IMPACT OF PROCESS WRITING STRATEGIES ON INSTITUTIONAL LOCATION OF UNDERGRADUATES IN SCIENCE AND TECHNOLOGY-BASED CAMPUSES

BY

Babangida Ibrahim Yarima

General Studies Directorate

Abubakar Tafawa University, Bauchi

babangidayarima@rocketmail.com

Phone: +2348025255933

ABSTRACT

The study investigated the impact of written English strategies associated with process writing of undergraduates in science and technology-based universities on their institutional location. A quasi experimental research design was adopted using pre test, mid way and post test. Science and Technology fresh students of the two universities constituted the population, from which a total of Two Hundred participants was drawn to make the sample. Two sample t test analysis conducted revealed that no significant difference existed between the two institutions selected after an exposure to treatment activities, implying the retention of the null hypothesis and the rejection of the alternate hypothesis. Thus, findings from the study revealed that, students' institutional location does not affect their process writing strategies. In the light of the findings obtained from both quantitative and qualitative data, the study recommends, among other things, inter institutional collaboration in the teaching of writing and the establishment of writing centres.

KEY WORDS: *process writing, strategies, institutional location, undergraduates, science and technology-based universities*

INTRODUCTION

Most previous studies on environmental factors regarding language variability have focused entirely on speech and grammar (see, Ellis, 1987; Larsen-Freeman & Long, 1991; Polio, 1992; Mason, 2006; for instance). While these are prominent in second language acquisition, they cannot be over emphasised at the expense of such an important language component as bilinguals' writing process. This fact is crucial as computer –based as well as collaborative techniques are nowadays being applied in the area of second language writing (Haas, 1989; Huang, 2000; Howard & Schendel, 2009; Whitmore, 2012).

In developing nations like Nigeria, not all universities are equipped with modern writing training facilities. With the establishment of many universities in the country in recent years, it is essential to ensure a uniform standard in terms of English for Academic Purposes (EAP) writing curriculum for science and technology related courses across institutions. The need for the present study stemmed from the desire to enhance the written English performance of students of science and technology related disciplines, using a variety of writing strategies. This idea is largely informed by the fact that the number of universities in Nigeria is increasing at present to include federal, state and privately owned ones.

Several emerging insights, as pointed out in Tomlinson (1983), attempt to improve on some of the inadequacies associated with the traditional approaches to the teaching of writing. A host of studies (such as Frakenberg-Gracia, 1999; Flowerdew, 2000; Graham & Perin, 2006 and Booth, 2009) have advocated for reviewing the techniques of teaching writing relevant to the purpose, topic and intended readers. Students are, therefore, expected to use writing as a means of interaction (Swales, 1990; Badger & White, 2000; Hyland, 2000; Syrquin, 2006). The interactive activity, which is a component of the present study, is necessitated by the inability of university science and technology students to effectively produce written texts through the recursive process of composing and editing. Through interaction as one of the process writing activities, students are likely to enhance their writing performance.

The writing approaches – where we are today

The process-based approach, as noted in Flower & Hayes (1984), Hayes & Nash (1996), Gunnarsson (1997), Badger & White (2000) and Seow (2002), focuses on what writers actually do and the choice they make when they write. In this sense, the writing process paves way for the means of achieving cohesion, coherence as well as the convention of writing relevant to the learners' need and purpose. This approach is, in most cases, 'unpressured' seeing learners as active participants in the whole exercise. Students are allowed to confer in pairs, small groups and with a teacher. The teacher's role here is mainly that of a facilitator, a scaffold and a writing consultant. This process is, among other things, multilayered, recursive, focused on interaction with the text and involving free writing. The present study sought to find out whether or not this particular writing technique has any impact on the institutional location of science-based students. In addition, the whole product is expected to be contextualised. Side by side with the process-based, is the product-based approach. This is where writing compositions are timed on the basis of the complexity level of task.

Usually, in the case of Senior Schools Certificate Examinations essay writing in Nigeria, a period of fifty minutes is allocated to an examiner-selected composition of 400 word length. The evaluation is, therefore, based on timed/pressured production. Consequently, feedback comes along four weighing points: content, organisation, expression and mechanical accuracy. As such, good ideas are valued and flaws penalized. The content is expected to be well organised with demonstration of a very sound command of the language (expression) devoid of poor mechanics. The modified product oriented approach is, according to Jacoby, Leech & Holten (1995), a more or less, similar to the genre-based approach. Kaewpet (2009) equally agrees that the two approaches do share common features. As Brown, Glasswell & Harland (2004) noted, in both the modified product and the genre approaches, students are made to carefully study materials relevant to a given assigned topic. And, afterwards the candidates write an essay based on the genre already analysed, corrections effected and feedback given for the learners to rewrite before another essay topic is given.

