ISSN 2348-3156 (Print)
International Journal of Social Science and Humanities Research ISSN 2348-3164 (online)
Vol. 2, Issue 4, pp: (27-35), Month: October - December 2014, Available at: www.researchpublish.com

Evaluative Procedures for EAP Writing Curriculum in Science and Technology-Based Universities

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Abstract: **Second language curriculum development is presently witnessing a large scale shift-in-emphasis. There is a marked departure from the traditional stress on content, materials and methodology to a focus on needs analysis, decision making, programme design and evaluation. A lot of applied linguistic variables have today revealed numerous salient but significant features in the second language teaching-learning process. This development requires a consistent evaluation of existing curriculum and syllabus designs at various language learning stages. This paper, therefore, dwells on an in-depth identification and development of EAP writing curriculum for the science and technology-based universities. Also discussed in the paper are language syllabus format types and evaluation procedures. The whole exercise revolves around learner- needs particularly in the context of communicative uses and functions of written English within a variety of real life situation. This way, learning outcomes are geared towards reflecting purposes.**

Keywords: **second language, EAP writing curriculum, syllabus design, science and technology- based universities, evaluative procedures, learner needs**

I. INTRODUCTION

English for Academic Purposes (EAP) in Nigerian universities, as enshrined in the NUC benchmark, places emphasis on written English. Although there is a slight difference in content between the conventional and the science and technology based tertiary institutions 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. Where such students are not pressured, their written English mainly becomes a product of plagiarism (Braine, 1994; Tardy, 2004; Aborishade, 2007).

Available literature on this subject reveals the concern of numerous scholars about students' weak performance in technical writing in Nigeria. For instance, Udeayo & Wudiri (1996) remark that there seems to be no correlation between students' performance at Use-of-English and their writing abilities in science and technology related disciplines. Perhaps, this could be attributed to the fact that the Use-of-English syllabus is largely loaded with grammar and study skills. Ironically, the EAP syllabus does not lay any considerable emphasis on the writing skills of university students (Braine, 1994; Nwoke & Maisamari, 2006; Aborisade, 2007; Salager-Mayer, 2008). Such a great challenge, as pointed out by indigenous scholars, could be linked to lack of exposure to modern writing techniques. The preoccupation of this chapter is the writing component of the EAP among the science and technology-based undergraduates. The EAP in most universities, as (Aborisade, 2007) stated, is run for the foundation-year students. This category of students in the science and technology-based universities also takes the basic science courses in their first year. In Nigeria's situation, the arrangement is regardless of their respective courses of specialisation.

Besides, most university students write poorly owing to their false assumptions that mere grammaticality reflects competence and also that oral proficiency results in corresponding writing ability. Such a category of students also claims that, it is not necessary to acquire any additional writing skill at the tertiary level. They often hold a misleading notion that

they have already acquired adequate writing skills at the secondary school, polytechnic or college of education (in the case of those admitted into the university through Direct Entry). Worst still, those in the science and technology related disciplines also feel that, by virtue of their professional orientations, they do not require any writing techniques. Thus, such students view scientific writing as a product of a context less and linear rather than a contextualised and recursive process.

II. THE EXISTING LANGUAGE SYLLABUS FORMATS

Fundamentally, second language syllabus design is based on content selection, sequential organization (according to need and difficulty level) and implementation. This is usually arranged unit by unit. Different scholars vary in the choice of a unit and what it constitutes. Corroborating Long & Crookes (2009), Robinson (2009) presents the Analytic (process-oriented, type B) and the Synthetic (product-oriented, type A) syllabuses. Robinson (2009) points out that while the former designs do not decide the language units for classroom presentation, the latter is concerned with specific elements in a prioritized order. The new arrangement requires the language learner to be able to learn a language in discrete units which are independent of one another and integrate the pieces when the time comes to use them for communicative purposes. This idea further suggests that Lexical, Structural, Notional and Functional Syllabuses fall under the Synthetic. That must be why Long & Crooks (2009) posit that the Analytic Syllabuses, on the other hand, offer the learner target language samples which, while they may have been modified, may not be controlled for structure or lexis. The Analytic and Synthetic Syllabuses are both prospective decisions as they point to a fixed decision about what to teach and in what order. On the contrary, there is retrospective view point of language syllabus (see, for instance, Clarke, 1991). This way, syllabus is seen as only a record of what was already done. Other language syllabus types along the task perspective are Procedural Syllabus (based on language learning procedures) and Process Syllabus (strictly learner-based and not language based).

The content/material is another basis for classifying language syllabuses. In this regard, there are basically three types of designs. These are: first, grammatical syllabus which emphasizes rules and ignores communicative ability. Long & Crookes (2009) note that, the design is further split into three: the Elli's Structural, the Willis' Lexical and the P P P (Presentation, Practice, Production). The central focus of each of the programmes is the outcome. Next is Situational Syllabus, mainly concerned with language items that are ordered based on the given situation. This design, however, fails to realize that most of what people say is common to a wide range of situations. Furthermore, many words in English, for instance, are dual-purpose. The third is Communicative Competence Syllabus. This is the order of the day and the most preferred.

