

***A Publication of the Faculty of Education,  
Lagos State University, Ojo, Lagos.***

# CIENCE AND VELOPMENT



*Komfandor*

# SCIENCE AND DEVELOPMENT

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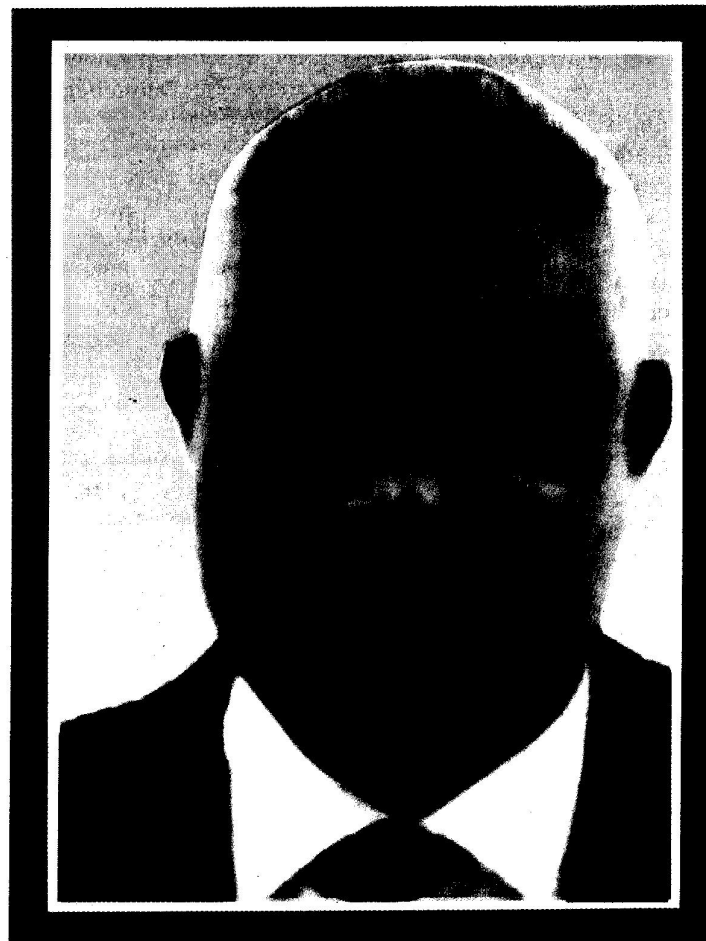
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**PROF. EMMANUEL OLAGUNJU ODUBUNMI**

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Teachers' Grade II Certificate  
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July, 1978  
M.PH Science Education  
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Doctor of Philosophy (Ph.D) - Science Education  
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Ibadan Local Schools Board, Secretariat, Ibadan  
1969 - 1972  
Elementary Class Teacher/Head Teacher  
Nigeria Youth Service Corp, Community Secondary  
School, Enugu State  
1975 - 1979  
Graduate Teacher/Head of Science Department  
Oyo State College of Education  
1960 - 1964  
Senior Lecturer  
National University of Lesotho in South Africa  
1996 - 2002  
Served while on leave of absence  
Lagos State University, Ojo, Lagos State  
1984 - till Date

### Teaching Experience at the University Level

Apart from teaching at the primary, secondary and College of Education levels, I have handled or I am handling some of the following courses at the University level for the past twenty eight years.

### Lagos State University

Taught courses to include: General Teaching Methods, Tests, Measurement and Educational Statics, Educational Research Methods, Introduction to Curriculum Development Curriculum and Instructional Strategies in Science, and Theories of Learning Applied to Science Education

Educated students to include courses in biology and integrated science to include: Variety of Plants, Basic Ecology, and Basic Genetics???