The act of composing texts either with pen and paper or in word document is day-in-day –out witnessing rapid improvements. In addition to the product, the process and the genre-based approaches, others are still emerging. These include the 'Sentence Combining Plus' (SC [+]), 'Textual Enhancement' and 'Collaborative writing'. Others are 'Procedural Text' (also

known as 'Instructional Text', which tends to minimise distance between language and action through sequence of instructions and recommendations by simply answering the question 'how?') and 'Rhetorical Structure Theory' (the theory of intercultural relationships that govern discourse structure; thus, pointing to the multi sentential coherence including sequence, purpose and elaboration). Interestingly, some of these, such as sentence combining and collaborative writing, were reflected in the present study and some of their elements have actually been embedded in it. The relevance of the above mentioned approaches to the present study is in the light of the fact that Collaborative Writing is relevant to polishing of drafts and sentence combining (SC) is associated with planning as proposed in this research work. Adopting some of these strategies in the present study could be practicable since the most modern writing techniques involve a recursive writing process.

The present study engaged the experimental subjects in rigorous writing activities involving both collaborative and recursive activities during the composing stage. This way, rather than adopting the traditional 'error–search' marking among 'the error maniac' teachers, the present study opts for reformulating by means of drafting and redrafting procedures. This is with a view to producing readable documents among science and technology students (Allwright, 1988; Kress, 1994; Walker and Riu, 2007; Shin, 2008). More so, this study takes cognisance of several modern essay scoring methods as they greatly determine the writer's performance. The process goes a long way in motivating even the 'error- phobia' learners by exposing them to self monitoring and peer correction. As Whitmore (2012) points out, the idea also caters for students with writing block through recursive writing tasks, collaboration with colleagues and teacher scaffolding as means of reducing anxiety, among other things. For this reason, the relevance of attitude in developing writing abilities cannot be over emphasized.

To encourage the learners, the teacher is always required to motivate them (Hanrahan, 1998). This strategy involves pointing out that every step in the writing process aims at a progress. Nordquist (2007) observes that both interest and indifference among students towards writing arise from their abilities. This may not always be the case as those who are weak in writing could still have the desire to write and be corrected in a non threatening atmosphere through self monitoring and learner interaction. For better writers, Booth (2004) suggests that, it should be made clear to them that the world of writing is fast changing; as such, they still need to keep learning. This way, they remain abreast of conventions and also become acquainted with rules and other relevant mechanics involved in writing across cultures. It is only a constant practice that makes a professional writer.

From another dimension, Paltridge (2001) recognises only four types of writing teaching techniques within the purview of EAP situation. These are controlled composition, rhetorical functions, process approach and genre approach. Controlled writing is restricted to using substitution tables, written expressions and frame completion. Rhetorical functions involve not only rhetorical patterns such as diction, punctuation and spelling but also grammatical correctness. Process approach, on its own part, places emphases on learner autonomy dealing with both the writer and the writing process. This last approach, therefore, involves brainstorming, organisation, drafting, re-drafting, revising and proofreading, all of which are sub components of the present study. The teaching of a particular academic genre like essays and research reports refers to genre approach to writing.

Although the present study views every stage of the writing process as prominent to the overall production of a readable text, it basically focuses on the coherence in students' written English. It is always expected that a science and technology written document is comprehensible, straightforward and precise. Unfortunately, the final drafts of most of this category of learners for the present study lack such qualities or features. A sample of students' written documents drawn from science and technology related courses have revealed this point. The weaknesses identified are largely owing to the fact that these students are rarely trained in writing techniques relevant to their specialities (Barass, 1978; Hutchinson & Waters, 1987, 2004; Dudley–Evans, 2001; Taylor, 2006). Consequently, the document they produce is usually hard to grasp.

Purpose of the study

The main purpose of the study was to ascertain whether there would be any difference between students of the two campuses sequel to the writing strategies adopted.

Research Question

Research question raised for this investigation is: "What is the difference in the written English achievement test between students of the two universities: ATBU, and BASUG, before and after exposure to the training involving process writing strategies?"

Hypothesis

Hypothesis generated is 'There is no significant difference in the written English achievement test between experimental subjects of the two universities: ATBU and BASUG before and after treatments.'

METHODOLOGY

Research design

Fresh science and technology-based students of 2011/2012 session in two distinct universities constituted the subjects for the study. One university, Abubakar Tafawa Balewa University (ATBU), is federal-government owned and the other, Bauchi State University Gadau (BASUG), was established by the state government. The choice of these universities for the study stemmed from the need to enhance the written English performance of students of science and technology related disciplines, using a variety of writing strategies. The number of universities in Nigeria is increasing at present to include federal, state and privately owned ones.

