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**FROM THE DESK OF THE EDITOR IN CHIEF
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(KIJE)**

KWASU International Journal of Education (KIJE) is an international and interdisciplinary journal that publishes scholarly articles, research based findings and position papers with relevance to Education. It is expected that this Journal would provide the platform where scholars in education and its allied disciplines all over the world would make contributions to knowledge, practices and policy formation that would impact on quality education and society at large.

The articles in this edition of the Journal focused on issues and trends in the general education of learners across all levels of education. Some of the areas covered by the contributors include Information and communication technology as it affects learning behavior and development of children, learning difficulties, particularly in science education, curriculum development, issues and trends in the education of children with special needs, enhancing positive life living through sporting activities among others.

I like to thank all the contributors for making the publication of this maiden edition a reality. I also wish to commend particularly the efforts of the Editorial Board of this edition of the Journal. This Journal is the brainchild of the College of Education, Kwara State University, Malete, Nigeria.

To all our contributors, I look forward to your continued patronage please.

Professor Muhammed Baba Gambari
Editor In - Chief

KWASU INTERNATIONAL JOURNAL OF EDUCATION (KIJE)

Calls for papers

The Editorial Board of Kwasu International Journal of Education (KIJE) invites articles from scholars for consideration and publication in her Journals which will be published twice in a year, January and July respectively.

Guidelines for manuscripts

1. Manuscripts submitted for publication should be 15 pages maximum, including references, using New Times Romans, 12.Font. Articles must be typewritten, double spaced on one side only and on A4 paper. Author's name, contact address, email, telephone number(s), and a brief bibliographical note should be typed on a separate sheet and attached to the article.
2. Articles should be preceded by an abstract of not more than 200 words
3. Figures, tables and drawings should be clearly drawn and the positions marked in the text. Pictures where applicable should be very few black and white glossy print
4. Quoted passages of more than three lines should be extracted. Shorter quotations should be enclosed in double inverted commence.
5. Footnotes are not permitted. The Journal follows the author/ date system of station, by which reference is made in the text by citing the authors surname and date of publication. Generally, authors are expected to follow the American psychological Associations writing style.
6. All works sighted in the text must be listed under references in alphabetical order of author's surnames.
7. The editorial Board reserves the right to accept or reject manuscripts after peer review
8. An author of a published work will receive one copy of the Journal free.
9. An author is to submit a self-addressed A4 size envelope with postage stamp for mailing the Journal.
10. Article must be submitted in three hard copies and one electronic copy [in Microsoft word

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SCIENCE TEACHERS' MISCONCEPTIONS OF BASIC SCIENCE CONCEPTS AS REVEALED IN CLASS LESSONS DELIVERED IN PUBLIC JUNIOR SECONDARY SCHOOLS IN ILORIN METROPOLIS, NIGERIA

By

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Abstract

This study identified misconceptions of basic science concepts held by the Basic Science Teachers in Ilorin Metropolis, Kwara State, Nigeria. Thirty-two teachers selected purposely from twenty randomly selected Public Junior Secondary Schools took part in the study. Data gathering was done using an Audio Tape Recorder. Forty lessons thought by the thirty-two Basic Science Teachers were recorded on audio tape and analyzed in the study. Findings from the study indicated that the Basic Science Teachers held misconceptions related to basic science concepts. The study advocated upward review of admission requirements into the science teacher education programme. Also, the study called for the re-introduction of the Teacher Vacation Courses and the commencement of the mandatory Teacher Professional Development scheme.

Science Teachers' Misconceptions of Basic Science Concepts as Revealed in Class Lessons.....

Key Words: Basic Science, Class Lesson, Junior Secondary School, Science Teachers, Misconceptions,

