

Science Teachers Association of Nigeria

SCIENCE, TECHNOLOGY AND MATHEMATICS (STM)
EDUCATION FOR SUSTAINABLE DEVELOPMENT

STAN

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UCHENNA NZEWI

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| | |
|---|-----|
| The Relevance of Learning Resources in the Effective Teaching of Science, Technology and Mathematics (STM) | |
| <i>Umoru D. Audu & Oghogho K. Bake</i> | 73 |
| Prospects and Challenges of E-learning in Tertiary Education: Designing and Development of E-learning in Education and Training | |
| <i>Usman E. Ochoyi & Esaduwha O. Stanley</i> | 77 |
| Sub-Theme F | |
| Breaking the Gender Gap in Science Education through the Application of Indigenous Technology: Implication for Sustainable Development | |
| <i>Sr. Dr. Felicia M. Opara & Elekalachi C. I.</i> | 81 |
| Female Education in Science, Technology and Mathematics and Sustainable Development in the New Millennium | |
| <i>Professor M. A. Wasagu & Mrs. Rabi Muhammad</i> | 86 |
| The Under Representation of Females in Science, Technology and Mathematics: Implication for the Universal Basic Education Programme and Sustainable Development | |
| <i>Mrs. Rabi Muhammad</i> | 89 |
| Achieving Gender Equity in Science, Technology, and Mathematics (STM) Education through Co-operative Learning: Implications for Sustainable Development | |
| <i>Dr. Charles U. Eze</i> | 93 |
| Biology Panel | |
| Effect of Constructivist-Based Instructional Model on Senior Secondary Students' Achievement in Biology | |
| <i>Rev. Ofonime F. Ndioho</i> | 98 |
| Improved Practical Approaches to Biology Teaching for Sustainable Development in Nigeria | |
| <i>Hauwau Isa</i> | 102 |
| Chemistry Panel | |
| Towards Inculcation of Chemistry Practical Skills in Students: Teachers' Difficulties | |
| <i>Ugwu Anthonia</i> | 106 |
| Achieving National Economic Empowerment and Development Strategy (Needs) through Chemistry | |
| <i>Abbas A. Babayi</i> | 110 |
| Environmental Education Panel | |
| Science, Technology and Mathematics Education and Biodiversity Conservation for Sustainable Development in Africa: Challenges & Future Directions | |
| <i>Dr. Adeniyi G. Ajewole & Ben B. Akpan</i> | 113 |
| Students' Perception, Attitude and Practical Steps taken Towards Sustainable Development of the Environment | |
| <i>Michael A. N. Arove</i> | 118 |
| Sustaining Environmental Sanitation through Adequate Waste Disposal Methods to Eradicate Land Pollution Menace in Calabar South L.G.A. of Cross River State | |
| <i>Scholar E. Ncharam & Cecilia K Bissong</i> | 122 |
| Energy Generating Machines and their Effects in an Academic Environment: Implications for Sustainable Development | |
| <i>Felicia O. Agbo & Emmanuel Taukek</i> | 126 |

CONTENTS

PAGE

| | |
|---|------|
| Members of the National Executive Board, 2007..... | vii |
| Members of the Conference Planning Committee..... | viii |
| Foreword..... | ix |
| Preface..... | x |
| Presidential Address | |
| <i>Professor Paul Eniayeju</i> | 1 |
| Sub-Theme A | |
| Science, Technology, and Mathematics (STM) Education for all Students: Promoting Effective Teaching of STM Subjects in our Schools through Teacher Preparation <i>Dr. S. B. Olorukooba</i> | 3 |
| Strategies for Involving Industry in the Professional Humanpower of Vocational, Technical and Technology Educators <i>Dr. S. O. Adenle & Dr. C. O. Oke</i> | 7 |
| The Quality of Human Resources for Teaching Science in Primary Schools in Niger State: Implication for Sustainable National Development <i>A. T. Akinsola, Janet Lawal & M. R. Oyedokun</i> | 15 |
| Issues on Human Resource Development for Science, Technology and Mathematics Education (STME) in Nigeria <i>Dike Ngozi & K. J. Ndokwo</i> | 19 |
| Sub-Theme C | |
| Engendering Learning Equity in Science and Technology Classrooms for Sustainable Development <i>Dr. Z. C. Njoku</i> | 24 |
| Sub-Theme D | |
| Curriculum Enrichment of Science Technology and Mathematics Education as a Basis for Sustainable Development <i>Dr. Akinyemi Folasayo Orukotan</i> | 32 |
| Building a Sustainable Science Curriculum in Nigeria: Accommodation Local Adaptation, Leveraging Technology and Enhancing Areas of Improvement for Quality Assurance <i>Dr. Ayodele O. Ogunleye</i> | 36 |
| Strategies for Developing Teachers' Competences and Skills in Book Development for Sustainable Science, Technology and Mathematics Education in Nigeria <i>Dr. Ben C. Uzoechi</i> | 45 |
| Selected Classroom Practice for Improving the Science Curriculum in Nigeria <i>Mohammed Musa Balasa & Mohammed Bello</i> | 49 |
| Sub-Theme E | |
| Effects of Learning Resources on Students' Performance <i>A. O. Aderounmu, O. A. Aworanti & Kasali J. A.</i> | 52 |
| Science, Technology and Mathematics (STM) Education for Sustainable Development: The Need for a New Perspective: Creating E-learning Environments in our Higher Education Institutions for the Sustainable Development in Science Technology & Maths Educ. in Nigeria <i>Dr. Ayodele O. Ogunleye, Dr. C. O. Oke & Dr. B. F. Adeoye</i> | 58 |
| The State of Learning Resources in Secondary Science, Technology and Mathematics (STM) Education for Sustainable Development in Lagos State <i>Dr. Ogunmade T Oludare & Okedeyi S. Abiodun</i> | 68 |

