, T.E (2011). *The relevance of instructional materials for effective curriculum delivery in Nigeria*. proceeding of state faculty of education Lagos State University
- Enaigbe, N. (2009). Influence of sex difference of students on their achievement in secondary school Mathematics. *Journal of Mathematical Association of Nigeria*, 25(1), 102-113.
- Bassey, A. (2009). *Instructional materials in forms: An appraisals of concept forms and use: Onitsha Publishers Ltd.*
- Federal Republic of Nigeria (2004). *National Policy on Education*. (4th Edition). NERD Press.
- Mkpka, M.A. (1989). *Curriculum Development and Implications*, Owerri, Totan publishers.
- Okoro, O. M. (1990). A comparative study, of two methods of teaching orthographic projection in technical drawing. A seminar paper presented at University of Nigeria, Nsukka.
- Osemeikhan, J.E. (1989). Conceptualization production, standardization and maintenance of Educational materials. Keynote Address Delivered at the NERDC/BCEDA/symposium Fair on science and technology Educational material. University of 35. 11-15, September.
- Ikotun, F. (2014). *STAN Physics for Senior Schools*. Heinemann Educational Book publishers, Nigeria.
- Isola, O.M. (2010). Effects of Standardized and Improvised Instructional Materials Students' Academic Achievements in Secondary School Physics. M. Ed Thesis, University of Ibadan, Ibadan.
- Kochhar, W. (2012). *Government and Education Analysis of the Historical legal and Political basis of Education Management*, University of Ibadan Press.
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- Nwagu, N. (2010). Biology Teachers' perceptions on the utilization of material resources as a way forward for effective biology education. In O.S. Abonyi (Ed), *52nd Annual Conference Proceeding of Science Teachers' Association of Nigeria (STAN)*, 210 – 216, Ibadan, HEBN Publishers Plc.
- Obaru, J.K & Okoh, C. (2009). *Instructional materials production: the need for improvisation and innovation* Africa Journal of Education and Developmental Studies (AJEDS) 2 (1 & 2), 129-136.
- Ogbondah, N. E. (2008). Effective resource utilization. A better Approach to Teaching and learning of physics. *Academic Journal of Interdisciplinary Studies*, 2 (6), 35 – 39.
- Olumorin, C. O., Yufuf, A, Ajidagba, U. A. & Jekayinfa, A. A. (2010). Instructional Media and Their Sources for Teaching and Learning Tertiary Institution, A Nigeria perspective. *African Journal of Educational Studies*.4 (2), 128
- Oluwagbohunmi, M. F. & Abdu-Raheem, B. O. (2014). Re-engineering Science Education for Sustainable National Security. *West African Journal of Education*, 35(20).145-155.
- Osakwe, E (2009) *Navigating the nation through today's shame to tomorrows fame*. Social studies at pilat 17th in the series of inaugural lectures, Delta State University, Abraka, Feb 29th.
- Oso, R. (2011). *Navigating the nation through today's shame to tomorrows fame*. Social studies at pilat 17th in the series of inaugural lectures, Delta State University, Abraka.