From each of the two campuses selected for the study, a number of one hundred students was randomly selected to make a total of two hundred participants. These participants constituted both the experimental and control the groups. The study was carried out at three stages: pre–test, mid-way and post–test. Between each test occasion, there was a two-week gap, which also covered the treatment periods. The design for this study adopted the pre test-post test quasi experimental research procedure. In this case, the participants were subjected to treatment involving essay writing activities and the written English test scores compared with the results at both pre test and post test stages (Xiang, 2004). A mid way test was also conducted to help identify if difference in performance was attributable to efficacy of treatment alone or it was coupled with some extraneous factors.

Figure I: The Design Structure

R O1 X O2 O3

The R stands for random assignment, X for treatment and each O represents a different wave of measurement. The subscript against each O indicates a subset of measures. In this case, O1 implies pre test while O2 and O3 suggest midway test followed by final post test.

RESULT

Table 1answers the research question raised for this investigation.

Table 1: Written English performance total and percentage scores for experimental subjects based on location of institutions

Variable	Institution	N	Maximum Scores Obtainable	Total Score Obtained	Percentage Scores
Pre-test	ATBU	100	5000	1045	20.9
	BASUG	100	5000	1026	20.52
Mid-way test	ATBU	100	5000	3241	64.82
	BASUG	100	5000	3255	65.1
Final Post test	ATBU	100	5000	3460	69.2
	BASUG	100	5000	3566	71.32

The test was aimed at providing the solution to the research question of the study which sought to determine if any difference exists in the written English between students of the two campuses before and after a rigorous exposure to training involving process writing strategies. By this observation, Table 1 depicted that there was no considerable difference in both the total and the percentage scores between the experimental subjects of the two universities selected for this study. At the pre test stage, ATBU students scored a total of 1045 (20.9%) and students of BASUG a total of 1026 (20.52%) from the total obtainable score of 5000. After the mid-way test that followed the textual planning activities, students of ATBU obtained a total score of 3241 (64.82%) which was slightly below the total and percentage scores of BASUG (3255 and 65.1% respectively). In any case, a difference of only 44, representing 0.28% may not be so significant to have been influenced by any factor other than chance. Surprisingly, even after the final test sequel to the revision activities, the performance of subjects of the two institutions still increased. Students of ATBU scored a total of 3460 (69.2%) and BASUG students again slightly outscored their ATBU counterparts by a little difference of 160 (2.12%).

To confirm whether or not the little difference was significant, an inferential statistic was employed. The two sample t-test was, therefore, used in the test as summarized in Table 2. The hypothesis for the study tested for the effects of the outcome of the experiment on institutional location by looking at the possible differences between the two schools involved in the experiment.

Ho: There is no significant difference in the written English achievement test between experimental subjects of the two universities: ATBU and BASUG before and after treatments.

Table 2: Two sample t-test on mean written English performance scores of the experimental group by location of schools

Variables	Institution	N	Mean	Std. Deviation	Std. Error	t-value	Df	P
Mid-way test	ATBU	100	31.69	6.294	0.629	0.116	198	0.908
	BASUG	100	31.79	5.926	0.593			
Final post test	ATBU	100	34.06	6.037	0.604	1.749	198	0.082
	BASUG	100	35.37	4.431	0.443			

(t-critical = 1.98)

The result in the table did not reveal any significant difference in the performances of students from the two schools (ATBU and BASUG) in the two variables of written English before and after exposure to the treatment. The observed t-values for the tests are all lower than the critical value of 1.98 and the observed levels of significance are higher than the fixed level of 0.05 ($P > 0.05$). By these observations, the null hypothesis that there is no significant difference between the mean written English performance scores of the experimental subjects of the two universities: ATBU and BASUG is, therefore, retained. The implication here is that the treatment could be effective irrespective of the students' location.

Three samples of paragraphs produced by an experimental subject each at the pre test, the midway and the final treatment stages in each of the two universities are presented below. Samples 1, 2 and 3 were extracted from essays of ATBU and samples 4, 5 and 6 from BASUG experimental subjects.

1. Some of our highest technicians should be staffed in technical support. The importance of ICT. ICT can be utilised to model situations and solve problems. ICT acts as a force change in society and citizens should have an understanding of this ICT.

2. Computer can enhance educational efficiency. The efficiency in teaching various subjects could be improved. For instance, many teachers are already teaching large classes of students. In this situation, students no longer received the much desired individual assistance. It is possible to use carefully prepared computer programmes to ensure that learners are accurately and systematically instructed.

