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Nigerian Student's Perception of Technical Words in the Senior Secondary School Chemistry Curriculum

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Abstract: This study looked at how much students understand technical words in chemistry as a means of solving the problem of under-achievement of chemistry students at the secondary school level. The instrument of the study was a six-point scale questionnaire designed by the researcher for the purpose of the study. It was administered to 150 subjects from ten randomly selected schools in Ado and Moba Local Government Areas of Ekiti State. Results show that students perceived 20 of the 30 identified technical words/terms from the senior secondary school curriculum as difficult to understand.

Key words: Chemistry, language, science and technology, students, senior school, Nigeria

INTRODUCTION

The ultimate aims of science education in every society are to provide people with the knowledge of science needed for the fulfillment of the socio-economic and cultural needs of the society as well as ensure the means for physical survival. The Federal Government of Nigeria seems to have realized these by stating in its National policy on Education that one of the aims of education should be equipping students to live effectively in our modern age of science and technology. In view of these aims the policy emphasized the need for effective teaching and learning of science in secondary and post secondary institutions.

Science and technology remains a priority aspect of the education policy but scientific literacy in Nigeria is as low as 40% in spite of the fact that science has been taught in the schools since the nineteen century. This could be as a result of the way science is being communicated to students which consists primarily of law, theories and definitions which are unrelated to the experiences of students but only serve the requirements of the Senior School Certificate Examinations (SSCE) (Aigboman, 1985). This has caused some concern to parents, governments, educationalists and teachers. This concern has helped to initiate some actions to improve on the present situation.

Activities by individuals and bodies like STAN, NERDC etc., for the past two decades are therefore aimed at stimulating interest in science at all levels of education. Aspects that have been looked into include curriculum modification, innovation, teaching methods, teaching facilities, student factors etc. Perhaps one of the factors that has not received much attention is the role of scientific language in popularizing and demystifying science.

Teaching and learning whether in science or elsewhere are based on words. It is therefore by means of words that thoughts, feelings, observations etc. that are characteristic of science activities are expressed. In arguing the importance of language in a learning situation, Awoniyi noted that a child is born into a society where a specific language the mother tongue is spoken. This forms the earliest experiences of life which made up the foundation and basis for latter education. The teacher cannot therefore ignore the mother tongue in the school setting.

Science teaching and language problem: The indigenous or native language is generally regarded as the vehicle of culture (Akinwamide, 2002). It has been observed that the way an ethnic group classified events happening around them is manifested in the language of the group. According to Ala, a different language would mean a different classification and so it is difficult to translate from one language to another and still preserve the meaning.

According to Urevbu (1990), Nigeria has about 400 ethnic groups (this implies about 400 languages) and this can have great implications on the Nigerian science students who would form different models in expressing themselves in the interpretation of science events and phenomena. The fact that Nigeria has adopted English as her official language makes it incumbent on her students to be bilingual while those who belong to small ethnic groups may even have to be trilingual. While examining

the problems one may encounter in such a cross-cultural setting in science teaching and learning, there might be some issue of linguistic interference and adequate conceptualization of what certain experiences mean in a second or third language being studied due to cultural differences between the learner and the native speaker of the target language (Urevbu, 1990).

Every discipline has its language and every teacher (whether he intends to or not) should initiate his students in the use of some form of language. Chemistry is no exception. Chemistry vocabulary does not only include new words but words used everyday which are assigned specific meanings.

A comparative analysis of words like solution, sugar, alcohol, coke, flask, suspension, air, soap, rubber etc., shows that efforts have to be made by the chemistry teacher to distinguish between the ordinary meanings of these words or terms and their respective scientific meanings. Such difficult words may be called technical words. It has been found that when students have difficulty with a problem the most common obstacle is that they have not asked themselves the meaning of the technical terms in the problem (Faleye, 2004).

The problem of under-achievement in chemistry at the secondary school level has been highlighted (Jegede, 2003; Faleye, 2004) it would appear that lack of understanding of technical words in chemistry is partly responsible for this under-achievement. For proper grasping of chemistry ideas and concepts, these technical words/terms have to be understood.