Introduction

The fact that teachers can only teach their students what they know is not debatable herein lies the significance of high-quality teachers in education delivery. Indeed, the pivotal role of quality teachers in providing quality education is well documented in the 6th edition of the National Policy on Education (FRN, 2013). The Teachers Registration Council of Nigeria (TRCN) also noted that “no education system can rise above the quality of its teachers” (p.8) (TRCN, 2004). The results of the study conducted by Agharuwhe (2013) in Nigeria revealed that effective teachers produced students with better academic achievement. The sustained public outcry for durable solutions to the abysmal performance of Nigerian students in public examinations within the past few decades attest to the low quantity of education currently in place. Major shareholders rightly identified the poor teacher quality as a significant factor responsible for the worrisome poor performance of students in public examinations in the country (Wadup, 2014, 7th September). Evidence from literature equally suggests that the quality of teachers, particularly at basic education level, is applauding. For instance, in the year 2008, Kwara State administered a test on 19,125 primary schools teachers in Primary Four Mathematics. Results of the test showed that only seven teachers passed the test in while only one of the 2,628 graduate teachers passed the test. The result also indicated that only 1.2 percent passed the test in literacy (Ladipo, 2013). A similar assessment was conducted in Oyo State among primary school teachers. The results of the study revealed that the teachers are deficient in both disciplinary (especially science) and pedagogic knowledge as reported by Agoro and Akinsola (2013).

In the current post-modern era advancements in modern science and digital technologies (ICTs) exert profuse influence on sustainable socioeconomic growth and development. Individuals now more than ever before have to be scientific literate and also e-literate to be a successful member of the society. Indeed sustainable development is no longer possible in any field of human enterprise without modern science and ICTs. Hence, it is now imperative for every citizen to acquire and utilize knowledge of basic science and ICTs for survival, comfortable living and meaningful contribution to the

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Introduction

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society. The inclusion of basic science into the school curriculum is to ensure that students become functional members of the nation in future through acquisition and utilization of basic science and ICT knowledge and skills. It is also to lay a solid foundation for future scientists and technologists who would power the economy of the country. There is no doubt that only high-quality science teachers can accompany these tasks successfully. It is therefore, imperative to probe into the quality of science teachers. Basic Science Teachers' level of mastery of basic science concepts, processes and ethics as well as pedagogic skills is thus a sine-qua-non for the achievement of the aims and objectives of science education in the nation.

There is sufficient evidence in science education literature that Nigerian student's academic achievement in science discipline is poor. Students' misconceptions of basic science concepts among others have been identified as the major factor responsible for the students' poor academic achievement in science disciplines (Abimbola, 2013). Several studies were conducted on sources of students' misconceptions in science (Abimbola, 2013; Abimbola and Baba 1996; Bello 2004, Amen and Gunstone 1992, Soyibo, 1988; Rayla and Rayla, 2006), but only a few studies focused on science teachers' misconceptions. The unwillingness of teachers to subject themselves to knowledge assessment (Premium Times 2014, March) accounted for the draught of studies on science teachers' misconceptions.

Literature in the field of science education revealed that teaching and learning of science are fraught with misconceptions. The history of research interest on students' misconception of science concepts according to Boo (2006), is traceable to the early works of Piaget (1929 and 1930) on children' conceptions of natural phenomena. Students' misconceptions are traceable to many sources as suggested by researchers. Some of the sources includes; (i) teachers, (ii) everyday experience and observation, (iii) perceptual thinking, (iv) textbook diagrams and statements, (v) anthropogenic thinking, (vi) didaskologenic (vii) Internet and (vii) semantic confusion among others (Bello, 1997a; Boo, 2006; Sesen, 2010; Wikipedia, 2014). It is important to note that these sources of misconceptions do overlap as rightly explained by Boo (2006).

In 1988, Soyibo conducted a study on misconceptions of science held by the Nigerian undergraduate biology pre-service teachers. The results of the study indicated that both the first year and the final year pre-service teachers held several misconceptions related to selected biology concepts. A similar study was carried out by Bello (1997b), among pre-services science teachers to determine their understanding of the concept of living things. A total of 73 first-

year science student-teachers from two colleges of education took part in the study. Findings from the study revealed that the pre-service science teachers held many misconceptions and alternative conceptions related to the concept of living things. Amen, and Gunstone (1992) also carried out a study on the understanding of some selected science concepts among Nigerian science teachers using clinical interview and achievement least as data gathering instrument. Findings from the study revealed that the science teachers' understanding of the selected science concepts was very poor. The science teachers were noted to hold the same range of misconceptions as funds among students. Bello (2002) carried out a study on Biology teachers' conception of biology concepts. Results of the study clearly revealed that all the biology teachers held several misconceptions related to biology concept that they taught their students. The average number of misconceptions per teacher and per lesson was found to be 7.8 and 6.2 respectively. In Singapore, Boo (2006) conducted a study on biology teachers' misconceptions of biology concepts. Findings from the study revealed that the examination questions set by the biology teachers were fraught with misconceptions of basic biology concepts held by the teachers.