3. In today's world, not only are we surrounded by technology, but our primary means of reaching others in far and near places are also mediated by technology. Computer can enhance educational efficiency. However, technology is often associated with numerous problems. These huddles include low funding, paucity of ICT infrastructure, irregular and low quality power supply, and high cost of ownership of facilities which include capital and operational costs.

Sample 1 exhibited a weak logical sequence coupled with flaws in grammar. Sentences were not

logically ordered. Furthermore, the idea of the entire paragraph was not fully developed due largely to sentence fragment as in 'the importance of ICT' inserted as an independent sentence in the middle of the paragraph. The essay was scored 11/50. In sample 2, a topic focus was fully established with ideas sequentially arranged. Each sentence further explains the previous one. Based on the progressive improvement owing to the first treatment phase, the essay was awarded 32/50.

Sample 3 was produced at the final post test level. This extract has shown the students' ability to lump two contrasting ideas as well as cause-effect relationship in a single sentence through thesis development skills acquired during the treatment segment of actual writing. This is evident in the first sentence of the paragraph: 'In today's world, not only are we surrounded by technology, but…' The essay has satisfied all requirements for a score of 36/50 since it is flawless due the writer's demonstration of ability to delete, insert, and further re modify sentences with a view to extracting blemishes. These skills were acquired from the composing strategies of self monitoring and idea restructuring. Though very long, the last sentence of the above paragraph has effectively conveyed the intended message. This competence is evident in the writer's consistent use of modifiers to qualify nouns as in 'low', 'irregular', 'high', ' capital', and ' operational'. Globally, the sentences have been successfully linked to each other with the help of such inter sentential cohesive elements as 'however' and 'these huddles' owing to the strategies of clustering, sentence combining and group conferencing. Samples 4, 5 and 6, as presented below, were extracted from the writing of a student of BASUG before, during and after an exposure to treatment activities.

4. Information Technology are the processing and maintenance of information communication technologies they include all Medias in transmitting radio video datas or multimedia such as cable satellite fibre optics, wireless, radio, infra-red, Bluetooth, wifi and etc. They key thing is not technology itself
understanding technology.

5. A major obstacle to using information technology is infrastructure deficiencies in Nigeria. Computer equipment was made to function with other infrastructure such as electricity under controlled condition. For the past fifteen years Nigeria has been having difficulty stable and reliable electricity supply to every nook and crannies of the country without success.

6. In Nigeria, a formidable obstacle to the use of ICT includes infrastructure deficiency. ICT is, nevertheless, a force that has changed many aspects of our lives such as medicine, tourism, travel, business, law, banking, engineering, and architecture. The umbrella perfective for ICT provision recommends examining new technology for various levels of analyses.

Sample 4 demonstrated a very low competence level of the writer. Plural auxiliary 'are' was wrongly used for a singular concept 'information technology'. Also, a personal pronoun wrongly introduced as a subject referent. Another inherent weakness is obvious in inserting a plural marker ('s') for 'media' and 'data' which are already plural forms. As could also be noted, even where 'such as' introduced examples, the list was followed by etc. The last sentence of the paragraph: 'They key thing is…understanding technology' is hard to comprehend. The essay was awarded 8/50.

Adopting a deductive pattern, the writer of sample 5 presented a clear topic sentence. The controlling is sentence was further efficiently and

effectively supported by smooth sentences due to an exposure of experimental subjects to textual planning strategies. The essay was scored 31/50. Sample 6 exhibits the writer's ability to place a focus on place adjunct over and above the subject. This is, no doubt, the result of the training the subjects acquired in the skills of re modifying ideas as evidenced in the use of a concession signal, 'nevertheless' as a connector between ideas in the initial and the subsequent sentences. The second sentence of the paragraph, therefore, suggests a high degree of competence. This skill was acquired through the use of exemplification resulting from list making melo-strategy (a component of brainstorming strategy), which was acquired at the composing stage. The last sentence shows a rich vocabulary/diction as in 'umbrella', 'perfective', and 'levels of analyses'. Such a display of diction reveals the experimental subjects' mastery of text re-structuring strategy, which involves removing, adding and replacing words with other much more appropriate ones. The essay was scored 34/50.

Below are two tables, one for composing and the other for revision and editing, each showing, in order of priority, the strategies that worked the wonders already displayed.

