

Teachers' Perception of Correlates of Students' Language Competence and Achievement in Biology

Sam Oluseyi Oyekan, Ph.D.

Department of Special Education and Curriculum Studies
Adeyemi College of Education
Ondo, Nigeria.
seyoyekan@yahoo.com

Abstract: *The study examined teachers' perceptions of factors that hinder students' achievement in Biology. A sample of 153 teachers responded to a 21-item questionnaire on correlates of language competence in biology. Using relative frequencies of biology teachers' responses, analysis of data identified nonchalant attitudes, declining reading culture and misinterpretation of questions, linguistic interference of mother tongue with English, visual illiteracy, wrong spellings, limited biological vocabulary and defective study habits as some of the factors that might impede students' performance and interest in biology classrooms. Hence, it is suggested that continuous exposure of students to effective reading culture, constructive English language skills, good teaching with multimedia devices, and remediation of emerging learning difficulties can enhance their language and communicative competence, comprehension and achievement in biology.*

1. INTRODUCTION

Creative verbal and analytical skills in coherent observations, abstraction and description of basic concepts and processes can enhance students' language competence and performance in Science, Technology and Mathematics (STM) programmes. But numerous studies have consistently confirmed that overwhelming decline in the use of English language is the most serious obstacle against Nigerian learners' struggle towards logical reasoning, good social behaviour, critical worldview and academic success in Senior School Certificate (SSC) examinations (Ayodele, 1986; Igbure, 1987; Olukotun, 2014). Could the fluctuating achievement and interest in Senior Secondary School (SSS) biology be linked with the recurrent students' difficulties in reading comprehension, explanation, illustration, expression and presentation of the subject matter in English Language? A skilful use of words, in addition to the adoption of mental images, often makes for greater flexibility and precision (Sharp, 1975; Holliday, 1976) in clear understanding and retention of biological concepts. Such a rational disposition to learning could possibly ease the enunciation of fundamental scientific concepts and processes in Nigerian senior secondary schools.

Meanwhile, the greatest shortcomings of many secondary school students seem to result from their anaemic reading culture, poor articulation and attitudes towards learning of biology (Usua, 1974; WAEC, 1984, 1985; Oyekan, 1993, 1995; Ahmad & Asghar, 2011, Akinwumi & Oluwafoise, 2011; Olukotun, 2014). The prevalence of poor spoken and written English, even among university graduates, was blamed on addiction to digital devices (television, videos, mobile games and applications); and absence of a compulsive reading habit in the society (The Punch, 2014; Olukotun, 2014). What then prevents interplay of language competence and performance in biology? Perhaps the main dilemma with the students' inability to commit thoughts coherently into writing is hinged on poor conceptual understanding and use of the language.

Obemeata (1978) observed further that many Nigerian children are victims of proficiency in the English Language as they speak very little at home. The problem worsens when they are also allergic to reading biology and allied science books for recreational pleasure, qualitative knowledge, incisive understanding and creative application of the subject matter someday. Their limited competence in the use of English language is likely connected with our bilingual or

multilingual environments which do not offer many opportunities to hear and speak English, the second language (Osisanya, 1978; Afolayan, 1991). Understandably, many children are more engrossed in their mother tongue which structurally differs and interferes with the medium of instruction, interaction and communication in the biology classrooms. This seems to make a substantial proportion of biology students to be handicapped by and operate with a severely limited range of vocabulary in our multilingual and pluralistic society.

2. THEORETICAL FRAMEWORK

English language is a core foundation subject that is being studied and used a medium of instruction throughout the schooling period as a second or foreign language. Being a coded system of words, phrases or signs that expresses feelings and ideas about the world, it seems language is very important to logical thinking, cognitive retention and expression of biological concepts in writing. In accordance with McCarthy's (1952) opinion, language is a major key to the child's mental life as a basic mastery of linguistic skills is an essential pre-requisite for academic achievement. Language also serves as a means of exploring, understanding and gaining control of one's world; establishing relationships with others; and developing aesthetic and moral sensibility (Downey and Kelly, 1979; Stevens, 1986). Since language affects total behaviour when being used by students to conceive and explain learning activities in and out of the school, it becomes apparent that English language and thought cannot be separated from classroom instruction and achievement in biology.

