

Effects of University Freshmen's Writing Strategies on Their Professional Orientation

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Abstract: *The author investigated the effects of university fresh science and technology-based students' writing strategies on their professional orientation. A pre test – post test design was carried out and scores computed based on a two sampled t- test. Qualitative data revealed variation between pure science students and those in business related programmes in terms of acquisition and application of specific writing strategies. However, quantitative data showed no remarkable difference in performance between the two categories of university freshmen. Students across disciplines are, therefore, required to interact both before and during writing tasks so that they share specific planning, composing and revising strategies.*

Key Words: *science and technology-based students, university freshmen, writing strategies, professional orientation*

I. Introduction

The increasing demand for English in professional careers has necessitated a paradigm shift in terms of both content and approach in English Language Teaching (ELT). As can be rightly seen, there is a marked departure today from General English (GE) to English for Specific Purposes (ESP). Hortas (2008) attests to this when he says, 'Recent world events have under-scored the need to increase understanding and to improve communication...More individuals have specific academic and professional reasons for seeking to improve their language skills' (p.15). The ESP programme narrows its focus to developing communicative competence in specialised fields, which includes English for Science and Technology (EST). Hortas (2008) further remarks that the words, sentences and the subject matter all relate to a particular discipline. The present study focuses, specifically on EST. In this regard, the materials for the English teaching programme were specially prepared to meet the needs of science and technology based students.

Today, there is a wide range of literature in the field of EST. Some of the absolute characteristics of the programme, according to Dudley – Evans (2001), are that it is designed to meet the students' specific needs and also centred not only on the language but also on the skills, discourse and genres appropriate to those activities. This suggests that the teaching methods and materials for science laboratory or technical workshop report writing are different from the language of business communication, for instance. In fact, as a branch of ESP, EST approach is also based on the results of a needs analysis. This is in harmony with the basic principle of ESP, 'Tell me what you need English for and I will tell you the English that you need' (Hutchinson & Waters, 2004, cited in Brown, Yarima & Moses-Ojo, 2005 p.63).

The English for Science and Technology programme has so far exhibited a lot of interest in the area of students' written discourse performance (See for example, Dudley-Evans, 2001; Zhu, 2004; Tardy, 2004; Hutchinson & Waters, 2004; Shaw, 2006; Kirk Patrick & Klein, 2008). This development is one of the reasons for the desire to merge ESP with EOP. The idea gives rise to what is today coined "English for Specific Academic Purpose" (ESAP). Proponents of the move include Beard & Heartly (1984), Jordan (1997), Sager (2002), Dudley-Evans (2001), Huanran (2005) and Songhoru (2008). According to Sager (2002), ESAP aims at, among other things, the ability to write successful academic papers by developing skills to:

brainstorm and implement a research procedure; organise concepts;
use discourse markers and cohesive devices effectively; provide
appropriate support for assertions; understand the rhetorical conventions
of the type of paper to be written; and, recognise plagiarism and use
citations and practice effective self editing (p.7).

All the foregoing expectations can be practically made possible only when science and technology students acquire skills of drafting and redrafting procedures as suggested in the present study. Only through these proposed strategies, science and technology based texts would appear cohesive, coherent and purposeful. Martinez –Cabeza (2003) views cohesion as a formal preparation of texts, whereas coherence is the result of interaction between text and the receiver. Thus, the way information in EST- related documents is extracted and

organised explains the level of coherence of such scientific texts. The approach equally relates to the way certain cohesive devices, as in Jordan (1980) and Abdolmehdi (2002) are related to the communication situation and the purpose of the text. The experimental subjects in this study, who are science and technology based, have also been trained in the skills of reordering sentences. The idea aimed at producing readable and standard scientific documents. The students were also exposed to 'sentence combining' which was followed by 'the sentence combining plus' (Crowhust, 1983; Abdolmehdi, 2002; Beach, 2007). Abdolmehdi (2002) further contends that 'the sentence combining', on the one hand, essentially refers to a technique in which the learner combines basic sentences to produce longer and more complex sentences. He also points out that 'the sentence combining plus', on the other hand, involves not only sentence combining but also goes as far as to reorganising or reordering jumbled sentences to make meaningful texts. These techniques immensely helped the experimental subjects in producing coherent, final drafts in science and technology related texts. Actually, EST associated documents are by their nature written in a style that makes them exceedingly straightforward, clear and concise. This is why Burkhart (2000) stresses that:

Please do not think that good English is not critical in science writing. In fact, scientists try to be so concise that their English should be better than that of workers in other disciplines...if you have read scientific papers, you would have noticed that a standard format is frequently used. This format allows a researcher to present information clearly and concisely(p.4).