Table 3(a): Hierarchical Presentation of Actual Composing Strategies that Led to Remarkable Improvement

Strategy	Effect on Exp. Group	Evidence from the Sample
Brainstorming	planning ahead of the composing process such that ideas were generated and ideas and purpose considered at the outset through outlining, pausing, thinking and organization chart	Sentence 1 highlighted the potential of ICT before lamenting on the fact that its usage is less than five percent. Thereafter, the subsequent sentences (2 to 5) pointed out the benefits of the programme.
sentence combining	Logical transition of ideas was ensured through inter-sentential link.	Building complex sentences, beginning with subordinate clauses then main clauses. Examples are 1. 'Despite…, it is obvious…' 2. 'In this technology driven age,…'
thesis identification and development	ordered materials from general to specific, thereby conforming to standards and demands of technical writing.	listing, in order of priority, the diverse benefits of computer. Sentence 1: 'potential of ICT', sentence 2: 'expanding and widening access in providing the quality of education', sentence 3: use of internets helps lecturers', sentence 4: everyone requires ICT competence to survive' and 5: 'the need for ICT … cannot be overemphasised'
Un jumbling	enhanced logical ordering, which is science-oriented as against natural ordering, that is non-science-based.	A single benefit was mentioned in each of the five sentences.
self monitoring	variety of sentence length.	The first two sentences are long and the last three short.
planning frame	coherence and logical manipulation enhanced through insertion, deletion, replacement and reorganizing.	'teaching, learning and research'; 'fully harnessed; 'e-learning alone'; ' a simplified way'; 'expanding and widening access'; 'tertiary institutions'; 'technology-driven age'; ICT competence' and

		'Nigerian institutions'
free writing and loop writing	writing freely based on ideas clustered initially. Then organising a summary.	Sentence 4 and 5 restated, emphasised and summarised the details of the first three sentences: '...everyone requires ICT...' and 'the need for ICT...'

Table 3(b): Hierarchical Presentation of Actual Revision and Editing Strategies that Led to Remarkable Improvement

	Strategy	**Effect on Experimental Group**	**Evidence from the Sample**
	working in pairs	use of appropriate modifiers and commas between subordinators and noun clause and also before adverbial phrase	'...potential of ICT in teaching, ... , ... , it is...'
	Idea sharing, restructuring and reformulation in pairs	variety of synonyms	'fully', 'simplified' and 'reduced'.
	Crafting	Intra-sentential flow of ideas	consistent use of modifiers (both adverbs and adjectives) such as 'really', 'fully', 'simplified' and 'reduced' as well as use of commas as boundaries separating phrases and clauses.
	discourse organization	cohesive ties and paragraph structure	each of the sentences (1 to 5) discussed, in one way or the other, the benefit of computer education at tertiary level in Nigeria.
	teacher scaffold and time allocation	obtaining further input and feedback on progress so far as well as going back and forth for details and idea sequence	beginning with the challenge of Using ICT in tertiary institutions (less than five percent in Nigeria) before the positive impact (sentences 2 to 5)
	small group editing	checking for fluency and accuracy and discussing drafts with colleagues through interactive feedback and reorganising for sequence	use of a proper noun 'it' to refer to ideas, phenomena and concepts
	self edit/proofreading	Checking for spellings, punctuation and grammar	capitalising proper nouns (Nigerian and ICT) and hyphenating between compound expressions (e-learning and technology-driven)
	Reviewing	final revision after linking sentence with the next	sample sentence 2 linked with sample sentence3: '...e-learning...reduced cost.'

There is no significant difference between the written English mean performance scores of the experimental subjects of the two universities: ATBU, Bauchi and BASUG who were both exposed to the textual planning and the polishing drafts strategies. This is shown in Table 3, a summary of the students' total and percentage scores at the two institutions and Table 4 that summarises the two sample t-test on written

English mean performance scores of the experimental group by location of school. The actual essays showed numerous errors ranging from poor spelling and punctuation to sentence fragments and incomprehensible paragraphs among ATBU students and similar gravity of errors among students of BASUG at the beginning. However, after the midway test, the errors reduced considerably and then further reduced remarkably at the end such that ATBU and BASUG students were able to display efficient and insightful writing competence.

DISCUSSION

The hypothesis for the present study, which predicted that there is no significant difference between the written English mean performance scores of the experimental subjects of the two institutions: ATBU and BASUG was 'accepted', implying the rejection of the alternate hypothesis, as shown in Table 2. This implies that treatment was effective irrespective of location of school. This finding is in harmony with the opinion of Pagano, Bernhardt, Reynolds, Williams & Mc Currie (2013). Aspects of treatment responsible for the considerable improvement are idea formulation and subsequently thesis development followed by student-student and teacher-student conferencing during the recursive writing process.