As language is so central to all human learning experiences, such children with poor linguistic powers are likely to be progressively retarded in logical reasoning, verbal interaction, operational and descriptive knowledge of their world, concept formation, and cognitive retention of biological content. In other words, educational failure might result from sociolinguistic differences between the school and pupils (White, 1974; Stubbs, 1976). Hence, science teaching can be regarded as a sociolinguistic behaviour as biology education is anchored on the acquisition of communication and analytical skills to explore a wide spectrum of biological concepts and processes by direct experience of things in nature. Downey and Kelly (1979) believed that perceptual concepts and some practical ones can be learned without language but abstract, logical, and relational ones which constitute the basis of scientific and mathematical reasoning inevitably rely on suitable use of language. Meanwhile, students who study biology frequently encounter and have to learn new technical vocabulary as a threshold of linguistic competence and performance. The level of attainable word power, through time, is bound to affect the quality of learning activities such as problem-solving, observation, reading comprehension, abstraction, discussion and retention of biological concepts and processes.

3. OBJECTIVES

Since much formal school learning depends on the use of language, the problem of teachers is to identify the source of linguistic disadvantage (Downey and Kelly, 1979). Attempts have been made by Usua (1974) and Oyekan (1995) to scrutinise the secondary school pupils' class notes, workbooks and scripts towards identifying a catalogue of language-related students' weaknesses. Such identified factors which hinder students' achievement in Biology are often exemplified by poor conception, limited vocabulary, defective reading, spelling mistakes, scanty description of biological concepts, and misuse of scientific terms or words.

The purpose of this study was to identify correlates of language and communicative competence associated with achievement among the Senior School Certificate (SSC) biology students in Nigeria. It was intended to highlight and suggest plausible solutions to learning problems associated with students' language competence in the use of English for effective learning, understanding, retention and application of biological concepts beyond the classroom situations.

4. METHOD

A sample of 153 practising career teachers that teach SSC biology was utilised for the investigation. A 21-item questionnaire titled Correlates of Language Competence in Biology (CLCB) was developed, validated and used for data collection. It was given to teachers to tick (√) the appropriate column of the students' weaknesses as factors that could inhibit students' conceptual understanding and achievement in SSC biology: Strongly Agree (SA), Agree (A),

Teachers' Perception of Correlates of Students' Language Competence and Achievement in Biology

Disagree (D) and Strongly Disagree (SD). They were considered as impediments to analytical, communication and presentation skills that are used in observation, abstraction, manipulation, description, retention and application of biological knowledge to everyday life.

The resulting data was analysed by using relative frequencies of practising teachers' perception of factors that could hinder students' achievement in Biology. Those correlates of language and communicative competence that did not secure an aggregate of 75 in Agree dimension (SA+A) on an Agree-Disagree continuum representing fifty per cent of the sample respondents were rejected.

5. RESULTS AND DISCUSSION

Analysis of data depicted in Table 1 showed that most of the teachers perceived students' weaknesses associated with their language competence as factors that severally hinder their academic achievement in SSC biology. It could be further observed that language deprivation, absence of science clubs, inadequate exposure to well-stocked library, poor writing of experimental and field-study reports, and failure to realise the pervasive influence of English on other subjects were not considered to have substantial impact on the students' language competence in learning and performing well in biology.