Gender & STM

Belief-Systems and Gender Disparity: Implications for Science and Sustainable Development in the Wake of HIV/AIDS Epidemic

Dr. Ndubisi I. Anyanwu 131

Home Economics

Laboratory Safety Consciousness among Home Economics Teachers in Secondary Schools in Kontagora Local Government Area of Niger State

Mrs. A. A. Situ 136

Correlation between Students Grades in Home Economics in WAEC and NECO Examinations in 2003/2004 and 2004/2005 Academic Sessions

Mrs. C. A. Olarewaju 143

Integrated Science Panel

Utilisation of Floor Puzzle in Improving NCE Students' Achievements in some Integrated Science Concepts

Mrs. Ese M. Alake 150

Hausa Cultural Practices and STM Instructions: Implications for Interpretational Abilities among Integrated Science Pre-service NCE Teachers in Kano State

Hussaini Yahaya Peni 154

Mentoring Beginning Integrated Science Teachers: A Strategy for the Sustainable Development of STM Education in Nigeria

Dr. C. O. Oke, Dr. S. O. Adenle, Dr. Ayo Ogunleye & Dr. S. A. Adeyemo 158

Mathematics Panel

Mathematics Education for Sustainable Development

Dr. Adebola S. Ifamuyiwa 162

Mathematics Teachers' Development and Professional Conduct Necessary for a Sustainable Development in STM Education: Curriculum Perspectives

Adesoji O. Aderounmu 166

Curriculum Issues: Educational Reforms and the Need for a Focus on Mathematics Education as Critical Element for Sustainable Development

Thomas D. Bot 172

Recreational Mathematics: Its Values and Uses in Mathematics Instruction in Primary and Secondary Schools

John E. Eze 176

Physical & Health Education

Sustainable Health Education: Implementation of the Family Life and HIV/AIDS (FLHE) Programmes in Schools

Dr. Nkadi Onyegegbu & Prof. O. C. Nwaorgu 182

Appraisal of Syllabi Contents of Physical Education in Senior Secondary School: Implication for Sustainable Development

Dr. R. O. Okuneye, Tony Dansu & E. K. Abraham 188

Consumer Education: A Tool for Sustainable Development in the Health of Secondary School Students

Mrs. Pauline U. Ademiju 193

Academic Discipline and Gender Differences in Secondary School Students' Knowledge and Practices on Communicable Diseases

A. N. A. Soboyejo 196

APPRAISAL OF PHYSICAL EDUCATION LESSONS IN PRIVATE PRIMARY SCHOOLS IN LAGOS STATE

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and

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Abstract

A typical primary school curriculum is expected to include physical education programme that enables pupils to participate in variety of physical activities on regular basis. This study appraised the trends of physical education lessons in private primary schools in Lagos State. 46 physical education teachers and 500 pupils participated in the study and two sets of questionnaire with reliability values of 0.68 and 0.81 were the main instruments for data collection. The data collected were analysed using percentage and Weighted Mean Score (WMS). Findings revealed that there is high percentage of non-specialists teaching physical education in private primary schools in Lagos State, thereby leading to poor emphasis on content areas, and this in turn leads to poor curriculum implementation.