Statement of the Problem

Given the immense impacts of science on human beings, it is not surprising that science educators and researchers, as well as the general public are worried about the abysmal performance of students in science subjects. Reasons adduced for the students' poor achievement in science by researchers include misconceptions of science concepts held by students and teachers alike, poor mode of instruction, misconceptions in science textbooks, and lack of science laboratories among others (Abimbola, 2013; Rayla and Rayla, 2006). In recent times cognitive psychologists with constructive epistemological perspectives clearly indicated that learning is a process of conceptual change where individual learners construct their personal meanings of concepts and natural phenomena. (Ausubel, Novak, and Hanesian, 1978; Novak, 1991; Yager, 1991). It is apparent that an individual student or teacher can hold misconceptions by constructing the idiosyncratic meaning of science concepts that are at variance with the widely accepted meaning of the concepts in the scientific community. It is thus apparent that students' misconception in science is unavoidable and would continue to impinge on learning outcome.

The United Nations Educational, Scientific and Cultural Organization (UNESCO), (2002) noted that ICT has become the basic building blocks of modern society. This suggests that in the present millennium no citizen can be a functional member of the society without being a scientific literate and e-

literate person. Basic science offers unique opportunity for every student to become scientifically literate through acquisition of basic science products, processes, and ethic. However, meaningful learning of basic science is significantly hampered by many factors such as misconceptions, dearth of supplementary textual materials in basic science, access to the Internet, and virtual library services, etc. These factors among others compelled most Nigerian Junior secondary school students to depend almost entirely on their teachers' lecture note. Consequently, Basic Science Teachers' scientific knowledge and skills to a large extent determine the students' level of science knowledge and literacy. As argued earlier, teachers can only teach what they know, thus their misconceptions related to science concepts can readily diffuse into the students' cognitive structure. The focus of this study was thus on identifying teachers' misconceptions of basic science concepts as part of efforts to improve effective teaching and meaningful learning of basic science concepts by the students.

Purpose of the study

This study attempted to determine whether Basic Science Teachers held misconceptions of basic science concepts that they taught their students.

Research Questions

- (1) Do Basic Science Teachers held misconceptions related to basic science concepts?
- (2) What are the sources of the misconceptions of basic science concepts held by the teachers (if any)?
- (3) How prevalent are Basic Science Teachers' misconceptions of basic science concepts?

Sample Selection

The study population consisted of all the Science Teachers in public Junior Secondary schools in Ilorin metropolis. Simple random sampling technique was used to select 20 Junior Secondary Schools from Ilorin metropolis. All the 32 Basic Science Teachers in the 20 randomly selected Junior Secondary Schools volunteered to participate in the study. They thus, were purposely selected as the representative sample of the target population of the study.

Research Instrument

The instrument used for data collection was an Audiocassette tape

recorder. It was used for audio recording of the basic science lessons taught by the selected teachers.

Date Gathering and Analysis

Data gathering in this study was carried out through the use of audio cassette recorder. Forty basic science lessons taught by the 32 Basic Science Teachers were audio recorded in the study. The recorded lessons were then carefully transcribed verbatim. The content of the lessons were subjected to qualitative analysis to identify misconceptions of basic science concepts held by the teachers. Simple percentage and mean computation were then used to analysis the data statistically.

Validation of the Identified Misconceptions Held by the Teachers: The identified misconceptions of basic science concepts held by the teachers were submitted to three science education lecturers for validation. They were asked to judge the correctness of the researcher's classification of the teacher's conceptions as misconceptions in according with the definition of misconception as used in this study. (Misconceptions are ideas that are incompatible with the current scientists' conceptions of scientific concepts). The validators were also asked to analysis the transcribed basic science lessons for identification of misconceptions. The comments of the validators were used by the researcher to produce a final list of misconceptions of basic science concepts held by the Basic Science Teachers shown in Table 1.

Results

Research Question 1: Do Basic Science Teachers held misconceptions related to basic science concepts?

One thousand and forty-three (1043) basic science concepts words were identified in the 40 Lessons delivered by the 32 Basic Science Teachers. Qualitative analysis of the 40 basic science lessons revealed that the teachers held only 37 misconceptions that are related to 22 basic science concepts shown in Table 1. Misconceptions were identified in all the 40 basic science lessons delivered by the 32 teachers. Apparently, all the 32 Basic Science Teachers held some misconceptions related to basic science concepts. The result clearly provided the answer to research question 1. The result is consistent with the findings of the earlier studies conducted by many researchers in Nigeria (Amen and Gemstone, 1992; Bello, 2002; Soyibo, 1988). The identified misconceptions spread across the three school science subjects namely, biology, chemistry and physics.