Table1. Frequency Distribution of Correlates of Language Competence in Biology

| | Correlates of Language Competence | SA | A | SA+A | D | SD | D+SD |
|-----|---|-----|----|------|-----|----|------|
| 1. | Nonchalant attitudes towards learning and use of English as a second language | 103 | 35 | 138 | 14 | 1 | 15 |
| 2. | Careless reading and misinterpretation of the questions or activities | 90 | 37 | 127 | 10 | 16 | 26 |
| 3. | Linguistic interference of the mother tongue with English Language | 60 | 65 | 125 | 21 | 7 | 28 |
| 4. | Poor understanding of English Language in classroom practices. | 55 | 67 | 122 | 25 | 6 | 31 |
| 5. | Visual illiteracy occasioned by inability to observe and describe forms and functions of organisms and relevant apparatus | 46 | 75 | 121 | 23 | 9 | 32 |
| 6. | Declining reading culture for pleasure to knowledge acquisition | 75 | 45 | 120 | 20 | 13 | 33 |
| 7. | Failure to write the correct spellings of scientific names and terms | 97 | 21 | 118 | 27 | 8 | 35 |
| 8. | Inability to listen, comprehend and jot down correct notes during biology lessons | 65 | 48 | 113 | 29 | 11 | 40 |
| 9. | Limited range of biological vocabulary and restricted verbal interaction | 62 | 49 | 111 | 26 | 16 | 42 |
| 10. | Inadequate learning environment that lacks problem-solving activities, free discussion, creative listening and self-expression in good English | 59 | 50 | 109 | 38 | 6 | 44 |
| 11. | Poor understanding and misuse of appropriate biological terms and words. | 54 | 42 | 96 | 52 | 5 | 57 |
| 12. | Scanty and incoherent description of biological concepts and processes | 40 | 54 | 94 | 47 | 12 | 59 |
| 13. | Failure to purchase and read standard biology texts and leisure story books | 39 | 49 | 88 | 38 | 27 | 65 |
| 14. | Adoption of defective study habits | 36 | 52 | 88 | 25 | 40 | 65 |
| 15. | Inability to carefully read and strictly comply with guiding instructions | 30 | 49 | 79 | 43 | 31 | 74 |
| 16. | Inability to interpret and apply biological information in life situations | 25 | 52 | 77 | 36 | 40 | 76 |
| 17. | Failure to realise the pervasive influence of English Language in the teaching, learning and achievement in other subjects e.g. biology, chemistry, mathematics | 6 | 9 | 15 | 68 | 70 | 138 |
| 18. | Poor writing of experimental and field-study reports | 6 | 11 | 17 | 97 | 37 | 134 |
| 19. | Inadequate exposure to well-stocked library with biology and allied books | 8 | 12 | 20 | 104 | 29 | 133 |
| 20. | Absence of science clubs as a forum for the exchange | 10 | 22 | 32 | 70 | 51 | 121 |

| | | | | | | | |
|-----|--|----|----|----|----|----|-----|
| | of ideas and skills | | | | | | |
| 21. | Language deprivation resulting from children's impoverished home environment | 14 | 18 | 32 | 89 | 32 | 121 |

Key: SA: Strongly Agree; A: Agree. Total Candidates that Agreed = SA+A;

SD: Strongly Disagree; D: Disagree. Total Candidates that Disagreed = D+SD.

The above evidence in Table 1 established some perceived correlates of language competence in students' achievement associated with differential comprehension, retention and communication of biological concepts in the teaching-learning continuum. This corroborates findings of previous studies (Oyekan, 1995; Ogunniyi, 1986; WAEC, 1985; Stubbs, 1976; Usua, 1974; McCarthy, 1952) that students' achievement is a function of their language and communicative competence. In other words, students' achievement in biology is honed on analytical, communication and presentation skills in creative observation, manipulation, abstraction, description and application of basic concepts and processes in biology to everyday life.