### Administrative and Management, Experience

Lagos State University, Ojo Lagos State, Nigeria  
1964 - 1994  
Head, Biology Unit, Department of Curriculum Studies  
1966 - 1996

Coordinate of Teaching Practice and School Attachment  
Program, Faculty of Education  
1992 - 1994

Head of Department, Curriculum Studies in five  
different occasions  
Head of Science Unit, Department of  
Curriculum Studies  
1994 - 1999

Chief Coordinator, Sandwich Degree Program  
1994 - 1996

Dean, Faculty of Education  
2003 - 2005

Chairman University Admission Committee  
2003 - 2005

Chairman Senior Staff Disciplinary Committee  
2006 - 2006

Dean, Faculty of Education  
2006 - 2006

Member, Lagos State University Governing  
Council  
2005 - till date

Chairman, ASUU Ethnic Committee  
1996 - 2002

National University of Lesotho

Statutory Member of Senate

Member, Faculty of Education Executive

Faculty Research and Conference Committee

Chairman Committee on PGDE Program of the Department of Science  
Education

Reviewer and Editor of Textual Materials (Science) Developed for Distance  
Learning.

Member - Faculty of Education Executive Board, Faculty Research and  
Conference Committee, Committee of

Professors, Organising Committee of the National Conference on  
Mathematics, Science and Technology Education, Organizing Committee of

1999 BOLESWA Conference and Workshop organized by the Ministry of  
Education for Teachers in Research Methodology

Learning Teaching Education Project, World Bank Sponsored  
2001 - 2002

### Academic Awards And Distinctions

University of Ibadan Scholar for Masters and Ph.D Programs  
1980-1983

Appointed Chairman Board of Governors, Government College,  
Ojo Lagos  
1989-1991

External Examiner, University of the Western Cape for Masters

Dissertation Exaternal Examiner to University if Ibadan for Ph.D Thesis

External Examiner, Ed.h Cowan University, Western Australia for

Ph.D Thesis Consultant for National Teachers Institute, Kaduna  
2008 - till  
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Consultant for Universal Basic Education Commission  
2010 - till date

Appointed Chairman,, The Apostolic Schools Board  
2010 - till date

Chaplain, Lagos State University  
2010 - till date

Master's Courses Taught



Psychological Foundations of Science Education, Historical Foundations of Science Education, Philosophical Foundations of Science Education, Test Development in Curriculum Research, Curriculum Evaluation, Research Methods, Instructional Strategies in the Sciences, and Supervised many master's dissertations Ph.D Courses Taught Advanced Statistics, Advanced Research Methods, Curriculum Implementation, and currently four Ph.D Students

**National University of Lesotho** 1998-2002

Taught courses to include: Biology Methods, Science and Society, Curriculum Development, Educational Statics and

Education Research Methods at PGDE level

Tai Solarin University of Education, Ogun State, Nigeria

2008 - 2009

Taught the following while on Sabbatical leave:

Biological Techniques, Biology Teaching Method, and Projects Supervision

#### **Research Experiences**

Preformed Researches Focusing on Science Teacher Education, Curriculum Design and Implementation, Classroom interaction, and Science Instruction Strategies including metal cognitive strategies Participated in a research to a?? That was accepted and funded by Canadian Development Agency - Participation of girls and women in Science and Technology Education in Lesotho by Odubunmi E. O. Maruping M.

Surveyed several universities of Science and Technology in Nigeria to determine how far they have pursued their objectives Led a research team on "The Impact Assessment of the Federal Teacher's Scheme (FTS) in the Western Zone Participated with other consultants in a research project on repositioning of National Teacher's Institute Kaduna

#### **Research in Progress**

Biology, Chemistry, Physics Teachers' Science Teaching Orientations, Classroom Practices and Students Achievement in the subject Comparative Analysis of Senior Secondary School Students' World -view, Classroom Practices and achievement Science

Poor Performance in Science Subjects: Will Integrated Teaching Strategy solve the problem?

#### **Member of The Academic and Professional Bodies**

Member - Educational Studies Association of Nigeria Science Teachers' Association of Nigeria, Biology Panel; Integrated Science Panel, National Association of Research in Science Teaching based in U.S.A. Association for the Education of Teachers in Science.

#### **Publications**

ODUBUNMI, E. O. (1991): Analysis of Plot Teachers' learning outcomes in Primary Science Journal of the Science Teachers Association of Nigeria Vol. 27, No1

ODUBUNMI, E. O. BALOGUN, T. A. (1991): The Effect of Laboratory and Lecture Methods on Cognitive Achivement in Integrated Science Journal of Research in Science Teaching. Vol. 28 No.3

ODUBUNMI, E. O. (2001): Improving Science Teacher Education Program (STEP) through Research Based Strategy. Science Education International Vol. 12 No. 1

ODUBUNMI, E. O., (Reviewer and Ed.) 2001: Diploma Education Primary Science Year 1-Distance Teacher Education Program (DTEP) NTT, Ministry Education, Lesotho.