Introduction

Physical education as an integral part of the total education programme, for too long, has not lived up to its name. According to Delisio (2006), traditional physical education classes provide too little activity to too few students, offer little or no guidance for maintaining a healthful lifestyle, and this can make less athletic children feel inadequate, which can further turn them off exercise. Elementary physical education is a planned sequence of activities that should afford pupils the opportunity to achieve competency in a variety of movement forms (Physical Education Home, 2006).

In an ideal elementary physical education class, pupils learn to apply movement concept to the development of motor patterns and integrated movement sequences. This helps greatly in providing personal fitness potential as a major programme outcome among the pupils. According to San Juan Unified School District (2006), a typical primary school curriculum should include physical education that enables pupils to participate in a variety of physical fitness and recreational sports programmes on regular basis. In an earlier submission, Scott (1992) opines that pupils in primary schools must be taught aerobic exercises that must be prevention and protection oriented.

Scott (1992) stresses that involving pupils in properly planned and executed physical education programmes can influence the major systems of their bodies, reduce the risk of coronary heart diseases, improve tolerance for stress and promote wellness. Moreover, children who become physically fit are more likely in later year to exert control over health risks and avoid behaviours that are counter productive to good health. According to Scott (1992) physical activity engaged in as a child can encourage fitness throughout ones lifespan. Many adults did not learn the value and benefits of exercise as children especially those of aerobic nature; hence, they lack positive exercise behaviour. Future adults (i.e. pupils) can escape this poor habit if there is well planned and executed physical education programme in schools. Proper execution of physical education programme requires certain basic factors that include qualities of teachers and what is taught. Previous studies report very high percentage of non-qualified physical education teachers in schools and poor teaching of subject matters (Okuneye & Dansu, 2005; Keinde, 2002; & Okuneye, 1997). On the issue of teachers' knowledge of physical education skills and evaluation ability, Okuneye (1997) reports that physical education teachers in primary schools do not adequately possess required knowledge and ability.

According to Okuneye (1997), physical education programme is extremely important to the society and its foundation should be laid in primary schools. In the new generation of physical education emphasis are on programmes that stress life-long fitness activities (Delisio, 2006). In line with this new trend, schools

around the world have renovated their gymnasium to look like fitness centres and revamped their curriculum to emphasise fitness over competition (Delisio, 2006).

However, Okuneye (1997) posits that facilities and equipment required for teaching physical education in primary schools should be simple ones that can be largely improvised. This is based on the fact that most activities of physical education at this level of education is simple and natural to human movement and as such the needed facilities and equipment should not be expected to be sophisticated; rather they should be simple to be acquired within the immediate environs. This implies that inability to construct a world-class gymnasium in the schools is not an excuse for poor implementation of physical education programmes.

Preference is given by many Nigerians to private schools, mindless of their relatively expensive services. Services of these schools are expected to be of high quality and relevance to individuals and the entire society. To what extent have the private primary schools fulfilled this obligation in provision of quality physical education? This study was conceived to investigate the current trends in physical education lessons in selected private primary schools in Lagos State, Nigeria.

In doing this answers were sought to the following research questions;

1. Are the teachers qualified to teach physical education?
2. To what extent is physical education taught in private schools?
3. What are the content areas emphasised in physical education lessons?

Methodology

Participants

The population of this study includes all physical education teachers and pupils in private primary schools in Lagos State. 46 teachers were selected using purposive sampling technique from twenty government approved private primary schools in five Local Government Areas of the state. 18 (39.1%) of the teachers were males, and average age for all the teachers was 36.7 years, while the average year of teaching experience was 6.8 years. And among the pupils, 500 primary four to six pupils were selected using simple random sampling technique at the average of 25 pupils per school. 312 (62.4%) of the pupils were females and average age for all the pupils was 9.2 years.

Instrumentation

The main instruments for data collection in this study were two sets of structured questionnaire developed by the researchers on physical education lessons in primary schools. One of the questionnaires was meant for the teachers and the second one for the pupils. The two sets of instrument had two sections each (i.e. section A & B). section A dealt with the demographical data of respondents, which include sex, age, qualification, area of specialisation and teaching experience (in years). In addition to this, school records were also consulted to re-affirm qualifications of teachers. Section B of the instruments sought information on extent of teaching and content areas emphasised during teaching of physical education.

The two sets of questionnaire were validated by four professional colleagues, and they were further subjected to test-retest method for reliability test. The *r* values were 0.81 and 0.68 for teachers' and pupils' questionnaires respectively.