The results of this study showed that teachers' perceptions of factors associated with language and communicative competence that hinder students' achievement in Biology were:

- Nonchalant attitudes toward learning and use of English as a second language
- Careless reading and misinterpretation of questions or activities
- Linguistic interference of mother tongue with English language
- Poor understanding of English language in classroom practices
- Visual illiteracy occasioned by inability to observe and describe forms and functions of organisms and relevant apparatus
- Declining reading culture for pleasure or knowledge acquisition
- Failure to write the correct spellings of scientific names and terms
- Inability to listen, comprehend and jot down correct notes during biology lessons
- Limited range of biological vocabulary and restricted verbal interaction
- Inadequate learning environment that lacks problem-solving activities, free discussion, creative listening and self-expression in good English
- Poor understanding and misuse of appropriate biological terms and words
- Scanty and incoherent description of biological concepts and processes
- Adoption of defective study habits
- Failure to purchase and read standard biology texts and leisure story books
- Inability to carefully read and strictly comply with guiding instructions
- Inability to interpret and apply biological information in life situations.

These students' weaknesses should be identified and rectified by teachers, parents, and schools. Biology teachers should engage in quality teaching with concrete explanations, regular assignments, theoretical discussions and practical work hinged on exploration of the environment, and continuous assessment of learning outcomes as means to improve students' interest, conceptual understanding and academic achievement.

A glance at Table 1 shows that nonchalant attitudes towards the learning and use of English, careless reading and misinterpretation of questions, linguistic interference of the mother tongue with English, poor understanding of English in classroom practices, and visual illiteracy constituted more serious language problems in biology classrooms. They may progressively hinder logical thinking, cross-sex interactions and communication of biological concepts and phenomena in English Language. The National Policy on Education's (Federal Republic of Nigeria, 2013) support for bilingualism in the initial use of mother tongue and English later can help to break ethnic, racial and communication barriers in the acquisition of relevant knowledge and expertise in modern science and technology within the ambit of our culture. But the sullen emphasis on mother tongue without adequate forum for transition to English particularly in Junior Secondary School (JSS) curricular programmes often precipitate a legion of students' weaknesses

and underachievement in the course of learning of biology. In some cases, mother tongue is interposed in the teaching of Integrated Science, the prerequisite to the choice and learning of Biology in SSS classes. Such an instructional practice may culminate in poor understanding of English language, misinterpretation of biology questions, and linguistic interference of the mother tongue with English while thinking and committing biological ideas into writing.

Although traditional African science suffers from lack of proper scientific process of investigation, explanation and coding, the difficult concepts being faced in STM bear foreign names, are hardly commonly observed in our culture and therefore difficult to learn (Eshiet, 1994). The resulting visual illiteracy and incoherent description of biological concepts and processes due to their limited range of biological vocabulary tend to induce poor performance and undue vilification of biology among the school subjects. Unless this sociolinguistic gap between the personnel, creative language of the student and the impersonal language of science is bridged, students may continue to see science as a foreign culture being imposed upon them (Ogunniyi, 1986).

The results further indicate the prevalence of declining reading culture and limited range of biological vocabulary, failure to buy relevant books and write correct spellings of scientific terms, inability to comply with guiding instructions and apply biological information in life situations, misuse of appropriate biological terms, incoherent scanty description, and inadequate learning environment that deactivates communication skills as a host of difficulties which interfere with effective teaching and learning of biology. The general wave of societal indiscipline for materialism and aversion towards education could have contributed to the declining learning environment and reading of biology books or some basic reference materials for knowledge acquisition, pleasure and functioning as enlightened citizens.

Finally, language deprivation resulting from children's impoverished home environment, absence of science clubs and exposure to well-stocked library with biology and allied books, poor reports of experiments and field studies, and failure to realize the pervasive impact of English Language on other subjects were given inconsequential rating by the teacher respondents. It should be noted that students from poor parents in a multilingual-multicultural society without sufficient opportunities to learn and use English Language may have limited vocabulary for learning and writing reports of experiments and field studies in biology. The absence of science clubs and well-stocked library could also prevent meaningful interpersonal relations, acquisition of essential knowledge, and exchange of skills necessary to facilitate biology learning and achievement.

