REDUPLICATION IN ISEKIRI: AN INTERFACE BETWEEN VERBS AND PRONOUNS

Henry Matsete Orru

Abstract

The thrust of this paper is on an examination and analysis of the behavioural pattern of some Isekiri pronouns in the environment of verbs. An interface between verbs and pronouns in Isekiri results in the morphological process known as reduplication. Not all types of verbs and pronouns in Isekiri will be considered in this work. The focus will be on only those which interface to trigger the morphological process the writer intends to highlight in this paper. This will necessitate an explication of the key words such as verbs, pronouns and reduplication, and there after the use of copious illustrations to bring out the morphological process (reduplication) sought.

The primary focus of this paper is to examine and analyse the morphological process (reduplication) that results from the interface between verbs and pronouns in Isekiri. In this regard, the writer will first and foremost explicate some key words in the title and thereafter move on to exemplify how reduplication results from the interface between verbs and pronouns.

Verbs in Isekiri

In Isekiri, verbs are *asuliofo,* and have the following types:

i. Asuliofo kpatakiri (main verbs)
ii. Utienyin asuliofo (auxiliary verbs);
iii. Asuliofo – gbogofo (Transitive verbs)
iv. Asuliofo - aregbogofo (Intransitive verbs).

As in English, verbs in Isekiri (*asuliofo*) constitute that part of speech which tells what somebody or something does, or what state somebody or something is in. The crucial role of giving meaning to sentences which verb plays make it the most important part of speech.

Pronouns in Isekiri

In Isekiri, pronouns are known as *Ojoruko*, and as in English they are noun (noun phrase) substitutes. They are noun equivalents referring to a previously named or understood persons or things.

Isekiri has the following types of pronouns:

i. Ojoruko-onekawo (Personal pronouns);
ii. Ojoruko-ebi (Relative pronouns);
iii. Ojoruko - Ojijone (Reflexive pronouns);
iv. Ojoruko – ubiro (interrogative pronouns);

v. Ojoruko – uwewe (demonstrative pronouns);
vi. Ojoruko – urunone (Possessive pronouns);
vii. Ojoruko – arenuka (indefinite pronouns);
viii. Ojoruko - akpen-use (Reciprocal pronouns).

Since the focus of the paper is not on the examination and analysis of verbs and pronouns per se, but on the morphological phenomenon that results from the interface between the two of them, the writer will not go beyond this skeletal information on them. What will be done next is to examine and analyse the interface between verbs and pronouns and how it results in reduplication.
However, before doing that it will be necessary to explicate what reduplication is.

Reduplication

Reduplication in linguistics is a morphological process in which the root or stem of a word (or part of it) or even the whole word is repeated exactly or with a slight change. It is used in inflections to convey grammatical functions, such as plurality, intensification, etc and in lexical derivation to create new words. it is often used when a speaker adopts a tone more "expressive" or figurative than ordinary speech and is also often, but not exclusively iconic in meaning.

Reduplication is found in a wide range of languages and language groups, though its level of linguistic productivity varies. Other terms that are occasionally used include cloning, doubling, duplication and tautonym.

Reduplication is often phonologically in one or two different ways:
1. Either as reduplication segments (sequences of consonants/vowels);
2. Or as reduplication prosodic units (syllables).

In addition to phonological description, reduplication often needs to be described morphologically as a reduplication of linguistic constituents (i.e. words, stems or roots). The base is the word (or part of the word that is to be copied. The reduplicated element is called reduplicant, often abbreviated as **RED** or sometimes just **R**.

English has the following types of reduplication, ranging from informal expressive vocabulary (the first four shown below) to grammatically meaningful forms (the last one shown below).
1. **Rhyming reduplication**: hokey-pokey, razzle-dazzle, super-duper, boogie-woogie, tennie-weenie, walkie-talkie, hoity-toity.