Table 1
Samples of Misconceptions Held by the Basic Science Teachers

Concepts	Misconceptions	Sources
Pathogen	Mosquitoes cause malaria	Internet / Textbooks/ perceptual thinking/ Observations
	Tsetse fly causes disease like sleeping sickness	Textbook / semantic confusion / perceptual thinking
Skeleton	Air borne diseases are cause by air	Semantic Confusion
	Skeleton is the hardest part of the body	Textbooks / Observations
Breathing	All animals breathe out carbon dioxide and breath in oxygen	Didaskologenic / Textbooks
	Plants breath out oxygen because it is not useful for plants	Textbooks/Internet
Respiration	You breathe in oxygen and breathe out carbon dioxide that is use by plants	Textbooks/Internet/ Didaskologenic
	Respiration is the act of breathing in oxygen and breathing out carbon dioxide	Didaskologenic /Electronic sources
Growth	Growth is increase in size and weight	Everyday experience / Observation/ semantic confusion
Germination	Soil, sunlight, water are necessary for seed germination	Didaskologenic/Textbook/ Observations
Development	Development means advancement	Semantic confusion
Habitat	Habitat simply means places where both plants and animals live	Textbook / Non -Internet electronic sources
Organism	Organism means plant and animals	Didaskologenic/ Textbooks
	All living things can move from one place to another	
Food	Food is made up of three types of element, carbon, hydrogen and oxygen	Didaskologenic/ Textbooks
	Vitamins are always present in any food we eat	Didaskologenic
	Deficiency means lack of protein	
	Organ responsible for absorption of food is called Villi.	Didaskologenic
	A breakfast of rice, meal of beans and bread in the afternoon, super of bread and egg is balances diet.	Didaskologenic
	Excretion is activity of the body that breaks down body substances and produces waste substances.	
Nerve	Nerve is the force that carries impulses from every part of the body to the brain.	
	Motor neuron carries information to the brain	Observations
Seed	Some seeds are called cotyledon	Textbooks
	We can define seed as anything that comes out from the plant	Observations
Blood	Seeds are very tiny things inside the fruit	
	The protein in the blood is called hemoglobin	Textbooks

Science Teachers' Misconceptions of Basic Science Concepts as Revealed in Class Lessons.....

pH Value	A solution with PH value of 7 means that the hydrogen presents in it is very high compared with a solution with PH value of 6	Didaskologenic
Matter	Matter is anything that has no particular or specific unit These are character that you can see physically	Didaskologenic / perceptual thinking
Atom	Atom is the smallest indivisible particle of an element	Textbooks
Purification	Purification means making something pure and free from anti body	
Molecule	A molecule is an aggregate of two or more particles Molecules do not exist on their own they have to pair up	Didaskologenic
Magnet	A magnet is made up of iron or steal that is why it attracts iron and steal	Perceptual thinking
Echo	What brings a kind of vibration of sound to your hearing is Echo.	
Wave	Wave is a disturbance that travels to a medium and transfers energy without any damage to the medium and even itself.	Didaskologenic

Research Question 2: What are the sources of the misconceptions of basic science concepts held by the teachers (if any)?

A search for the probable sources of the identified misconceptions of basic science concepts held by the teachers was conducted through surfing the Internet, literature, relevant textbooks and non-internet electronic educational materials. Results of the search revealed that some of the misconceptions are traceable to textbooks and the Internet. For instance misconceptions such as (i) 'Mosquitoes cause malaria' was traced to a website (www.malarianomore.org/pages), and (ii) 'You breathe in oxygen and breathe out carbon dioxide that is used by plants' was traced to www.answers.yahoo.com and www.smh.com.au/1212259085199.html. Abimbola and Baba (1996) had earlier documented the existence of the misconceptions 'we breathe in oxygen and breathe out carbon dioxide' in a biology textbook widely used in Nigeria. A common misconception 'All living things can move from one place to another' was also traced to textbooks such a Basic Science textbook authored by Abdullahi (2013) among others. Three misconceptions, (i) 'Soil, sunlight and water are necessary for seed germination' (ii) Habitat simply means places where plants and animals live' and (iii) 'Respiration is the act of breathing' were traced to an electronic educational material, the Microsoft Encarta for Kids (2009). Probably sources

of other identified misconceptions of basic science concepts held by the teachers include didaskologenic, everyday experience, semantic confusion and perceptual thinking. (see table 1) This result provided the answer to research question 2. The various probably sources of misconceptions identified in the study were similar to those identified by many researchers (Bello, 1997a; Boo, 2006; Sesen, 2010; Wikipedia, 2014) Also, the sources of misconceptions do overlap as rightly explained by Boo (2006).