However, there is a discrepancy between the finding of the present study and the result obtained in an investigation by Udeayo & Wudiri (1996). Contrary to the findings of the present study, Udeayo and Wudiri (1996) found out that, there is no correlation between university students' EST training and their writing environment in science and technology related fields. This investigation has involved writing activities and tasks for those science students' EST training programme. The strategies adopted in this investigation include brainstorming, developing ideas, un-jumbling texts and intra-paragraph sentence completion. English for Academic Purposes (EAP) in Nigerian universities, as enshrined in the NUC benchmark, places emphasis on written English. Although there is slight difference in content between conventional and science and technology based universities in Nigeria, teaching of writing in all universities has been based on the traditional approach. This is where students are required to independently produce texts which are scored on the basis of grammatical correctness, spellings, and punctuation. When students are not pressured, their written English is mainly a product of plagiarism. In line with the ideas of the present study, training in written English is mainly for fresh students (Braine, 1994; Nwoke & Maisamari, 2006; Aborishade, 2007).

Based on another finding in the present study, the process writing strategies were found to be effective techniques in the written English of university science and technology students. For an efficient presentation of ideas and their logical manipulation, the before and the within-task writing activities are specifically crucial in second language writing among science-based university students in Nigeria. This point lies in the fact that, tertiary level students in this country mostly engage in writing with pen and paper. This situation is entirely different from developed nations where word processing is the major writing medium. As opposed to this view, Haas' (1989) investigation concentrated mainly on planning writing using the computer. The present study found out a sequential as well as higher level planning when using pen and paper. The discovery in this research shed more light on the need for composing and revising strategies that take cognisance of the fact that university students in this country are still grappling with pen and paper

writing. Thus, the strategies involved for this study are more applicable to Nigeria's context where university students' writing is based on paper and pen.

With the treatment activities introduced for the present study, it is found that location of university would not affect the written English performance of science and technology students. The basic condition, in this context, is ensuring the adoption of uniform course content. This study adopted a uniform lesson note, which served as a lesson manual and scoring guide based on a table of specification (Appendix II). These documents were largely responsible for the uniformity in this research. Thus, students in the two universities were exposed to similar treatment activities and their written English tests assessed using the same marking guide. As opined in (Braine, 1994; Flowerdew, 2000; Creme & Lea, 2003), the specialised second language writing programme in the university system is a specific academic discourse (writing across the curriculum) together with cross institutional collaboration. The findings in this research show that improvement sequel to treatment activities is regardless of location of institution.

CONCLUSION AND RECOMMENDATIONS

In the light of the findings of this investigation, it can be inferred that process writing strategies do not affect the location of institution and consequently the written English performance of science and technology related university students. Based on this conclusion, this study provides some far-reaching recommendations to all concerned in teaching and learning the use of English/EAP at the science and technology based universities. Several categories of persons are involved. These include the students as well as all stakeholders in the teaching-learning process.

1. The recommendations, which are provided based on the findings of this study, specifically reflect improvements in the component of written English. They are:

2. The actual strategies capable of improving writing performance, using in-put from textual composing and polishing in this study, are to be adopted.

3. Emphasis should be placed on those strategies from which each category of students will benefit more. That way, in addition to improving their written English performance, the writing strategies will efficiently address students' language difficulties cutting across deficit, common-core and specific subject area needs.

4. Science and technology related universities are to embark on inter-institutional collaborations in the teaching of writing with a uniform curriculum renewal package could be adopted.

5. To obtain further insights in the writing process, students are to engage in sharing ideas through peer editing and teacher-student conferencing. At the outset of the initial draft, they should take into account those factors associated with the writing process. These are the reader, the content, the purpose, the style/format and the writing medium.

6. In addition, the students should always embark on pre-writing activities (such as outline and mind map), drafting and redrafting procedures.

Essentially, these processes are recommended to formulate and develop ideas, determine heading, subheadings and sections. These steps make the writing process a multilayered and recursive activity. The process also aims at achieving logical manipulation of sequential and coherent ideas.

REFERENCES

Aborishade, P.A. (2007). Reading to write: Nigerian context of an in-sessional EAP provision. Retrieved: April 18, 2011 from http//www.hum.port.ac.uk/sks/pastconference proceedings/baleap-im/files.Aborishade.pdf.

Allwright, R. L. ; Woodley, M. P. & Allwright, J. M. (1988). Investigating reformulation as a practical strategy for the teaching of academic writing. Applied Linguistics. 9,236-256.

Badger, R. & White, G. (2000). "A process genre approach to teaching writing, *ELT Journal 54/2, 122-152.*

Barras, R. (1978). Scientists must write – A guide to better writing for scientists, engineers and students. New York: Willey and Sons Inc.

Booth, A. (2009) "Professional writing: 5 attitudes which will kill your career." Retrieved June 6, 2009 from http://copywriter.typad.com/copywriter/2009/02/professionalwriter.

Braine, G. (1994). "Starting ESL classes in Freshman writing programs", *TESOL Journal 3-4 (1994): 22-25.*

Brown, T. L, Glasswell, K & Harland, D. (2004). Accuracy in the scoring of writing: Studies of reliability and validity using a New Zealand writing assessment system, 9, 105-121.