ODUBUNMI, E. O. (2006) Science and Technology Education Nigeria: The Euphoria, Frustrations, and Hopes, 21<sup>st</sup> Inaugural Lecture, Lagos State University.

ODUNMI E. O. (2008): Curriculum Implementation in Nigeria: Its Influence on the dynamics of Education in Lagos

State in (Odubunmi and Okuneye, Eds) Dynamics of Education in Lagos State in the 21st Century, A publication 1 of the

Faculty of Education Lagos State University', pp 311-322

ODUBUNMI E. O. (2009): Science Education Challenges in (Kayoda Oyesiku, Segun Ogunsaju and Joshua Oni) Contemporary School Administration in Nigeria 169-84. Tai Solarin University of Education.

#### **Recent Publication in Journals and Edited Proceedings**

ODUBUMI, E. O. And ONAFOWOKAN, B.A.O (2003): Relative effects of Hands-on Experience and Expository Teaching Strategies on Students' Retention of Learning Materials in Science. Educational Perspectives Vol: 6. No. 1, 1-10

ODUBUNMI, E. O. (2005): Scientific and Technological Development in Emergent Societies in (Nwatoku, N.C. Akinpelu B. And Makinde. S. O. Eds.) Education: A Socializing Agent, P263-286

ODUBUNMI, E. O. (2005): Practical Approach to the Teaching and Learning of Genitic Concepts in (Oke. M., Ango M. C., Odeyemi J. O. Nwosu I. J. And Etokebe, I. J. Eds) Proceedings of the 2005 national' Biology Panel Workshop held at the Benue State University. P1-13

#### **Few Commissioned**

ODUBUMI, E. O. (1997); Observing Science Teachers Teach. Paper delivered as Guest Lecturer at the 1st STAN Workshop for School Heads, Principals and Administrators

## Foreword

**Science and Development** is a book of readings in honour of *Professor Emmanuel Olagunju Odubunmi*. The book contains well researched articles on the following subthemes:

- *Science Education for Development*
- *Science, Technology and Development*
- *Sciences, Humanities and Development*
- *Sports Science, Health Education and Development*
- *Science and Management Education*

This book of readings is a repository of knowledge on science and its relationship with development. It is hoped that the information therein will be of immense benefits to the solution of problems and challenges of development in Nigeria.

Professor Odubunmi has devoted his time and energy to science education throughout his stay in the university system. This is so because he believes that science education has intrinsic value for human development and improvement of quality of life, as well as being a tool for building a better society for all and sundry.

The book is divided into various chapters. The authors are seasoned, experienced and respected scholars from across the country. Contributors paid much regard to simplicity and clarity of language to make it a book of interest to all.

The effort of members of the editorial board and that of the faculty board members are highly appreciated.

Thank you and God bless

**Prof. R.O. Okuneye**  
*Dean Faculty of Education*  
*Lagos State University, Ojo*

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## Teacher Preparation and Participation in Sciences: A Stock-Taking of Transactions

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### Abstract

*This study examined teachers' preparation and participation in sciences. A descriptive-survey research design was adopted. Population included science education students in tertiary institutions and in-service science teachers. Of these, 200 in-service teachers 10 from each of the 20 existing local government of Lagos state were selected by simple random sampling. Data was collected in two stages; through a self developed questionnaire and secondary source. Simple frequency and percentage was used to analyse data. Findings revealed the unsatisfactory state of teachers' preparation and lack of opportunity for retraining in a quest for quality assurance*

### Introduction

Teaching is an arduous task and carries heavy responsibilities; it therefore requires a specialized training to inculcate the needed knowledge, pedagogical skills and ethics of the profession. In most African countries however, teaching has been regarded as a job for ll comers {Ciwar,2003}. There are also a large number of persons {birds of passage} who use teaching as a stepping stone to other professions Okebukola,1998.

Everyone found in the classroom claims to be a teacher and there seems to be no clear yardstick for determining a teacher.