The place of grammar in language is not questionable. Scientific writing tends to require compliance to grammatical rules and diction. In fact, a careful choice of words is eminent. Thus, it is suggested that simpler and commonly used words are much better than complicated, highly technical, impressive jargons (Jean-Luc, 2008). No doubt, syntax plays an important role in the production of science and technology texts. Burke (2005) as well as Lott (2005) clearly attests to this fact. Frodesen & Holten (2003), following Ferris (1999), also remark that to successfully achieve textual connectedness requires grammaticality first. Along this line, Chaves (2009) emphasizes the importance of utilising 'subordinators' and 'symmetrical coordinators' in an essay. For this reason, Kehler (2002) also opines that the 'sentence combining' involves, in addition to cohesive ties, the coherence of the text. This further justifies the fact that 'sentence combining' is not narrowed to a mere syntactic orderliness. Apart from linguistic competence, sociolinguistics, discourse, and strategic competences are equally significant in technical writing. That must be why Gunnarsson (1997) and Lillis (2008) view writing process as a sociolinguistic phenomenon. As could be noted, substantial evidences from Pragmatics, Rhetorical Structure Theory (RST) and research in second language learning have justified the relevance of context in deducing meaning. A good EST document designer or writer is required to consider context and comprehensibility at the planning stage. Also, where the writer must have overlooked these two important factors earlier, he or she would revisit and include them during polishing. This fact has been supported by a number of research evidences (Hovy, 1988, 2005; Baynham, 1995; Swales, 2000; Leki, 2003; Kanoksilapatham, 2005; Fabricius-Hansen, 2008 and Shuo, 2008). A document remains readable only if it is coherent; an incoherent text no matter how structured its sentences are, is still hard to grasp. A host of other studies such as (Chambers, 1989; Ransdell & Levy, 1996; Marcu, 1997; Passerault, Coirier, & Andriessen, , 1999 and Kehler) have lent support to this fact.

Of equal relevance to coherence in technology related text is the careful use of layout and graphics in presenting scientific (descriptive and procedural) data. Here, according to Journal of Young Investors (2005) and also Casey & Selfe (3008), except for units of measurement, use of abbreviations should be avoided. That is regardless of whether the text is produced by paper-and-pen or in a word document. Hence, Haas (1996) reports that the impact of computer technology on writing performance is today of paramount importance.

Although the present study was devoted to strategies associated with process writing, it would not be out place if genre writing approach is addressed. This view is in the light of the fact that both approaches are significant in science and technology related writing. What makes scientific document peculiar is in its clarity and conciseness. This form of writing is also slightly distinct depending on the problem investigated and the nature of scientific discipline. A science research report could also attempt to explore the rhetorical writing functions: description, exemplification, definition, cause- effect relationship and comparison-contrast. Other rhetorical functions are generalisation or interpretation and analysis of data (Jordan, 1980; Hamp-Lyons, (1988). For this reason, Jean-Luc (2008) also states that, 'although format and structure in scientific writing is similar, it tends to slightly differ according to specific disciplines' (p. 9).

It has become evident from this study that pre writing and composing activities are capable of improving the written English performance of students. These assumptions have, as a matter of fact, not been verified with university science and technology students prior to the present study. The need to evaluate the

efficacy of these claims is paramount as numerous categories of people are concerned about science and technology based students' poor performance in writing. Such people include the students themselves, their teachers, syllabus designers and research sponsoring agencies. Others are government, private organisations, and the general public. The need for improvement in this regard is not limited to students; it also involves work place graduates in science and technology related jobs.

It is, therefore, expected that science and technology students' writing ability would in turn enhance their performance in their course of study. It would equally go a long way in providing job opportunities after graduation. This is largely because employers always expect university graduates, regardless of their profession, to be capable of, at least, presenting readable documents.

Objective

The main objective of the study was to find out whether there is any remarkable difference between students' professional orientation and their writing.

Research Question

The research question generated from the objective of the study is stated as:

‘What is the difference between the mean score of the business related and the pure science students both before and after exposure to treatment activities?’

Null Hypothesis: There is no significant difference between the written English performance mean scores of business related and science experimental subjects before and after treatments.

II. Research Design

The study comprised fresh students in pure science and business related areas of specialisation at Abubakar Tafawa Balewa University. The science students involved those in biological sciences, chemistry, geology, physics, and mathematical sciences. Students of business courses were drawn from accounting, banking and finance, business management, management information technology, and business education.

A sample of 200 members was selected based on a stratified technique. Thus, 100 and another 100 students were made to represent each category of professional orientation. Pre test – post test research design was adopted with a pre test, first treatment segment, mid way test, another treatment component followed by final post test. Treatment activities comprised prewriting planning, composing, which involves grammar and mechanical accuracy and revising procedures. Result was computed using a two-sample t test at a probability level of 0.05.