MATERIALS AND METHODS

Population: The population for the study included all SS2 chemistry students in secondary schools in Ado and Moba Local Government Areas of Ekiti State. All these schools offer chemistry at the senior school certificate examination.

Sample: The sample consisted of 150 chemistry students randomly selected from ten senior secondary schools in Ado and Moba Local Government Areas of Ekiti State. Fifteen chemistry students were thus randomly selected per school and in schools where there are just 15 students offering chemistry, all the students were used for the study.

Data collection and analysis: The questionnaire was administered to all the subjects selected for the study. The simple percentage was used to analyse the data collected. The percentage score for each item was calculated for each of the six scale points (In this study a word/term is considered difficult to understand if the sum of the percentage scores in columns 5 and 6 is >40).

RESULTS AND DISCUSSION

From the Table 1 it was found that the SS2 chemistry students in senior secondary schools under

Table 1: Percentage scores for each technical word term

Technical words/terms	1	2	3	4	5	6	Total
Acid	0.2	32.2	30.1	18.00	8.9	10.5	19.4
Air	0.6	27.1	31.4	20.30	10.2	10.4	20.6
Alcohol	1.5	38.3	40.7	11.60	2.5	5.4	7.9
Aldehyde	0.4	5.7	8.6	16.20	21.9	41.2	63.1*
Allotropy	4.9	10.6	7.6	35.50	25.6	15.9	41.5*
Alums	0.0	33.6	24.5	14.10	20.3	7.5	27.8
Amide	0.9	8.3	26.3	21.60	12.1	30.8	42.9*
Amphoteric	0.2	11.7	20.1	19.40	27.2	21.4	48.6*
Anhydrous	0.3	19.2	29.6	17.40	26.7	6.8	35.5
Aqueous	0.0	36.2	42.5	11.20	6.3	2.7	9.0
Atom	3.2	21.7	24.1	30.80	20.2	11.7	31.9
Biodegradable	0.6	30.4	20.6	16.30	19.7	12.4	32.1
Buffer	0.4	19.3	22.6	14.10	25.2	18.4	43.6*
Base	0.4	36.2	28.1	10.40	13.4	11.5	24.9
Brass	0.6	24.0	31.3	23.20	19.2	1.7	20.9
Brine	16.0	7.7	10.4	11.90	21.0	32.6	53.6*
Calorific value	0.0	44.5	20.7	25.90	15.9	3.8	19.7
Catalysis	8.8	10.1	4.3	19.40	27.1	30.3	57.4*
Catenation	0.2	8.1	16.8	15.20	36.7	23.0	59.7*
Centrifuge	0.4	13.2	41.5	17.40	9.0	18.5	27.5
Ceramic	0.1	18.5	44.3	20.40	12.8	3.6	14.4
Chalks	7.3	8.8	19.3	23.20	24.6	16.8	41.4*
Chromatography	10.2	0.8	11.9	22.00	24.7	30.4	55.1*
Colloid	9.5	4.1	4.1	19.40	22.3	40.6	62.9*
Condensation	0.5	32.6	24.1	20.60	19.4	3.8	23.2
Cracking	21.8	4.3	6.2	13.20	24.7	29.9	54.6*
Crystallization	1.1	29.3	22.8	19.40	11.2	16.2	27.4
Decantation	0.2	12.7	18.3	37.10	23.4	8.3	31.7
Decay	19.2	4.6	10.0	10.90	28.3	28.5	56.8*
Dehydration	11.5	10.9	15.2	22.60	31.1	11.7	42.8*
Deliquescence	6.4	4.2	11.6	17.80	30.3	29.7	60.0*
Delocalization	3.5	9.7	8.7	6.30	29.6	35.2	64.8*
Dialysis	2.6	10.3	10.0	14.40	21.3	40.4	51.9*
Dipole	4.1	19.2	16.3	25.60	24.9	9.3	34.9
Disaccharide	1.8	2.8	24.6	19.10	21.2	30.5	51.7*
Effervescence	0.2	11.3	10.5	18.90	23.0	36.1	59.1*
Efflorescence	0.5	10.4	8.6	13.50	29.3	37.7	67.0*
Effusion	4.1	17.4	4.8	16.70	41.2	20.8	62.0*
Emission	0.8	8.3	11.1	28.90	23.5	27.4	50.9*
Emulsion	0.1	15.4	22.8	20.10	21.4	20.2	41.4*
End-point	2.9	17.7	21.3	33.20	19.9	5.0	24.9
Energetics	6.3	16.2	18.7	20.20	21.5	17.1	38.6
Enthalpy	2.7	2.8	20.4	19.20	25.3	29.6	54.9*
Entropy	15.8	8.4	4.4	12.40	18.3	40.7	59.0*
Enzymes	18.3	1.8	18.7	10.30	16.1	34.8	50.9*
Esterification	15.9	2.8	10.7	9.90	19.3	42.2	61.5*
Exosphere	10.6	3.9	9.6	12.50	14.2	49.2	63.4*
Fermentation	0.1	30.0	12.2	21.80	26.7	4.2	30.9
Fertilizer	21.3	13.3	23.3	16.70	8.7	16.7	25.4
Filtration	20.0	12.0	22.0	18.00	10.0	17.3	27.3
Fluorescence	18.2	1.3	3.5	9.50	8.4	59.1	67.5*
Glass	17.4	1.9	6.2	4.80	9.2	60.3	69.5*
Hard water	9.3	12.0	15.3	18.75	20.7	24.0	44.7*
Hydrolysis	10.1	4.8	20.0	7.50	26.4	21.2	47.6*
Half-life	8.0	12.7	17.3	20.00	20.0	22.0	42.0*
Indicator	23.3	11.3	42.7	19.30	6.9	14.7	21.4
Inhibitor	10.7	12.0	16.0	16.70	21.3	23.3	44.6*
Ionization	8.7	13.3	15.3	18.00	20.0	34.7	54.7*
Orbital	7.3	10.7	16.0	20.70	20.7	24.7	45.4*
Resonance	12.0	3.3	14.0	18.70	19.3	22.7	42.0*
Salt	6.7	12.7	17.3	19.30	20.7	23.3	44.0*
Suspension	7.3	12.0	15.3	19.30	20.7	25.3	46.0*