A teacher is an individual who has acquired adequate content knowledge, pedagogical knowledge and pedagogical -content- knowledge through exposure to training in a formal school settings. In Nigerian

universities two forms of degree are awarded ; a bachelor of Science/Education degree (B.sc/Ed) which combines training in content knowledge domicile in Faculty of Science with training in pedagogical knowledge domicile in Faculty of Education. The second option is a Bachelor of Education degree ( B. Ed) with options in specialized fields of science. Training in content and pedagogy take place in Faculty of Education. There is a rave argument on the extent of coverage of content in this arrangement. This process of training entails acquisition of theoretical and practical knowledge.

The process of teacher preparation requires adequate attention because a country's quality of education cannot rise above the quality of its teachers {FGN ,2004}. The present forms and methods of preparing future teachers deserve a focus in view of continuous criticisms on the quality and quantity of teachers in Nigeria. Plethora of studies had admonished the present bunch of teachers for their shallow content knowledge {Okebukola,1998 }, lack of pedagogical skills {Ajewole, 2005; Odubunmi, 2001}, poor attitude {Owolabi & Okebukola, 20009}, and lack of commitment {Ofoegbu,2005}.

There is a raving controversy on whether the increasing failure rate in public examination was a result of poor quality of teachers. It becomes imperative to examine the structure of teachers' preparation and participation in schools. Attention is however focused on sciences in view of the increasing failure rate in science subjects (WAEC, 2009) and the needed emphasis on scientific and technological development.

### Methodology

This is a descriptive-survey research designed to inquire into the process of enhancing the abilities and capabilities of human resources in the teaching profession. Population included science education students in tertiary institutions and in -service science teachers in Lagos State , Nigeria Public Secondary Schools . Of these, 200 in-service science teachers 10 from each of the 20 existing local government were selected by simple random sampling as sample for the study.

Data was collected in two stages; the first stage involved collection of data through a self-developed questionnaire titled questionnaire on retraining of science teachers (QRST). The questionnaire dealt with issues relating to the training of teachers. It consisted of eight types of training programme (improvisation, teaching method continuous assessment, management of large classes, teaching difficult topics in sciences, usage of science curriculum and further studies). Teachers were to indicate the types of training acquired, when the training was received and the body organizing the training. QRST was validated by giving the initial draft to two science

education lecturers in Lagos State University. Necessary modifications resulting from their criticisms and reviews improved the content validity of the instrument. The reliability of the instrument was established using the test-retest method within an interval of two-weeks, this produced a correlation co-efficient value of 0.82.

Data was also obtained from the secondary source at the second stage. This involved a documentary analysis of the records of students' enrolment in each of the tertiary institutions, undergraduate students' performances, students entry admission requirements, nature of training available in Nigerian tertiary institution; in-service teachers teaching qualification and experience. Data was analysed using simple frequency and percentage.

### Results

**Table 1 : Students' enrolments in education and science education (2008/09 academic session)**

School	Students Enrolment in College/Faculty	Students Enrolment in Science Education	Ratio of Science to other Disciplines
LASU	1061	141	3.22
UNILAG	4700	882	17.83
AOCOED	1021	154	7.43
LACOPED	1000	167	7.43
FCEA	2606	638	1.4

Source : Faculty offices of the institutions

Table 1 shows that the enrolment of students' in science education is low. Table 1 also shows that the ratio of 60:40 (science:arts) policy provision has not been achieved.

**Table 2: Students Entry Requirements and Academic Performance in Nigerian Universities**

Variables	Academic performance in percentage	Index of Performance
Students' entry requirements	50 which represents half of the overall scores in the university entrance examination	Education courses (Science) attracted the least cut-off marks or entry qualification for admission in all Nigerian universities.
Undergraduate Students		Overall students

Performance		performance index
1 <sup>st</sup> class division	0.02	showed that students' who studied education performed far below their counterparts from faculty of science in the content courses
2 <sup>nd</sup> class upper division	5.32	
2 <sup>nd</sup> class lower division	58.26	
3 <sup>rd</sup> class division	26.66	
pass	09.76	

Table 2 reveals that students' entry requirements to science education is the least possible. Table 4 further reveals that majority of the undergraduates science students (58.26%) are of average ability level.