Research Question 3: How prevalent are Basic Science Teachers' misconceptions of basic science concepts?

The teachers misconceived only 22(2.1%) out of 1043 basic science concepts identified in the 40 lessons. It was evident from the preceding figures that the prevalence level of misconceptions held by the teachers was very low. The result provided the answer to research question 3. However, none of the 40 lessons was free from misconceptions, indicating that every teacher held misconceptions of basic science conception as shown in Table 2.

Table 2
Quantitative Analysis of the Identified Misconceptions of Basic science Concepts Held by Teachers

No of Teachers	32
No of Lessons	40
No of basic science concepts identified in the lessons	1043
No of basic science concepts misconceived by the teachers in the lessons	22 (2.10%)
No of basic science lessons with misconceptions	40 (100%)
No of teachers that held misconceptions of basic science concepts	32 (100%)

Discussions

A major finding of this study indicated that teachers held misconceptions of basic science concepts in their cognitive structure. The finding is a strong evidence indicating that Basic Science Teachers are a major source of students' misconceptions of science concepts and poor academic achievement in school science disciplines. The finding is a worrisome situation because students often rely heavily on whatever their teachers taught. The existence of misconceptions of basic science concepts in the cognitive structure of the teachers is the greatest obstacle to laying a solid knowledge base for further learning by the students. Misconceptions taught by the teachers are likely to be highly resistant to change because most students regard teachers as the authority in their field of

specialization. It is not unlikely that most teachers teach in the same way they were taught and even repeat what they were taught to their students during class lessons. Indeed, some of the teachers' misconceptions were noted to be very similar to those held by many secondary school students identified by several researchers (Ameh and Gunstone 1992. Abimbola 1986. Bello 1990, 1997; Soyibo 1988). Misconceptions consistently repeated in this manner could take the semblance of accepted scientific concepts, herein lies the obstacle to meaningful learning posed by teachers' misconceptions.

In an attempt to enhance the meaningful learning of complex and abstract basic science concepts such as Respiration, teachers often spontaneously make use of analogies, metaphors and other similar instructional strategies to simplify the concepts during class lessons. Oversimplification of abstract and complex basic science concepts and casual use of analogies and metaphors do often result in misconceptions (Wikipedia, 2013). This type of teacher induced misconceptions known as Didaskologenic misconceptions. In this study, some misconceptions of basic science concepts held by the teachers were most likely from Didaskologenic source. This source of misconceptions seems to suggest that some of the Junior Science Teachers embarked upon rote-learning rather than meaningful learning during their schooling. It equally indicated that the teachers most probably do not update their knowledge of the topics they intended to teach before teaching their students. The existence of misconceptions of basic science concepts in the cognitive structure of the teachers calls to question the quality of the teachers. Indeed, evidence abounds in science education literature (Adewumi, 2002 and Olawepo, 2000) that only a few teachers in Kwara State had professional qualifications to teach Basic science.

The current global trend in the education sector is towards delivering educational services through the use of modern digital Information and Communication Technologies (ICTs). These electronic resources are gradually becoming popular and accessible to teachers and students alike in Nigeria. The Internet and CD-ROM based educational software are especially popular as sources of knowledge among the teachers and the students. There are credible indications that the majority of Internet users viewed information from the internet as reliable and credible (Ackman, 2003; Zogby, 2009). Results from this study, however, pointed to these Internet resources as sources of misconceptions of basic science concepts. There are no official regulatory bodies to authenticate the content of information made available on the Internet. Consequently, it will remain for a long time an important source of

misconceptions. Misconceptions from the Internet source may be highly resistant to change because most Internet users erroneously perceived it as a very reliable and accurate source of information. Teachers and students alike should, therefore, always make use of established guidelines for determining the reliability and accuracy of the information on the Internet and non-internet electronic educational materials.