Crème, P, & Lea, M. R. (2003). Writing at university – a guide for students 2nd edition. London: Oxford University Press.

Dudley-Evans, T. (2001) English for Specific Purposes: Cambridge guide to TESOL. Cambridge University Press. English for Specific Purposes, 15,311-24.

Ellis, R (1990) Understanding second language acquisition, New York: Oxford University Press

Flower, L. S & Hayes, J. R (1984) "Images, plans and prose: the representation of meaning in writing". [electronic version] Written Communication, 1, 120-160.

Flowerdew, L. (2000) using a genre-based framework to teach organizational structure in academic writing. ELT Journal 54/4, 369-378.

Frakenberg – Gracia, A. (1999) " Providing a student writer with pre-text feedback. ELT Journal 53, 2, 100-106

Graham, S. & Perin, D. (2006) Writing next: effective strategies to improve writing of adolescents in middle and high school,Washington, DC: EE. Retrieved May 21, 2009 from www.all4ed.org/publications/writingnext.Pdf

Gunnarsson, B. L. (1997) The writing process from a sociolinguistic view point [electronic version]. Written Communication 14/2, 139 – 188. Retrieved: June 24, 2009 from http//wcx.Sagepub. Com/cgi/content/abstract/14/2/139.

Haas, C. (1989). How the writing medium shapes the writing process: Effects of word processing on planning. JSTOR: Research in the Teaching of English, 2, 181-207.

Hanrahan, M (1998) The effect of learning environment factors on students' motivation and learning, retrieved: 23/08/05 from eprints.quit.edu.au/1352/1/hanrahan-ijse.pdf

Hayes, J. R & Nash, J. G (1996). On the nature of planning in writing. In Levy C.M. and Ransdell, S. (Eds) The Science of Writing. Mahwah: L E A.

Howard, S A & Schendel, H (2009) Making the writing centre a writing environment, Retrieved: 11/06/10 from www.ideastap.com/ideasmag/the-knowledge/how-to-create-perfect-writing-environment

Huang, S & Liu, H (2006) Communicative language teaching in multimedia language lab, The Internet TESL Journal, 6 (2)

Hutchinson, T. & Waters, A (2004). English for Specific Purposes 19th edition. Cambridge: Cambridge University Press.

Hutchinson,T. & Waters, A. (1987). English for Specific Purposes – A Learning Centred Approach. Cambridge: C U P.

Hyland, F (2000). ESL writers and feedback: giving more autonomy to students. Language Teaching Research, 4 (1), 33-54.

Jacoby, S., Leech, D. & Holten C. (1995). A genre-based developmental writing course for undergraduate ESL science majors. In D. Belcher & G. Braine (Eds), Academic writing in a second language (pp 351-374). Norwood, AJ: Ablex.

Kaewpet, C. (2009). Communication needs of Thai civil engineering students. English for Specific Purposes, 28, 266-278.

Kress, G. (1994). Learning to Write Second Edition. New York: Routledge.

Larsen-Freeman, D & Long M H (1991) An introduction to second language acquisition research, New York: Longman Group

Mason, T (2006) Interlanguage and fossilisation: Critique of Krashen (Lecture 8- A Recap), Retrieved: 20/01/2007 from Timothy Mason's Site

Nordquist, R. (2007) "The Write Attitude and Your Writing Goals." Retrieved:June 09, 2009 from http://grammar.about.com/od/attitudesandgoals/a/attitudegoals.htm.

Nwoke, A. & Maisamari, A. M. (2000). The English for science and technology (EST) teacher as a collaborator, Retrieved: November 07, 2009 from displace.unijos.edu.ng/handle/10485/535.

Olaofe, I. A. & Mesembe, C. S. (2006). Reading in Advanced, Tertiary and University Second Language Contexts: a clause Relational Approach, Zaria: Tamaza.

Pagano, N., Bernhardt, S A , Reynolds, D, Williams, M, & McCurrie, M K (2013) An inter-institutional model for college writing assessment, retrieved: 06/02/14 from sites.udel.edu/files/2013/01/CCCassess.pdf

Paltridge, B. (2001). 'Linguistic research in EAP pedagogy', in J. Flowerdew and M. Peacock (Eds) Research Perspectives on English for Academic Purposes. Retrieved: November 16, 2009 from www.faculty.edfac.usyd.edu.au/staff/paltridb

Polio, C (1992) An introduction to second language acquisition, *Issues in applied Linguistics, 3 (2), 344-347*

Seow, A (2002). 'Process writing as a classroom activity', In Richards, J. C and W. A Renandya (Eds) Methodolgy in Language Teaching : An anthology of current practice. C U P. pp 315-321.