**Table 3: Percentage Distribution of Science Teachers' by Teaching Qualification and Experience.**

Variables	Nature	Percentage
Teaching Qualification	University graduates with no teaching qualification.	22.15
	University graduates with teaching qualification	32.30
	Non university graduates (NCE).	26.80
	Non university graduate (HND)	08.75
Teaching Experience	Below 10 years	35.63
	Between 10 years' and 20 years	58.64
	Above 20 years	05.73

Source :Ministry of education, Lagos state

Table 3 shows that less than half of the teachers' (32.30%) possess university degree with teaching qualification. Table 3 further reveals that more than half of the teachers (58.64%) possess teaching experience spanning over two decades.

**Table 4:** Frequency and Percentage of In-Service Teachers' Response on Nature of Training Received

Types of Training	Nature of Training				
	Induction	Refresher	Further Studies	Total Numbers of Teachers Trained	Total Number of Teachers not Exposed to Training
Improvisation	22(11.0)	26(13.5)	Nil	48(24.0)	152(76.0)
Teaching method	23(11.5)	50(25.0)	Nil	43(36.5)	127(63.5)
Continuous Assessment	45(22.5)	63(21.5)	Nil	108(54.0)	92(46.0)
Management of large classes	16(8.0)	60(30.0)	Nil	76(38.0)	124(62.0)
Teaching difficult topics in science	12(6.0)	43(21.5)	Nil	55(27.5)	145(72.5)
Usage of science curriculum	Nil	23(11.5)	Nil	23(11.5)	177(88.5)
Further studies(B.Sc., M.Ed.,M.Sc.)	Nil	Nil	37(18.5)	37(18.5)	163(81.5)

Table 4 reveals generally that few training opportunities are offered to in-service science teachers. It therefore means that science teachers are denied opportunities to update their knowledge.

**Table 5:** Frequency and percentage of in-service teachers' response on body organizing training.

Types of Training	WAEC	STAN	TESCOM	NERDC	SCHOOL
Improvisation	Nil	48	Nil	Nil	Nil
Teaching Method	Nil	33	25	Nil	15
Continuous Assessment	Nil	54	30	Nil	24
Management of Large Classes	Nil	36	22	Nil	18
Teaching Difficult Topics in Science	Nil	40	10	Nil	05
Usage of Science Curriculum	Nil	Nil	23	Nil	Nil
Further Studies	Nil	Nil	37	Nil	Nil

Table 5 shows that STAN, TESCOM and the school organize one or more types of training listed. Table 5 further reveals that WAEC and NERDC as examining body and curriculum development agency respectively have no contribution to the professional training of teachers.

**Table 6:** Nature of Programme Offered (University only) for 2008/2009 Academic Session

S/N	Nature of Training	Percentage of Institutions Offering the Programme	Degree Awarded
1	Education and Science (with options)	50.0	B. Ed
2	Science Education	11.5	B. Sc(Ed)
3	Teacher Education (with options)	15.4	B. Ed



4	Curriculum and Teaching (with options)	15.4	B. Ed
5	Curriculum and Instruction (with options)	7.7	B. Ed

Source : Joint admission and matriculation board ume/ de brochure. 2008/2009 academic session

Table 6 shows that there is a wide disparity in the nature of programme offered by universities in Nigeria. Table 6 further reveals that 11.5% of the universities gave much preference for the content knowledge to be offered in science (B sc Ed) while 88.5% of the universities gave preference for both the content and pedagogical knowledge in education.

#### Discussion of Findings

Finding of this study showed that students' enrolment in science education was low compared with the overall enrolment in the faculty/school of education. This is in agreement with Okebukola (1998) observation that there was low enrolment of students in education generally. It implies that science education courses have not attracted enough patronage from students. This low enrolment in science education poses a serious threat to the employment of qualified science teachers.

Another finding of this study is the low requirement for entry into science education courses. This is in agreement with Okebukola (1998) assertion that the lowest of barrel of students fill the education faculty. The low criterion of admission observed in this study possibly was due to low patronage of admission seekers into science education. This also accounted for the average academic ability displayed by science graduates. Invariably, these teachers showed little content knowledge, pedagogical knowledge and content pedagogical knowledge. As the popular adage goes: "garbage in garbage out". This implies that the quality of graduates is a function of the quality of intakes into science education programme.