Textbooks are indispensable in teaching and learning process thus; it is worrisome that textbooks contained misconceptions of basic science concepts. A major finding of this study indicated that teachers held misconceptions of some basic science concepts that are the same as those identified in some textbooks. The finding is an indication that teachers often take for granted the reliability and accuracy of textbooks information.

Results of this study showed that some of the misconceptions held by the teachers are traceable to their daily observations of natural objects, events, and phenomena as well as perceptual thinking. It is amazing that some of the teachers relied on their daily observations and perceptual thinking to provide explanations during class lessons instead of relying on sound scientific perspectives. It is equally surprising that some teachers exhibited semantic confusion. They were unable to distinguish between the common and the scientific meanings of some concept words such as Growth and Development as shown in Table 1. These results seem to indicate the deficiency in the teachers' disciplinary knowledge.

Conclusion

In view of the major findings of this study, it is evident that the Junior Secondary school Science Teachers held misconceptions of some basic science concepts, indicating that they are a major source of students' misconceptions of science concepts. The sources of the misconceptions of science concepts held by the teachers include; the Internet, Textbooks, Didaskologenic, Observations, Semantic confusion and Perceptual thinking. The frequency of the teachers' misconceptions per lesson was low. The existence of misconceptions of basic science concepts in the teachers' cognitive structure indicated that teachers possess inadequate knowledge of some basic science concepts

Recommendations

Improving the quality of the Basic Science Teachers could eliminate or at least significantly reduce the prevalence of misconceptions attributed to

Didaskologenic source. It is thus essential to re-introduce the Teacher Vacation Courses (TVC) and commence the mandatory Teacher Professional Development (TPD) schemes. Only professionally competent teachers with specialization in the field of Basic Science Education should teach the subject to reduce misconceptions during class lessons.

Although textbook authors owe the users the responsibility of providing reliable and accurate information in their books, teachers should not take textbook information for granted. Teachers should always make use of multiple sources of information when preparing for a lesson. Also, textbook authors should regularly revise their books to eliminate misconceptions and old information. Teachers should always screen textbooks for misconceptions before recommending any book for students to use.

References

- Abdullahi, T. (2013). *Basic Science For Junior Secondary Schools*. Ilorin: Grace Excellent Publishers.
- Abimbola, I. O. (1986). The alternative conceptions of human respiration held by selected form four students. *Journal of curriculum and instruction* 1 (1), 48-68.
- Abimbola, I. O. & Baba, S. (1996). Misconceptions and alternative conceptions in science textbooks; the role of teachers as filters. *American Biology Teacher*, 58. 14-19
- Abimbola, I.O.(2013). *The Misunderstood word in science: Towards a technology of perfect understanding for all*. Ilorin, Nigeria. The Library and Publications Committee, University of Ilorin, Ilorin, Nigeria.
- Ackman, D. (2003). *For 53% reliable information*. Retrieved from www.forbes.com>2003/01/31
- Adeniyi, E. O. (1985) Misconceptions of selected biological concepts held by some Nigerian students. *Journal of Biological Education*, 19 (4), 311-316.
- Adewumi, C.B. (2002). *A survey of Basic Science Teachers in secondary school in Ilorin metropolis*. Unpublished B.Sc. (Ed.) project, Faculty of Education, University of Ado-Ekit

- Agharuwhe, A . A. (2013). Effects of teachers' effectiveness on students'academic performance in public secondary schools ;delta State-Nigeria. *Journal of Educational and Social Research*, 3(3)1p.105-111.
- Agoro, A. A., & Akinsola, M., K.,(2013). Effectiveness of reflective-reciprocal teaching on pre-service teachers' achievement and science process skills in Integrated Science. *International Journal of Educational Research*, 1(8),159-178.
- Ameh, C.O. &Gunstone, R.F. (1992). The understanding of selected science among Nigerian secondary school science teachers. *Journal of Science Teachers Association of Nigeria*, 27(2) 30-36.
- Aworanti, O.A. (1994). *Effects of the use of a conceptual change instructional programme on senior secondary students' performance in biological concepts*. Unpublished Ph.D. Thesis Department of Curriculum Studies and Educational Technology. University of Ilorin, Ilorin, Nigeria.
- Baptiste, P.H. (2000). Will there be science literacy for his millennium? *Proceeding of the 41st Annual Conference of Science Teachers Association of Nigeria*. P. 12-22.
- Bello, G. (1997a). Effects of two forms of concept mapping istructional stratgies on senior secondary school students'achievement in evolution. Unpublished Ph.D. Theasis ,Department of Curriculum and Educational Technology, University of Ilorin, Nigeria.
- Bello, G. (1997b). Pre-service NCE science teachers' conceptions of living things. *Nigerian Educational Digest* 3 (1), 34-39
- Bello, G. (2000). Senior secondary school students' knowledge misconceptions and alternative conceptions of a major biology proposition *Ilorin Journal of Science Education* 2 (1), 43-52.
- Bello, G. (2001). *Conceptions of science and science teaching held by science teachers: Implications for National Development*. Paper presented at the 4th Zonal Conference of Nigerian Association of Education for