III. Results

The research question and the hypothesis tested the objective of the study which was directed at the professional orientation of the students and the treatment in relation to their performance in written English. The table below answers the research question formulated to guide the objective of this investigation.

Table 1: Written English performance total and percentage scores based on professional orientation of students

Variable	Course	N	Maximum	Total	Percentage
			Scores	Score	
			Obtainable	Obtained	Scores
Pre-test	Science and Tech	100	5000	1008	20.2
	Business related	100	5000	954	19.08
Mid-way	Science and Tech	100	5000	3234	64.68
	Business related	100	5000	3262	65.24
Final Post test	Science and Tech	100	5000	3538	70.76
	Business related	100	5000	3488	69.76

From this summary table, it could be seen that prior to the treatment activities, science students scored a total of 1008 (20.2%) and the business students obtained a total of 954 (19.08%). After first stage of the treatment, the mid-way written English total in respect of pure science students stood at 3234 (64.68%). The business students obtained 3262 (65.24%). At the final post-test that followed the second treatment phase of polishing, the pure science experimental subjects indicated a slight improvement by scoring a total of 3538 (70.76%). Similarly, the performance of their counterparts in the business related discipline improved to 3488 (69.76%). The two sample t-test was used for the hypothesis as summarized in Table 2.

Table 2: Two sample t-test on mean written English performance scores of the experimental group by professional orientation of the students

Variables	Course	N	Mean	Std. Deviation	Std. Error	t-value	df	Sig.
Mid-way test	Science and Tech	100	31.14	7.551	0.755	1.395	198	0.165
	Business	100	32.34	4.122	0.412			
Final post test	Science and Tech	100	35.08	4.931	0.493	0.970	198	0.333
	Business	100	34.35	5.688	0.569			

(t critical = 1.98)

The result in the table did not reveal significant difference in the scores of the students who were science and technology oriented and those who were business oriented in their performances in the written English when exposed to the treatment. This is indicated by the lower than the critical value (1.98) of observed t-values (1.395, 0.970) for the tests in the table and the significant levels which are higher than the fixed level of 0.05 ($P > 0.05$). By this observation, the null hypothesis that there is no significant difference between the mean written English performance scores of the business related and the pure science experimental subjects is, therefore, retained. Samples 1, 2 and 3 below are extracts from students of pure sciences. Extracts 4, 5 and 6 are from essays of those students in business related courses.

1. Alternative energy refers to energy that have no consequences such as for example fossil fuel or nuclear energy source are renewable and free energy. This also tell us more about energy that are preferable than the present energy. For example solar energy.
2. Renewable energy projects in many countries have demonstrated that this energy source can directly contribute to poverty alleviation. This is by providing the energy needed for creating business and employment. Such energy technologies can also make an indirect contribution to alleviating poverty by providing energy for cooking, space heating and lighting. Furthermore, the excessive pollutants such as green house gases are being emitted by the non-renewable energy which are harmful to human and other living organisms.
3. Despite its high initial capital cost, hydropower provides one of the cheapest sources of electricity. Under such condition, the hot gas or plasma has to be held in a magnetic field as it would vaporize in a normal container.

There is no sustained control of meaning in sample 1. The second sentence does not show any link with the first. It was also not clear what 'this' introducing the second sentence refers to. The third sentence is incomplete. It is actually a mere fragment. The essay was scored 12/50. Despite some occasional quality lapses, sample 2 shows intra sentential ties through an excessive sentence combining strategy acquired during the first component of experimental treatment. Evidences include 'this energy', 'also', 'furthermore', 'such as', and 'which'. The essay, as a whole was scored 28/50.

Although a brief paragraph, sample 3 maintains a consistent topic focus, thereby resulting in a sustained inter- sentential link. This is noticeable in the student's ability to aptly introduce the paragraph with a complex sentence and the last sentence was made to give an added clarification to the contrast given in the previous sentence. Thus, planning is evident. The technique provided an efficient conclusion to the idea. The use of commas as intra sentential boundaries in both sentences emanated from the treatment activities involving reflection, thinking, self monitoring as well as redrafting for quality improvement. The essay was scored 36/50.

4. What ICT is all about and it can be made use of especially by tertiary education in Nigeria. The impact of the institutions management in ICT. The needed necessary equipments facilities which Nigeria is making progress.
5. There is strong need to know and use modern technology in our social life, the economy, the business and education. New and sophisticated breakthroughs in high technology encourage companies to introduce technology innovations rapidly into our business practices. If Nigeria must be part of developed world in the near future, it must embrace technology. There is the need for the country to re-strategise and expand its vision so as to cope with the challenges of a technological society.
6. Crude oil was discovered in commercial quantities in Nigeria in the 1950s and production commenced immediately. Twenty years later, annual oil production peak was witnessed. Today, the nation is clearly over-dependent on crude oil for its foreign exchange earnings; hence the economy is vulnerable to the unstable nature of international oil market. This commodity will continue to play a role in the country's economy. Therefore, there is a need to expand the reserve base through continuous exploration activities.