2. **Exact Reduplication** (baby-talk-like); bye-bye, choo-choo, no-no, pee-pee, poo-poo.

3. **Ablaut reduplication**: bric-a-brac, chit-chat, criss-cross, ding-dung, jibber-jabber, knick-knack, pitter-patter, splish-splash, zig-zag, flim-flam.

4. **Shm-reduplication**: baby-shmaby, cancer-shmacer and fancy-schmancy. This process is a feature of American English from Yiddish, starting among the American Jews of New York City, then the New York dialect and then the whole country.

5. **Comparative reduplication**: in the sentence "John's apple looked redder and redder," the reduplication of the comparative is becoming more true over time, meaning roughly "John's apple looked progressively redder as the time went on."

6. Although (as shown below) there is a wide range of words that are reduplicated in Isekiri, the focus is however on how verbs and pronouns interface in sentence in Isekiri to result in reduplication. Below are some examples of reduplication in Isekiri:

Sisa	" Running/ Racing"
Dede	" all"
Meji-meji	" in twos"
Bebere	"slant/slanted"
Keke	"tight"
Keke	"until"
Leghe	"deceive"
Lele	"follow"
In-in	"no/answering in the negative"

Reduplication in Isekiri: An Interface between Verbs and Pronouns

We will use the following examples to illustrate how reduplication results from the interface between verbs and pronouns in sentences in Isekiri:

1. Maa son on
   NEG roast it (Don't roast it)

2. Mon on dede
   Drink it all (Drink all of it)

3. Jolo Kan an
   Properly nail it (Nail it properly)

4. Yaya a jubogho
   Spread it around

5. Maa kpa a
   NEG beat him/her (Don't beat him/her)

6. Mo ran aghan re uli ren
   I send (past) them go home aspect
   (I have sent them home)

7. O le e sode
   He/she drive (past) him/ her out
   He/she drove (past) him/ her out

8. Ragha a
   Rinse it

9. Jolo o ni
   Put it in order (arrange it properly)

10. Mo waa lele e
    I will follow him/her

Notice that in each of the ten sentences above, two words are underlined. These two words are verbs and pronouns respectively. You will also notice that the last segments/syllables in all of the first underlined words (verbs) are repeated (duplicated) as pronouns. This is a clear case of the morphological process known as reduplication resulting from the interface between verbs and pronouns in Isekiri sentences.

To bring this out clearly, examples (1-10) above are shown below in another format. This time, instead of the full sentences, the verbs and the pronouns in each of the sentences will be isolated:

	Verbs	**pronouns**
1.	Son "roast"	on "it"
2.	Mon "drink"	on "it"
3.	Kan "nail"	an "it"
4.	Yaya "spread"	a "it"
5.	Kpa "beat"	a "him/her"
6.	Ran "send"	aghan "them"
7.	Le "drive"	e "him/her"
8.	"Ragha " rinse	a "it"
9.	Jolo " arrange"	o "it"
10.	Lele "follow"	e "him/her"

Other examples are:

	Verbs	**pronouns**
11.	Gben "tear"	en "it"
12.	Dun "heal"	un him/her
13.	Re "slice"	e "it'
14.	Rin "sink"	in "it"
15.	Guo "pull/drag"	o "it"
16.	Gua 'drive"	a "it"
17.	Den "fry"	en "it"
18.	Yo "sift"	o "it"
19.	Tin "push"	in "it"

Conclusion

Reduplication as a morphological process in linguistics is found in a wide range of languages and language groups, though its level of linguistic productivity varies. Isekiri is not an exception. There are wide range of words that are reduplicated in the language. Although some examples of these are given in this paper, the primary focus however is on the interface between verbs and pronouns and its outcome of reduplication. Through copious examples, this has been shown in this paper with sentences in Isekiri.

In as much as it cannot be said that the morphological process of reduplication has been fully and exhaustively covered in this paper, it is hoped that the materials presented here will add to the general pool of knowledge and may be of immense assistance to scholars, especially those who are interested in contrastive linguistics.