Furthermore, failure to realise the pervasive influence of English Language in the teaching, learning and assessment of nearly all other subjects including biology seems to make the students sacrifice less amount of efforts and time for its effective study. Since the teaching-learning process in biology is centred on English Language, more priority attention and infrastructures should be given for its continuous acquisition and use. This supports Bloom and Lahey's (1978) observation that normal language development is a successful child's interaction with the context: form, content and use. It implies that listening-speaking-reading-writing continuum represents the natural sequence of language growth. Hence, children should be brought up in social and learning environments that readily promote problem-solving, creative listening, free discussion and self-expression in good spoken or written English. The level of students' language and communicative competence attained in these settings can enhance cognition, achievement and inclination towards biology education.

Teachers have varied abilities to make a subject interesting and meaningful in their bid to facilitate coherent learning and achievement motivation. Biology and English language should be taught functionally in small active groups with the use of laboratories, personal experience of nature and Nigerian life, and a variety of instructional materials centred on concrete illustrations. To buttress this view, Richards (1978) identified the following activities as basic components for a language (behaviour) of a biology teaching:

- explanation of the meaning of technical terms;
- use of relatively short sentences;
- repetition of sentences carrying important basic concepts;

- expansion of definitions using simpler and comprehensive language and;
- Use of simpler language in explanations.

The foregoing pedagogical efforts to ease learning and retention of biological concepts call for organised educational practices that will encourage incisive reading with understanding, expression of ideas with requisite brevity and clarity in good English, dictation of biological terms/words and instant correction of spelling mistakes therein, and prevention of noise interfering with the reception of information in biology classrooms. Hence, students' language competence and performance in SSC biology can be strengthened with effective use of chalkboard; instructional materials; experiments; field studies with expressive exploration of nature; diagnostic remedial instruction; and leisure reading of novels, science magazines and newspapers.

Adequate language competence which grows incrementally through an interaction of reading, discourse, writing and experience in a lifelong process of learning biology may foster the spirit of creativity and innovation in tackling the problems of individuals and the society. Attainment of this goal for corporate improvement of humanity inevitably requires personable dynamic teachers who are creative and innovative in their instructional leadership roles. Hence, they should skilfully provide a platform for extensive exploration of the environment and community resources, viable study habits, and constructive communication skills ingrained with wilful determination to arrest the perennial problem of underachievement in SSC biology. This can be accomplished and sustained with effective guidance techniques in intensive reading, summary, note taking, descriptive analysis and presentation of biological concepts and processes in English Language.

6. CONCLUSION

The study identified some factors associated with language and communicative competence which hinder students' achievement in SSC biology. These learning difficulties can impede effective acquisition of analytical, communication, and presentation skills in observation, retention, description and application of biological concepts to everyday life.

Hence, it is hoped that continuous exposure to English Language, exploration of the environment, expression of ideas with requisite brevity in writing, and remediation of emerging students' weaknesses can provide the framework for language facility, and improved academic performance in biology. Students could be made to equally discuss biological issues with colleagues and correct their mistakes as viable means to improve their language and communicative competence. This may stimulate academic interest in meaningful learning and enhanced achievement among the SSC biology students.

REFERENCES

- Afolayan, A. (1991) the concept of English as a second language as an applied linguistic policy for development. *Journal of English as a Second Language*, 3, 6-21.
- Akinwumi, I.O. & Oluwafoise, B.G. (2011) Students' attitude and achievement in senior secondary biology using the inquiry method, *Ikere Journal of Education*, 13(1), 12-20
- Ahmad, R.N. & Asghar, S.K. (2011) Attitude towards biology and its effects on students' achievement. *International Journal of Biology*, 3(4), 100-104
- Ayodele, S.O. (1986) An experimental study of relative rates of progress in written English by learners from differing educational backgrounds. *Nigerian Journal of Curriculum Studies*, IV (2), 54-62.
- Bloom, L. & Lahey, M. (1978) *Language development and language disorders*. New York: John Wiley and Sons, pp. 4-291.
- Downey, M. & Kelly, A.V. (1979) *Theory and practice of education: An introduction*. London: Harper and Row Publishers (2nd Edition).
- Eshiet, I.T. (1994) difficult concepts in science, technology and mathematics. A keynote address delivered at the 35th annual conference of the Science Teachers' Association of Nigeria. Abeokuta: Federal College of Education, 26th – 30th September, 1994.
- Federal Republic of Nigeria (2013) *National Policy on Education*, Yaba, Lagos: NERDC Press.