Science Teachers' Misconceptions of Basic Science Concepts as Revealed in Class Lessons.....

National Development (NAEND) held at College of Education Ikere 4-9th May.

- Bello, G. (2002). Biology teachers' misconceptions of biology concepts: Implications for biology teacher education. *Nigerian Journal of Counseling and Applied Psychology*. 1 (1), 145-151.
- Bello, G. (2004). Selected secondary school biology students' preconceptions of evolution: Implications for teaching evolution. *Institute Journal of Studies in Education*. 2(1). 50-62.
- Bello, Z. A. (2014). Senior Secondary School Students' Misconceptions and Alternative Conceptions of Selected Biology Concepts . *Unpublished M'Ed. Thesis Department of Teacher Education, Faculty of Education University of Ibadan Nigeria*. .
- Boo, H. K. (June, 2006). Primary science assessment item setters' misconceptions concerning the state of changes of water. *Asia-Pacific Forum on Science Learning and Teaching*, 7 (1).
- Federal Republic of Nigeria. (2013). *National Policy on Education*. Lagos: NERDC Press,.
- Ladipo, A. (2013, February 12). Education Sector in Criss. *Vanguard* , p. Retrieved from www.vanguardngr.com.
- New York Science Teacher. (nd.). *Science Misconceptions*. Retrieved from www.newyorkscienceteacher.com/..index.php
- Novak, J. D. (1991). Clarify with concept maps: A tool for students and teachers alike. *The Science Teacher*, 58, 45-49.
- Teachers Registration Council of Nigeria (2004). *Teachers Code of Conduct*. Abuja: Author.
- Olawepo, A. B. (2002). *A survey of professional qualifications of Basic Science Teachers in selected secondary schools in Ilorin metropolis*. Unpublished B.Sc. (Ed.) project, Faculty of Education University of Ado-Ekiti.

- Ralya, L.L. & Rayla, L. L. (2006). Some misconceptions in science held by prospective elementary teachers. *Science Education*, 22(5) 244 -251 Retrieved from www.onlinelibrary.wiley.com.
- Sesen, B. A. (2010). Internet as a source of misconception: Radiation and radioactivity. *The Turkish Online Journal of Educational Technology*, 9(4) Retrieved from www.tojet.net/article/v9i4/949.pdf.
- Soyibo, K. (1988). A comprise of first and final year undergraduate student-teachers' knowledge and misconceptions of selected biology concepts. *Journal of Research in curriculum*, 5 (1), 7-42.
- Times, P. (2014, March 22). Edo Teachers Shun Competency Test. *Premium Times*, p. Retrieved from www.premiumtimesng.com/nesw/158019.
- UNESCO. (2002). *ICT in education: A curriculum for schools and programme of teacher development*. Paris: Division of Higher Education, UNESCO
- Wadup.com. (2014, september 7). *Stakeholders Blame Poor Exam Performance of Nigerian Students on Teaching, Indifferent Parents & Technological "Distraction"*. Retrieved from www.wadup.com.ng
- Wikipedia. (2013, june). *Didaskologenic*. Retrieved from <http://en.wikipedia.org/wiki/Didaskalogenic>
- Wikipedia. (2014). *Scientific Misconception*. Retrieved from www.wikipedia.org/wiki/scientific
- Yarger, E.C.(1991). The constructivist learning model: towards reform in science education. *The Science Teacher*, September, 1991, 52-57.
- Zobgy, J. (2009). Why do people trust the Internet more? Retrieved from www.forbes.com>2009/06/17>media