References

Botha, Rudi P. (1988). *Form and meaning: a study of Afrikaans reduplication.* Cambridge: Cambridge University Press.

Close, R.A. (1975). *A Reference Grammar for Students of English*. England. Longman.

Hurch, Bernard (Ed). (2005). *Studies on reduplication. Empirical approaches to Language typology* (No. 28). Mouton de Gruyter. ISBN 3-11-018119-3.

Idowu, O.O. (et al) (1990) *Countdown to SSCE/JME English Language*. Ibadan: Evans Brothers.

Orru, M.H. (2005). "Isekiri Pronouns: Contrastive analysis". In T.O. Shobomehin (ed). *A Journal of Languages. Vol. 4.*

Thun, Nils (1963) *Reduplicative words in English*: A study of formation of the types tick-tock, hurly-burly, and shilly-shally. Uppsala.

Walter, E.M. (1973). *Handbook of contemporary English*. U.S.A: Harcourt Brace Jovanovich.

Wilbur, Ronnie B.(1973) *The Phonology of reduplication*. Doctoral Dissertation, University of Illinois.

www.wiseseek.com/what-is-reduplication.htm.

CREATIVITY: A STRATEGY FOR IMPROVING AND RAISING STANDARD OF INTEGRATED SCIENCE EDUCATION IN SECONDARY SCHOOLS IN CONTEMPORARY NIGERIA

Are Falilat Tinuola

Abstract

This paper presents "Creativity**:-** A strategy for improving and raising standard of integrated science Education in Junior Secondary Schools in contemporary Nigeria" Meaning of Integrated Science was highlighted, Creativity in Integrated Science was looked into, Strategies of Teaching Integrated Science to facilitate creativity in learners was examined and prospects of creativity was also considered. It was then recommended that Integrated Science teachers should on their own initiation look for suitable methods for their lessons to improve learner's creative spirit.

Meaning of Integrated Science (ITS)

The introduction of the Ayetoro Basic Science Program in 1968 attempted the teaching of the core science subjects as one entity. This preparation was meant for the first nine years of formal educational system in Nigeria. There were different foreign supports for the programme amidst which were the United States Agency for International Development (USAID) and the Ford Foundation. The focus of these programmes was "doing science the way the scientists do it". Integrated science aims at helping children to acquire scientific processes. Bajah (1982) states that "Integrated science is meant to unite those who have specialized disciplines in science". This is a "convergent" view. Integrated science is the first form of science a student encounters in the school.

Like many other concepts or disciplines, integrated science is yet to receive a unified working definition among the Nigerian Science Educators. Integrated science is seen by people in different perspectives.

The Science Teachers Association of Nigeria (STAN) made attempts at defining Integrated Science. The definition from UNESCO – UNICEF (1971) published seems to favour the members of the association. They see integrated science as an approach to the teaching of science in which concepts and principles are presented so as to express the fundamental unity of scientific thought and avoid premature and undue stress on the distinctions between the various scientific fields. Integrated science is a way of presenting science to the learner (young or old) such that he gains a relatively wide range of the knowledge of scientific processes and products. In sum, integrated science deals with using judgemental approaches to presenting science to the learners with reference to technological advancement and the society.

Technology stands as an incubator to integrated science. Integrated science is deep-rooted in science. Science and technology education play a dominant role in development efforts of nations (Emovon, 1985, Okpala, 1995).

Integrated science has undergone a lot of transformations. Moves made by both national and international bodies made this easy for essentials that have positive and negative implications for man's life on earth: food, drugs, clothing, fuel, aeroplanes, computers, radio, refrigerator, nuclear weapons and neutron, the main stream of creativity. The developed nations attach a lot of importance to the teaching of science within the first nine years which should be aimed at "preparation for useful living within the society and for higher education". For this, the school science subject taught in the junior secondary school science component of Nigerian education system is called integrated science. This is in consonance with the view of UNESCO – UNICEF (1971) that up till the junior secondary school level, students should be exposed to a broad view of science which enlivens and enlightens their interest in the environment and contributes to the steady development of their mental, manipulative and social skills.