- Holliday, W.G. (1976) Conceptualizing and evaluating learner attitudes to instructional stimuli in science education. *Journal of Research in Science Teaching*, 11(4), 101-109.
- Igbure, J. (1987) Falling educational standards: Are parents to blame? *The Guardian*, Thursday, July 9, p. 13.
- McCarthy, D. (1952) Language. In Monroe, W.S. (Ed.) *Encyclopaedia of Educational Research*. New York: The Macmillan Company, pp.165-171.
- Obemeata, J.O. (1978) Language tests for the language disabled child. *The Nigerian Language Teacher*, 2(1), 10-13.
- Ogunniyi, M.B. (1986) Two decades of science education in Africa. *Science Education*, 70(2), 111-122.
- Olukotun, A. (2014) Reading: The youth disconnect, *The Punch*, Friday, October 10, p.63; www.punchng.com
- Osisanya, D.O. (1978) Teaching, listening and speaking skills in English. *The Nigerian Language Teacher*, 2(1), 1-6.
- Oyekan, S.O. (1993) Diagnosis of students' weaknesses: A conceptual framework for remediation in science. *Journal of the Science Teachers' Association of Nigeria*, 28 (1 & 2), 59-69
- Oyekan, S.O. (1995) Effect of diagnostic remedial teaching strategy on students' achievement in biology, *Ph.D. Education Thesis*, Obafemi Awolowo University, Ile-Ife, Nigeria
- Richards, J. (1978) *Classroom language: What sort?* London: George Allen and Unwin, p. 134.
- Sharp, M. (1975) *Children learning: An introduction to educational psychology*. London: University of London Press Ltd.
- Stevens, P. (1986) NCLE language awareness working paper. *British Association of Applied Linguistics Newsletter*, 6, p.8.
- Stubbs, M. (1976) *Language, Schools and Classrooms*. London: Methuen and Co. Ltd.
- The Punch (2014) why reading culture is necessary among youths-Ifowodo, Friday, July 25, p.44
- Usua, E.J. (1974) Student weaknesses in the West African School Certificate biology theory. *Journal of the Science Teachers' Association of Nigeria*, 12(3), 63-67.
- WAEC (1984) Chief Examiners' Report, May/June 1984 GCE (O/L). Lagos: West African Examinations Council, pp. 10-460.
- WAEC (1985) West African Examinations Council meets on 1984 Nov. /Dec. GCE Examinations, *WAEC News*, 3(13), 20
- White, R.V. (1974) Communicative competence-registers and second language teaching, *IRAL*, XII (2), 129

AUTHOR'S BIOGRAPHY



Dr. Sam Oluseyi Oyekan is a Chief Lecturer in Science Education, Curriculum Development and Evaluation, and Teacher Education at Adeyemi College of Education, Ondo, Nigeria. He is a graduate teacher of Obafemi Awolowo University, Ile-Ife, Nigeria with B.Sc. Educ. (Biology) and PhD (Curriculum Studies) with 30 years of teaching and research experience at undergraduate and postgraduate levels. Dr. Oyekan has a strong flair for productive knowledge, and useful research works. He had published two books on **Groundwork of Curriculum and Instruction (1997)**, and **Foundations of Teacher Education (2000)**; and about 40 scholarly publications at national and international levels. This has strengthened his personality and erudition in several academic and administrative positions of responsibility.