In sample 4, the writer has not been able to adequately address elements of writing tasks. As a paragraph that was required to convey an idea, the sample lacks focus. Both sentence one and two are totally incomprehensible. The words 'equipments' (with 's' wrongly inflected) and 'facilities' appear tautological. 10/50 was awarded for the whole essay.

Sample 5 exhibits a high degree of competence. The message was fully developed through an excessive use of modifiers such as 'modern', 'sophisticated', 'technological', 'rapidly', and 'developed'. This is attributable to the brainstorming involving list making and clustering as well as sentence combining strategies. The essay was scored 26.

Sample 6, extracted from the essay produced by a student in the business related discipline reveals that students writing on the same subject/topic use different diction based on their professional orientation. This observation is obvious in the light of words used in the text which include 'commercial quantities', 'production', 'foreign exchange earnings', economy, 'international oil market', and 'reserve base'. Nevertheless, the treatment activities involving planning frame, on-line writing package, and conferencing the experimental students were engaged in have tremendously led to the sequential ordering of ideas throughout the paragraph. This essay has a score of 34/50. Below is a table for the strategies that worked more for professional orientation.

Table 3: Strategies that Worked More for Each Programme

Strategies	Course that Benefitted More	Evidence from the Data
Consistent topic focus	Science	Sentence1: '...hydropower...' sentence 2: '...hot gas or plasma...'
Intra sentential link	Science	'Despite its high initial cost,... the cheapest sources of electricity. Under such condition, ...
Planning frame	Business	Diction based on professional orientation: 'expensive', 'cheapest alternative', 'bulky amount'
Self monitoring and inter sentential boundaries	Science	'under such condition' linking the initial sentence with the subsequent one.
Sentence combining	Business	Use of complex sentences emanating from combination several clauses as in 'Even though natural endowments, they are still expensive'
Reflection	Science	Use of commas within sentences: '...cost... ..condition,...'
Restructuring	Business	1. '... in 1950s...' 2. Twenty years later, 3..Today,4. Therefore,
Group Editing	Business	Variety of synonymous words: 'breakthroughs', 'innovations' and 'practices'
Reviewing	Science	Quality improvement and diction relevant to discipline: 'hydropower', 'hot gas', 'plasma', 'magnetic field', 'pollutants' and 'emitted',.

IV. Discussion

Null-hypothesis for the present study predicted that there was no significant difference between the written English performance mean scores of the business related and the pure science experimental subjects. The study involved essay writing topics that cut across disciplinary variations. This decision is in line with the view of a host scholars that this category of students require training to write assignments, term papers, projects and journal articles to suit specific requirements of their academic disciplines (Kaplan, 1983; McKenna, 1997; Trosborg, 1997; Dudley-Evans, 2001; Morrison, 2004; Hutchinson & waters, 2004; Kirk-Patrick & Klein, 2008;). As found out from the present study, they posit that even though inter-disciplinary texts slightly differ in format and style, other technical documents generally share many things in common.

Findings of the present study has also debunked many on-going unwritten claims that science based students are generally weak in writing performance. If exposed to rigorous activities, as in the present investigation, science and business students are capable of displaying wonderful performance in writing. As Barras (1976) and Locker & Skienzler (2006) had earlier claimed, science and technology students' written English differs from other forms of writing. The present investigation has actually verified this claim and even went further to establish that such level of difference is in terms of genre and social network. This is obvious from the paragraph samples of the two categories of students based on professional orientation (samples 1 to 6) that revealed that students' writing even on the same topic varies on the basis of word choice.

V. Conclusion and Recommendations

No significant difference existed between the written English mean performance scores of the experimental group by professional orientation of the students. This is clearly revealed in the total and percentage scores summary (Table 1) and the two sample t-test summary (Table 2). In addition, the number of errors committed by science and technology students at the beginning was 28, which reduced to 10 at the

midway and then to 5 at the end. The number of blemishes of the students in business related courses was initially 23, then 11 after the midway test and finally to 5 after the last treatment phase.

In the light of the main finding of this study, it is recommended that there should always be teacher collaboration involving specific courses/subjects specialists and EAP/EST teachers. This is in addition to involving the diverse writing strategies found to be effective in the students' performance according to their areas of specialisation. A further study that examines possibilities of students' sharing writing strategies across professional orientation is also desirable.

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