Creativity in Integrated Science (ITS)

Lancaster (1974) and Ango and Sila (1986) saw creative skills acquisition by the science teacher as an important assistance to his profession. Being creative is one of the six elements in the psychology and development of a person and should be one of the objectives of teaching. Olagunju (2002) stated that the intervention of the teacher variables in the instructional setting is likely to exert a differential prediction of pupils learning outcomes. However, all intellectual activities, according to Guildford (1950), can be considered as being organized along three dimensions; operations, content and product. Each dimension is subdivided into smaller sub sets – each of which represents an intellectual factor or ability. Six of these factors (or abilities) are related to creativity. Here again in order for a teacher to inspire creativity in his students, he must be creative himself (Lancaster, 1974) and to be creative he must develop the skill for imagination and initiative to device new and better approaches. The National Policy on Education (FRN, 1981): Akinwumiju and Olaniya, 1996 and Balogun, 1986 in Olagunju (2002) emphasized variables of creativity in a child.

There are different ways of being creative. Creativity relates to divergence of ideas and not one-way traffic to situations but several, perhaps unlimited. It refers to doing simple things differently and in one's own way (Lancaster, 1974). It is ability to see problems, fluency of thinking, flexibility of thinking and originality (Kettner, etal 1959), simply, put creativity = intelligence + personality.

In science class, being creative would imply that, students are given the chance to venture answers which may have been provided by the teacher, teacher poses questions (problems) whose answers are not in text books, students are allowed to do something which has never been done before, something non – traditional, teachers not insisting on being very precise is very important in science. Afuwape, (2002) recommended that integrated science teachers methodology courses in teacher education and in service programme should be made to emphasize the need to teach the subject using methods that are characterized by games and simulation, among other things.

The training and in-service programmes should be activity – oriented with enough opportunities for the programme participants to master the theory and practice, integrating different types of games and simulation into integrated science teaching, simulation game is a good accommodation for creativity. There can be a long list of examples, but the longer the list is the more we realize that in Nigeria most science teachers are not creative and do not nurture creativity in their students (Silas, 1985). Different from the above ideas borrowed from Akpan (1992) creativity should be seen as a strange positive achievement derived from human wisdom. It is high time Nigerian science educators nurture creativity, if there will be improved technology. From the nature, purpose and structures of integrated science, it requires creativity approaches. Teachers need to be familiar with the nature, process and strength of these approaches. A few of them will be discussed below.

Creativity Strategies

Techniques and methods of teaching science will continue to surface as produced by research findings. The most important ingredient of teaching is the teaching methodology. Dissemination of mastered information depends on teacher's strategy. Teaching is the action of a teacher (someone) who is trying to assist others to reach their fullest potential in all aspects of development. For learning and development of intellectual abilities to take place, it depends on how the teacher is able to structure the curriculum content. Consequently, the need for effective teaching of science especially integrated science will lead us to examine some of the existing strategies.

The UNESCO five yearly conferences on science teaching and efforts of the Science Teachers Association of Nigeria (STAN) had completed the arrangement of a statement of the philosophy, methodology, content and evaluation of integrated science. Any adopted teaching strategy should be able to affect the cognitive, affective and psycho motor domains of the learner and give consideration to the nature of student under study, objectives of the teaching, environment of the class, content of the curriculum and the nature of evaluation to be applied. Since teaching is meant to bring a change in behaviour, these methods are meant to cause change in the behaviours of the learners.