This study further revealed that there is a wide disparity in the nature of programme offered in the various universities. This finding is in support of National Universities Commission observation for a need for accreditation of courses in Nigerian universities. Variance in structure of supposedly same programme among institutions could bring about differences in the qualities of graduates and discrimination among graduates of same programme.

As revealed by the findings of this study, there are more of the in-service teachers without teaching qualification. This finding is in agreement with National Manpower Board (2000) that there is inadequate supply of skilled

and well-trained people. This situation has forced government to employ teachers who graduated from such related fields as engineering and sciences to teach in schools. Despite this, students'-teacher ratio is still very wide (Okebukola, 1998). Availability of greater number of untrained teachers (without pedagogical knowledge) portends a serious threat to quality of teaching in schools. Perhaps the preponderance of lecture method among science teachers (Owolabi, 2008) was a consequence of the lack of pedagogical content knowledge of this category of teachers.

This study revealed further that there are more teachers with teaching experience spanning two decades in schools. This is a good development which might compensate for the large number of untrained teachers in schools. However, a yearning gap could be created in future when these teachers eventually retire. This is in view of the poor enrolment experienced presently in science education.

This study further revealed the inadequacy of efforts in retraining of science teachers. This finding provides further empirical support to the assertion that science teachers lacked the needed training to implement the science curriculum as desired (Ivowi, 1988). Retraining of teachers is highly desirable in view of the fact that where teachers do not undergo refresher courses, they tend to lose assess to current trends in their discipline. Keeping abreast of new knowledge in terms of methodology and pedagogical skills requires a continuous process of retraining. Jeanpierre, Oberhauser, and Freeman, (2005) noted that teachers are always enthusiastic about innovations. And that no matter the level of enthusiasm of teachers about innovation, their commitment to change is usually weakened by failure of programme developers to keep regular contact with teachers.

#### Conclusion

This study has revealed the unsatisfactory state of science education in Nigeria. This is due to numerous lapses which reside more at the corridor of teachers' professional development and teacher education programme.

#### Recommendations

- Strategies should be evolved to attract more students into science education. These may include: Payment differential in school fees ; Scholarships and automatic employment on completion of programme and teaching practice allowance.
- Regular retraining opportunities should be created for all teachers. Retraining should form the basis of criteria for promotion of science teachers.
- Train the trainer technique should be encouraged in schools to fast track the dissemination of information.

## Towards a Competency Based Reading Curriculum for Emergent Literacy In African Schools

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- d) Admission criteria in science education should be reviewed upward irrespective of enrolment.
- e) Harmonization of science education programme should be carried out to bring out a uniform structure.
- f) Only trained teachers should henceforth be employed in schools. Teachers without training should be given a mandatory five years ultimatum to acquire training and get certificated or be retired.
- g) Science teachers allowance should be reviewed to make it meaningful. The allowance should be paid regularly.
- h) Salary differential in civil service at first appointment between teachers with qualification and those without should be pronounced. The present one step differential has little impact.

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### Abstract

No country in the world today needs to make a case for the teaching of reading in schools. Rather, reading is a vital component of any national curriculum. This is in realization of the fact that reading is one of the most rewarding pursuits in life and an art that is central to human development. Achieving success in subject areas ranging from social studies to science requires that students are able to comprehend texts in such subjects. Through reading individuals develop insights of world beyond the life that they actually live. However, the apparent decline in reading achievement in our school system stares us all in the face. Researchers and educators continue to explore the various facets of the problem towards proper diagnosis and intervention. An important area to which the search light should be beamed is in the area of curriculum development. Critical pedagogy can help to alleviate reading problem it has become evident that we as educators must do more to prepare our children for the 21<sup>st</sup> century. This paper contributes to the accomplishment of this goal by examining how African children are taught to read in schools. It examines the literacy curriculum and the possibilities it creates for these children to become contributory citizens in the local and global communities when they grow up. Literacy development calls for effective teaching methods and teachers must be trained to acquire competency in teaching, reading and remediation strategies. To this end, the paper proposes a framework for a competency based curriculum designed for the achievement of reading efficiency at the pre-primary and primary levels of formal education.

### Introduction

The central plank of African governments' strategy to equip the nations for the new world order has been the stress on education. It would appear that education is the only policy area that hopes to improve the situation of the nations in future. In the case of Nigeria, its current policies can be best summarized by President Yar'Adua's seven point agenda.