study perceived 39 terms difficult to understand. This shows that about 63% of the selected terms in the study are not understood by students. Although one cannot generalize due to the limited scope of the study but there indication that lack of understanding to technical terms in chemistry poses a problem to students.

This finding lends support to that of Aigboman (1985) who in his findings from a similar study concluded that students' poor performance in certificate examination might be due to poor understanding of technical words in physics.

CONCLUSION

To enhance students understanding of these technical words, terms the teacher should always endeavour to clarify their respective meaning whenever he comes in contact with them. Any introductory lesson involving the use of any difficult words/term should highlight the meaning. The use of an English Dictionary and a dictionary of chemistry (or science dictionary or encyclopedia) side by side is advisable.

In addition, the teacher should adopt a strategy of ensuring an indiscriminate use of these technical words/ terms. Students should be encouraged to use these terms as often as possible both within and outside the classroom. This could be achieved through quizzes and debates and it is hoped that by so doing, they will come to the understanding of the proper meaning of such words/terms.

Researchers of Chemistry textbooks and other teaching materials can help to improve on the understanding of the identified words/terms by trying as much as possible to explain them rather than present practice of just defining or using them only in problem solving. This can be achieved through illustrations.

RECOMMENDATIONS

Another suggestion on how to help students understand these technical words/terms is to teach chemistry in the language the student understands best.

It is the belief of the researcher that chemistry instruction would be more effective if it is initiated in students' mother tongue. This supports Aigboman (1985) view that physics students whose mother tongue is not English find it difficult to appreciate the meaning of most scientific terms.

Another way of helping students to understand these technical words/terms is through demonstration, simple experiments and by giving simple project to the students. Simple demonstration or/and experiments can help to illustrate the meanings of technical words/terms like concentration, catalysis, chromatography effervescence, esterification, etc. It is when these words/terms are understood that the student would appreciate the importance of chemistry as a subject that establishes a relationship between man and his environment.

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