The ultimate of all is the unearthing of the creative potentials of individual learners. It is important to mention some projects that have attempted to improve instruction in science. One was the biological science curriculum study (BS CS), established in 1959, with three versions of blue, green and yellow which later re – surfaced as "Biological science pattern and processes" and was established to take care of all ability levels of school students. Others were physical science study committee (PSSC) which was to improve on science instruction in United States senior high schools, the Chemical Bond Approach (CBA); the Earth Science Curriculum Project (PEIP), Bendel State of Nigeria Primary Science Project (BSPSP), African Primary Science Programme (APSP) and so on. These programmes were meant to improve on science education institutions, yet science instruction has not been fully cared for. With the following bubble spot strategies, science, especially integrated science should continue to receive effective instruction treatment and thereby cause positive changes leading to creativity in the learners. Examples of the methods are discovery, fieldtrip, problem solving, concept mapping, value clarification, enter educate approach, use of human and material resources in education, mutual instruction, use of simulation game, individual set – experiments etc.

Discovery Method

This method helps learners to find out facts or learn about scientific occurrence. It involves critical thinking to arrive at a logical conclusion. This process of thinking should be meaningful, critical and systematic. The process of logical thinking are observing, using space, classifying, using numbers, measuring, communicating, predicting, inferring, formulating hypotheses, interpreting data etc. the discovery method could either be guided or unguided. Human and material resources in education are used to monitor the guided discovery while the unguided discovery allows learners to operate independently and find out facts on their own using known technique of investigation to explore the environment. This method helps to develop positive attitudes towards science. It is activity centred, and provides the students opportunities into the "real world" of science (Washton, 1967: 16).

Field Trip Method

This is an enjoyable instructional method, which allows teachers of science to take their students out of classrooms to the field, external laboratory, factory, farm and scientific places of interest to learn. Schools encourage very little environmental experiences (Ango, 1984), and science teachers complain of difficulties in getting places of interest to visit. Some people call it an excursion. It exposes students to the real world, natural principles of science, first hand experiences which they have been hearing verbally in the classroom. Scientific processes are tools for this method.

Problem Solving

This method involves the introduction of students to a particular task / problem, using various ways and skills already acquired to solve the problem. In solving the problem, there is need for reasoning skills. Problem solving tries to raise questions, formulate hypotheses; and generate ideas, experiment / implement and collect data to arrive at alternatives of the effectiveness of an enterprise. Problem solving is encompassing. Its sub-sets are simulation game, discovery, mutual instruction, case study and projects. Each is a critical, systematic and logical way of arriving at a conclusion.

Concept Mapping

This is a method where diagrams, pictures, models and maps are put on paper to describe events and show relationships among the events. The hierarchial arrangement of these concepts is a confirmation of explicit instruction. Explicit instruction is a systematic instructional approach that includes a set of delivery and design procedures derived from effective schools research merged with behaviour analysis (Rosen & Shine, 1997).

Human, Material and Natural Resources in Education

It brings novelty into teaching / learning situation when the integrated science teacher invites trained personnel of different scientific field to come and share their experiences with the learners. Concepts, principles etc are easily imbibed when this method is introduced. Along with human resources. Examples are graphic, display, printed, audio projected and materials like micro films, models, specimens. Physical structures, original instructional aids, improvised instructional aids, vegetation, animal, water and other physical aids, all contribute immensely to the development of teaching learning industry.

Mutual Instruction

This method can equally be called co-operative learning, peer collaboration, peer meditation, peer tutoring etc. This is an approach in which one child instructs another child in a material on which the first is an expert and the second is a novice. Not all mutual instructors are experts.

Simulation Game

This method is a contribution of two entities. Akinyemi, (1997) defined Simulation Game as a combination of game and simulation. Pulos and Sneider, (1994) defined game as an enjoyable social activity with goals, rules and educational objectives. Jones, (1992) defined simulation as a reality of function in a simulated and structured environment. Simulation game is a competitive interaction bound by rules to achieve. Specified goals that depend on skill and often involve chance and an imaginary setting. Concepts and principles presented in form of game, play, fun, folklore would be easily mastered. It is good, and advisable that teachers of integrated science use this method always (Erinosho, 2000; Afuwape, 2002).