Administration of Instrument

The schools where participants were selected were visited by researchers and their trained assistants for data collection. The consents of participants and the schools authorities were sought for and granted. Thereafter copies of questionnaires were administered to the selected teachers in their offices and to the pupils in some classrooms during break periods. The researchers gave guidance to the participants (especially the pupils) where required, and all administered copies of questionnaire were retrieved.

Data Analysis

The data collected were coded and analysed using frequency counts, simple percentage and Weighted Mean Score (WMS) with criterion value set at 2.50. These were further described via pictorial analysis of component bar charts.

Results

Table 1: Frequency and Percentage Distributions of Teachers by Specialisation

| VARIABLES | FREQUENCY | PERCENTAGE |
|-----------------|-----------|------------|
| Specialists | 17 | 37 |
| Non-specialists | 29 | 63 |
| Total | 46 | 100 |

The result presented in table 1 shows that only 17 (37%) of the 46 teachers that participated in this study were Physical Education specialists while 29 (63%) of them were non-specialists. Specialists as used in this study connote one who has minimum of Diploma or National Certificate of Education (NCE) in Physical Education or Physical and Health Education. Figure 1 below further describes this result.

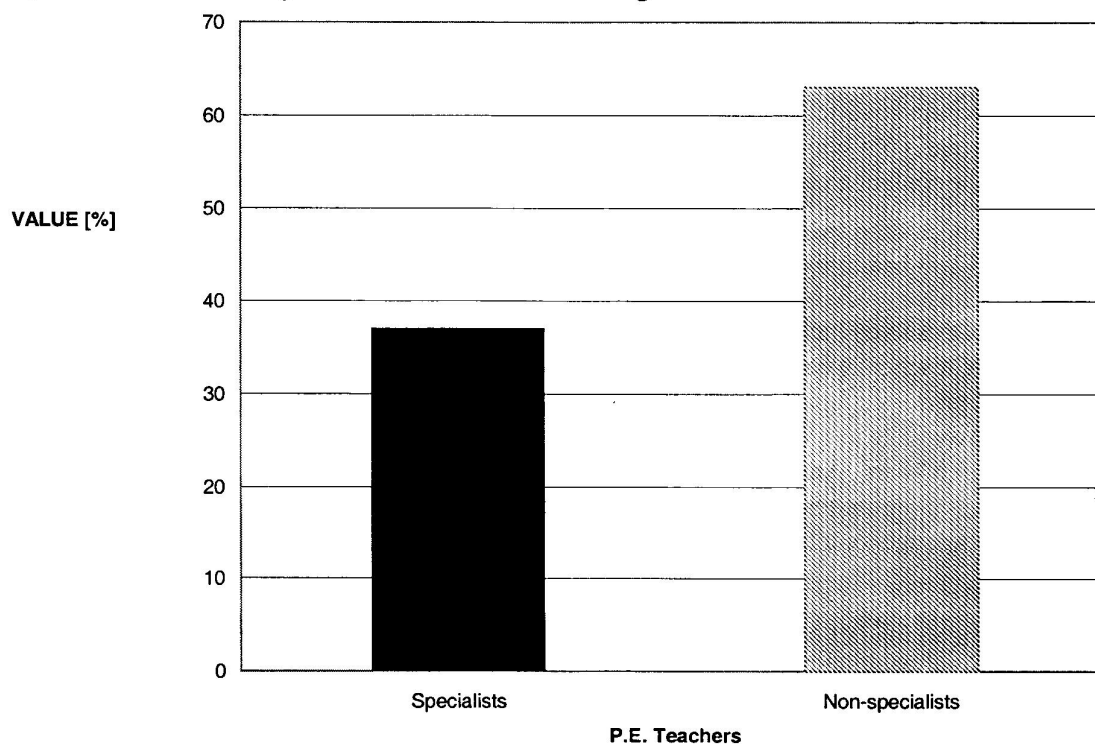


Figure 1: Component bar chart on physical education teachers' specialisation

Table 2: Frequency and Percentage Analyses on Number of Physical Education Lessons per Week

| Variables | Frequency | Percentage |
|--------------|------------|------------|
| Not at all | 39 | 7.1 |
| Once | 411 | 75.3 |
| Twice | 78 | 14.3 |
| Thrice | 16 | 2.9 |
| Thrice | 02 | 0.4 |
| Total | 546 | 100 |

The result presented in table 2 shows that 39 (7.1%) of 546 responses indicated that Physical Education lessons were not held in the private schools at all, while 411 (75.3%) shows that the lessons were held once in a week. 78 (14.3%) of them agreed the lessons were held twice a week, and only 16 (2.9%) a week. 2 (0.4%) respondents said there were Physical Education lessons in the schools for more than three times in a week. Figure 2 reflects a further description of this result.