Shin, S. K (2007). 'Fire Your Proof reader!' Grammar Correction in the Writing Classroom" *ELT Journal;* 62/4,358-365.

Syrquin, A. F (2006) Registers in academic writing of African- American college students. [electronic version]. Written Communication 23 (1), 63-90. Retrieved June 24, 2009 from http//wex.sagepub. Com/egi/content/abstract/23/1/63.

Taylor, S. (2006). Model business letters, E-mails and other businness documents (6th Edition). New Delhi: Dorling Kindersley PVT Ltd.

Tomlinson, B. (1983) An approach to the teaching of continuous writing in the ESL classes, ELT Journal, 37(1), 23-46.

Udoeyo, F. F. & Wudiri, A. J. (1996). Future engineers and the science of English language. *Bauchi Liberal Studies Series, 1 (1), 76-81.*

Walker,R. & Riu, C.P (2008). Coherence in the assessment of writing skills, *ELT Journal, 62 (1), 18-27.*

Xiang, W. (2004). Encouraging self-monitoring in writing by Chinese students, *ELT Journal;* 58/3,238-46.

A SAMPLE TRAINING PROGRAMME FOR TEACHERS

The first step involves explaining the several strategies such as brainstorming, spiderweb/spraychart, mind map, listing/jotting, and clustering. Teacher provides, as an example, the topic: 'Demerits of Science and Technology to the Society'. The students are required to close their eyes and think about the main topic for about five minutes either in silence or vocalising. Each student is then made to write the idea generated. They are also allowed to write a difficult word in their mother tongue at this level. After writing the first paragraph, students are asked to work in group for comparison and corrections. Afterwards, each student proceeds individually with the subsequent paragraphs. At the end, they exchange their work for editing each other's draft, feedback and possible re-writing. Teacher evaluates the lectures by asking some students to read out at least the corrected versions of their drafts.

Adopting the prewriting activities discussed above, students are required to write another essay of not less than four paragraphs describing the health hazards associated with cigarette smoking. Students are then required to study a passage and complete the gaps that follow it. Based on the information from the passage, students write complete sentences (either simple or complex but not compound) against ideas provided thereafter. Students will then be asked to restructure and rewrite the passage from the point of view of linking and cohesive devices such that some related sentences are combined to form either complex or compound sentences. They are to also restructure ideas for grouping and sequential organisation according to themes and sub-section and then reduce any overlong single sentence to manageable size by way of splitting with the help of relevant conjunctions.

Teacher evaluates the lecture by asking students for meanings and functions of various cohesive devices discussed. Teacher then concludes by re-emphasising that the student thinks and reflects while composing to ensure idea sequencing through avoiding multiple negative constructions, needless redundancies such as 'first and foremost' and piled up conditional clauses. However, in order to shorten sentences, students should not eliminate concession signals as well as connectives like 'because' and 'therefore'. This caution does not, however, include where there is unnecessary lengthy addition between subject and verb or between verb and object which tend to impede meanings.

Students are made to put jumbled texts in a correct order. They are then required to un-jumble a passage by sequentially reorganising it in a correct order. They are also required to point out to the whole class some of the errors they have noted after the self editing activities. Teacher allows students to copy the steps involved in self editing as a summary note. At this stage, students are to write a 1000 word essay before the next meeting next week on the topic "A critical analysis of Nigerian economy from 1985 to present date". For this assignment students are required to self-edit after an interval of one day between the first draft and the redrafting. Each student is given one hour within which to write an essay of at least 800 word-length on "The classification of living organisms". Since this task is not in any way a pressured text production activity, students will be allowed to freely interact as they write. They are then required to compare their drafts in pairs before they finally form larger group of six members each to once again share their work in form of student-student conferencing. And as they confer, teacher goes round to offer scaffold to the groups. Based on further insights obtained from peers, each student identifies specified weaknesses for correction. Where need arises a student is free to call the attention of the teacher for additional input. This is teacher-student conferencing.

TABLE OF SPECIFICATIONS FOR A TWO-ESSAY ITEM TEST OF WRITTEN ENGLISH

OBJECTIVES

CONTENT	ntroduce	rganise	xpress	ink/relate	Conclude	totals	ercentages
Relevance of heading	2			1		3	6
Introductory paragraph	2		1	1		4	8
Flow of ideas		2	2	1	1	6	12
Paragraphing	1	1		2		4	8
Diction		1	2			3	6
Cohesion	1	2	2	2	1	8	16
Sentence structure	1	2	2	2	1	8	16
Logical presentation	2	1	2	1	1	7	14
Variety of synonymous words			1	1		2	4
Conclusion		1	1	1	2	5	10
Totals	9	10	13	12	6	50	100
Percentages	18	20	26	24	12	100	100