Individual Set Experiment

This method involves assigning areas of difficulty to the learners to look into possible solutions. It may be individually or in groups. It is advisable that students elect projects for themselves while teachers take over supervision responsibility. During this period aids like computer assisted programme may be used. Such experiments are capable of teaching manipulative skills and general understanding. Teachers of integrated science are advised to teach their students methods of research / project before the actual period in order to stabilize their sense of original thought and to remove undue mental fatigue. Areas of project must be very much relevant to their field. And all necessary safety precautions must be effectively guided. Project work is inevitable for all scientifically focused students. It is obvious from the above that effective methodology maintains original thought of the children with increased knowledge. A single method may not be enough for the success of any teaching but the teacher's creativity matters in order to bring about effective teaching of integrated science. In addition, it must be noted that one control strategy can never satisfy a lesson or a particular teaching. Students individual differences are very strong factors. The Keller plan schedule advised the students to move on their own pace to aid effective and meaningful teaching and learning.

Enter - Educate Approach

This is a method where reinforcement, reward in the form of entertainments is provided to bring about learning (education). This entertainment could be provided through education media. Adeyemi, (1984) listed the various categories of educational media as follows: graphics materials, display materials, printed materials, audio materials, projected materials and other like microfilms, models, specimens. It is important to stress the limitations to this method, as it is too costly.

Prospects of Creativity

Creativity is very important in the teaching and learning of science in schools. Creativity is a way of minimizing or reducing cost of equipment and materials for teaching and learning. It is a method of widening the scope of inquiry, a challenge to curiosity in learners, it provides a very rich

visual experience to learners, it equally affords the science teachers the opportunity to exercise physical control of the stimuli and afford the students the opportunity of touching and manipulating for direct concrete experiences.

Creativity if properly used promotes quick understanding by arresting learners attention and also giving first hand experiences which are not easily forgotten by the students.

Conclusion

Creative teaching is multifaceted; it involves the setting up of class environments, which enhance the release of the creative talents of individuals. Creativity allows students to take control of their own learning without question.

Consequently, no restriction to some strategies recommended but it is left to the initiative of the Integrated Science teachers to decide the suitable ones for a lesson or teaching based on the factors surrounding the teaching learning process.

Recommendations

Based on the conclusion drawn it is recommended that:

1. Teachers who are creative and resourceful should be rewarded adequately to motivate them
2. Students who are creative and resourceful should be commended and rewarded accordingly.
3. Schools should establish science clubs, organise science fair, all these will make students to be curios and more creative.
4. Science teachers must be innovative, resourceful and creative in both thinking and manipulative skills to enrich the teaching and learning of science.

References

Adeyemi, M.A. (1984). Strategies for Integrating Educational Media into Higher Education in Nigeria. Nigeria audio – Visual Association. *Monograph series No. 1B.*

Afuwape, M.O. (2002). *Simulation Game – Assisted Instruction, Student Cognitive Style and Numerical Ability as determinant of learning out comes in Integrated Science* – Unpublished Ph.D. *Thesis, University of Ibadan*

Akinyemi, A. (1997). *Using Games and Simulation in Teaching Winneba; University College of Winneba, Ghana.*

Akpan, O. E (1992). *Towards Creative Science Teaching and Learning in West Africa* Schools. Catholic Mission Press, Cape Coast.

Ango, M. L. & Sila, M. D. (1986).Teaching and Learning of biology practical; the experience of some Nigeria Secondary School. *Journal of Science Teachers Association of Nigeria, 24(1& 2), 33 – 47, 1986*

Ango, N. Y. (1984). A Functional Science Curriculum in the 6-3-3-4 tier educational system in Nigeria. *Nigeria Journal of Curriculum Study, 2(1) 77-85.*

Bajah, S.T (1982). Two decades of Primary Science in Nigeria: a critical evaluation. A Plenary Paper Presented at the 23rd Annual Conference of STAN, at Akure, Akure 22-28.