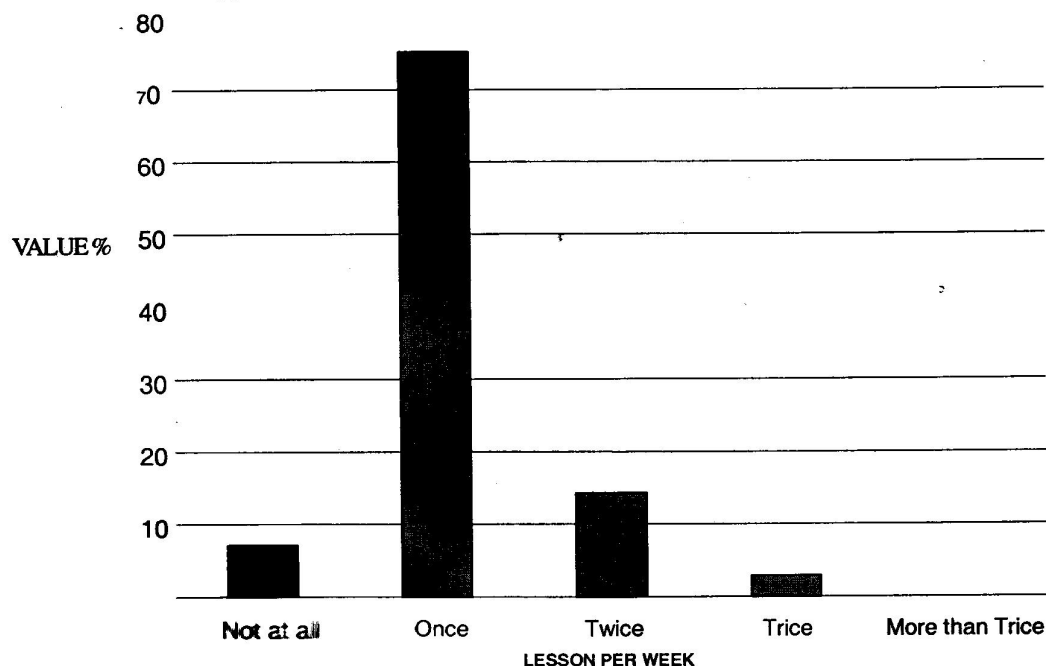


Figure 2: Component bar chart on number of P.E. Lessons per week

Table 3: Frequency, Percentage and Weighted Mean Score (WMS) Analyses of Data on Content Areas of Emphasis

| CONTENT AREA | NO EMPHASIS (%) | LOW EMPHASIS (%) | AVERAGE EMPHASIS (%) | HIGH EMPHASIS (%) | WMS |
|--|-----------------|------------------|----------------------|-------------------|------|
| Minor Games (filling the basket, catching the train) | 35 (6.4) | 216 (39.6) | 259 (47.4) | 36 (6.6) | 1.54 |
| Major Games (football, basketball, handball, volleyball etc) | 18 (3.3) | 138 (25.3) | 288 (52.7) | 10.2 (18.7) | 1.87 |
| Running Events (sprints, middle and long distance races, relay races etc) | 22 (4.0) | 105 (19.2) | 263 (48.2) | 156 (28.6) | 2.01 |
| Gymnastics (stunts & tumbling activities, balance activities, pair activities, group activities etc) | 236 (43.2) | 158 (28.9) | 101 (18.5) | 51 (9.30) | 0.94 |
| Aerobics (aerobic dance, callisthenics, rhythmic group activities etc) | 329 (60.2) | 117 (21.4) | 86 (15.8) | 14 (2.6) | 0.61 |
| Average | 128 (23.4) | 146.8 (26.9) | 194 (35.5) | 71.8 (13.2) | 1.39 |

Criterion value = 2.50

Results presented in table 3 show that no any content area of physical education taught in private primary schools recorded high percentage of emphasis. However, running events (28.6%) and major games (18.7%) recorded the highest emphasis, while Aerobics (2.6%) and gymnastics (9.3%) have the lowest. Weighted Mean Score (WMS) analysis of the data reflects similar results and all content areas have values below the

criterion value of 2.50; with running events (2.01) and major games (1.87) having relatively greater values and aerobic (0.61) and gymnastics (0.94) recording lower values.