Byrd, D. E (1990). Peter Tutoring with the Learning Disabled; A Critical Review. *Journal of Education Research 84 (2,) 115-118.*

Comber, L.G & Keeves, J.P (1973*). Science Education in Nineteen Countries: International Studies in Evaluation Stockholm,* 1.Almgvisit and wiksell.

D' Arbon, J. A (1972). A study of the Concept of Integration of Science Subjects in Secondary Schools. In Cohen, David (Ed) (1977). *New Trends in Integrated Science Teaching. LV. Paris, UNESCO*

Danachi, U.G. (1972). *Nigerian Modernization, The Colonial Legacy. New fork:* The fork: The Third Press.

Emovon, E. U. (1985) Sciencing – The Nigerian Experience: The Practice of Science in Nigeria. Key note addresses proceedings of the 26th Annual Conference of Science Teachers Association of Nigeria, pp 7-12

Erinosho, S.Y. (2002). Teaching Science for Effective learning. In Erinosho; S. Y; Adesanya, A; Ogunyemi, A (Eds.). *Teaching Effectiveness in Nigerian School*, Ibadan: Sam Bookman – Publishers.

Guildford, J. P (1950) *"Creativity", American Psychologist,.5 (44-45)*

Jones, K (1992). *Simulation in Language Teaching.* Cambridge: Press Syndicate of the University of Cambridge.

Kettner, (1959). "A factor- analytic study across the domains of reasoning, creativity and evaluation". *Psychological Monograph* 73 (479)

Kyle, W.C. (1997). The imperative to improve undergraduate education in Science, Mathematics, Engineering and Technology, *Journal of Research in Science Teaching, 3*46, 547 – 557.

Lancaster; O.E. (1974*). Effective Teaching and Learning* New York. Gordon and Breach.

Lawal, M.B. (1998). Teaching Water Population Using the values clarification strategy. A chapter in Okebukola, P & Akpan, B (eds) *Strategies for environmental education; Focus on water pollution.* S.T.A.N.E.E. series 2.. 63 – 73.2 (63 - 73)

National Policy on Education (1981) revised.

Okpala, N.P. (1995). Science and Technology Education for all in UNESCO (Ed). *Report on the state of Education in Africa*, UNESCO, publications. (95 – 99.)

Olagunju, A.M. (2002). *Nigerian Journal of Educational Psychology and Sports Ethics (NIJEPSE). 42 (84 – 89)*

Pulos, S. & Sneider, C. (1994). *Designing evaluating effective games for teaching Science and Mathematics. An illustration from co – ordinate geometry. Focus on learning problems in Mathematics*. 16 (3), 23 – 42.

Ranford, J. & Burton, A. (1974). *Thinking its nature and development* New York: John Wiley & Sons.

Rosenshine, B. (1997). Advances in research on instruction. In J.W. Lloyd, E.J. Kameenui and D. Chard (Eds.). *Issues in educating students with disabilities PP. A 7 – 221. Mahway, N.J. Lawrence Eaclbaum*

Science Teachers Association of Nigeria (1970). Integrated science: a course for the junior form of the secondary school, Curriculum development *Newsletter* No. 1 Ibadan: Yokele – pekun press.

Sila, M.D. (1985). *Teachers Creativity in the teaching of biology – practical.* Unpublished B.Sc (Education) Project, University of Jos.

UNESCO – UNICEF (1971). Planning for Integrated Science Education in Africa; *report of a regional workshop, Paris*: UNESCO.

Washton, N.S. (1967). *Teaching Science Creativity in Secondary Schools.* Philadelphia, W.B Saunder Company.

Wilson, J. (1966*). Education and Changing West African Culture*, London: Oxford University Press