Discussion

Findings of this study revealed that there is high percentage of non-specialists teaching physical education in private primary schools in Lagos State (see table 1 and figure 1). Comparing the public schools and private schools, Okuneye and Dansu (2005), report less number of qualified physical education teachers in the private schools. Similarly, Keinde (2000) reports gross inadequacy in the number of physical education teachers in schools stressing the fact that private schools are more affected.

This finding has serious implication for the curriculum and its implementation in schools. According to Salawu (1997), no education system can rise above the quality of its teachers; as untrained or poorly trained teachers will produce poorly tutored pupils. This implies that the non-specialists that handle physical education in private schools will poorly implement the curriculum.

The findings of this study further revealed that the number of physical education lessons taken in the private schools per week is inadequate, and that there are no uniform lesson periods for physical education in private schools. These could partly be reflective of the fact that the teachers who are handling the subject are not specialists; hence, do not know what to teach, and are not aware of the current developments in primary schools physical education. Current developments suggest that physical education must enable pupils to participate in practical lessons for at least 100 minutes every five days (Sam Juan Unified School District, 2006). This implies that ideally pupils must be taken out for 30-35 minutes lessons three times every week. According to Scott (1992), adequate number of physical education lesson is necessary because many inactive adults today have not learn as children, the act and benefits of exercise as pupils. Therefore, future adults (school children) should be made to escape this poor habit through proper implementation of physical education programme in primary schools.

The findings of this study also revealed that no physical education content area taught in private primary schools received high percentage of emphasis (see table 3). This is an indication of poor curriculum implementation. However, the finding showed that emphasis on teaching of major games such as football, basketball, handball and volleyball and running events such as sprints and other forms of races are relatively higher than other content areas such as minor games, gymnastics and aerobics. Those aspects of the curriculum found to be relatively emphasised in this study are more into competitive sports than movement skills; health and wellness of individuals. The implication of this is that few pupils will receive maximum benefits from such classes, and the less athletic pupils will be at serious disadvantage. It is however essential that school children must acquire knowledge and practice in fundamental motor skill [Okuneye, 1997].

Conclusion and Recommendations

It is concluded in this study that there is a high percentage of non-specialists physical education teachers in private primary schools in Lagos State and the number of physical education lessons taken in these schools per week are grossly inadequate. These have further resulted into poor emphasis on essential content areas in physical education programme for primary school.

These pose serious danger to proper implementation of the school curriculum. It is recommended that ministries of education and other appropriate authorities should keep eyes on physical education teaching activities that go on in the private schools. This could be achieved via intensifying inspections to these schools by special task forces. In addition, private school authorities should be made to employ specialists in physical education and should be made to encourage them to go for further short and long-term trainings in their area of specialisation.

References

- Delisio, E. R. (2006). *New physical education trend stresses fitness and fun* (online). Available: <http://www.education-world.com> 27/06/06.
- Keinde, I. (2002): *Job opportunities and current curriculum relevance for physical education products*. In P.O. Omidiran, I. Keinde & L. Aiyejuyo (Eds). *Issues in Nigeria Sports and Physical Education Administration*. Ibadan: Mac. Litto Production. 46 – 56.
- Okuneye, R. O. & Dansu A. (2005) *Comparison of practical physical education in selected private and public secondary schools in Lagos State*. *Educational Perspectives*. 8 (1): 49-63.

- Okuneye R.O. (1997). *Trends and issues in Lagos metropolitan primary schools' physical education*. In B. B. Oderinde & R. O. Okuneye (Eds). *Enhancing Quality Education in Nigeria*. LASU, Lagos: Faculty of Education Pub. 299-311.
- Physical Education Home (2006). *Elementary school philosophy* (online). Available: <http://www.aacps.org>. 27/06/06.
- Salawu, K. A. (1997): *Qualification teacher education for high quality education in Nigeria*. In B. B. Oderinde & R. O. Okuneye (Eds). *Enhancing Quality Education in Nigeria*. LASU, Lagos: Faculty of Education Pub. 62 – 68.
- San Juan Unified School District (2006). *Elementary school curriculum* (online). Available: <http://www.sanjuan.edu>. 27/06/06.
- Scott, H. J. (1992). *School children and fitness: Aerobics for life* (online). Available: <http://www.ericdigesth.org/092-3/fitness.htm> 27/06/06.