In evaluating the worth of a language syllabus, both linguistic and non-linguistic variables ought to be considered. Furthermore, the syllabus is often based on the learners' authority, societal values and aspirations; and, to a certain extent learners themselves. Even where the syllabus is teacher-controlled, it is still expected to be learner-directed.

Evaluative Procedures

Another crucial issue in language syllabus design is the evaluative procedures. This may, in some sense, be similar to formal need analysis. Brown (1989) defines evaluation as:

The systematic collection and analysis of all relevant information necessary to promote the improvement of a curriculum (or even a syllabus), and assess its effectiveness and efficiency as well as the participants' attitudes within the context of the particular institutions involved (p.223).

From the foregoing definition, the process of evaluating a language syllabus involves the gathering and the analysis of all necessary information in relation to the language programme. Such evaluative procedure also requires the promotion of improvement and assessment of the effectiveness and efficiency. Brown (1989) goes on to provide chart as a guide to evaluate the worth of a second language design. This format is simply known as Systematic Approach to Evaluation.

The procedure suggests assessing, at the outset, each of the five components in terms of effectiveness, its efficiency and the anticipated attitude of the learner (towards needs, objectives, test, material and the teaching for instance).

There are four approaches to language programme evaluation. First are the process-oriented approaches. These focus on not only the worth but also on the realization of both expected and unexpected goals and objectives. In this case, process is emphasized over and above product (achievable goals). Next are the Decision Facilitation Approaches, which greatly

take the decision makers or administrators into account. Some of the models developed in this regard are CIPP (Context, Input, Process and Product). There are also the Product Oriented Approaches. These are chiefly concerned with ensuring the achievement of goals and instructional objectives. For this reasons, Brown (1989) asserts that programmes should be based on clearly defined goals as well as measurable behavioural objectives. The measurement is usually carried out at the end of the programme with a view to determining success or failure. The last approaches are the Static Characteristic, which refers to the evaluative procedures undertaken in order to assess or judge a language programme. The assessors are normally professional in the field. These approaches are forms of programme accreditation which require the inputs of experts. It is beyond syllabus and extends as far as to the whole curriculum. The tasks include, among others, assessing the staff strength, quality and facilities.

As Breen (1989) pointed out, in any language programme evaluation the teacher is usually charged with, among others, the following responsibilities:

Sharing with learners the decision to be taken concerning the ways of gathering and retrieval of information in relation to each phase of the cycle; provision of range of pre-designed tasks for evaluation; coordinating the genuine investigatory process which the evaluation cycle entails; collecting and sharing key proposals regarding the programme/tasks; and, offering suggestions and ideas based on wide range of teaching experience and knowledge of the language (p 187).

Except where practically necessary, the teacher should not be too domineering by providing so many suggestions. Evaluation of task in language classroom is to be in three phases: revisit previously designed tasks: choose the most relevant task features bearing in mind content, objectives, procedure, their contribution to the task and the role of classroom situation in relation to the task; and, refine and create task.

In addition to encompassing the totality of the variables relevant to teaching – learning process, an effective curriculum ensures coherence. Such factors are mutually complimentary. Also, this largely depends on efficient planning and implementation. The latter relies solely on the strength of the former. Dynamism is thus, viewed as a key to proper curriculum planning and development. As the societal values, needs and aspirations change with time, so also do the learner needs. It does not matter much whosoever takes the lead in curriculum development and syllabus design. It is essentially the question of whether or not the product justifies the process.

Second Language Syllabus

Until quite recently, most educational practitioners could not distinguish between syllabus and the curriculum which, as pointed out above, encompasses the whole educational programme including the syllabus design. The main emphasis then, according to Nunan (1989), had been placed on language syllabuses as against the broader processes of curriculum development. Typically, language learning needs in Nigeria vary across educational levels. In fact, all the editions of the National Policy on Education maintain almost the same aims and objectives at every learning stage. This consistency always reflects the changes in our societal needs as well as the global challenges in relation to the functions and status of English. Every language policy, for instance, emphasizes the acquisition of literacy… for life - long education and useful living (Federal Government of Nigeria, 2004).

Interestingly, a significant focus has today been shifted to a course design that involves need analysis, goal/objective setting, methodology, selection of materials, learning environment and evaluation. This is the current trend. There is also a great deal of emphasis today on the nature and mode of the language teaching-learning process. This idea also suggests a paradigm shift from the mere concern about the nature of language. Thus, language syllabus is nowadays chiefly concerned with learner – centred approach. For this to be successful, Nunan (1989) further posits that, the learner need and perceptions ought to be considered. Again, second language syllabus of today is activity-based loaded with varied error correction procedures. Most often, however, second language learning situation determines the mode of delivery/presentation. In addition to what is covertly enshrined, conditions warrant deviations from what is planned to unplanned strategies. Consequently, even the language content is often altered. This is regardless of whether the design is flexible or binding. In fact, language syllabus designs go beyond the prescription-flexibility dichotomy. From different view- points, second language syllabus formats do emerge.

Like any programme design, the language syllabus is derived from the curriculum. The syllabus takes cognizance of the aims/objectives, the teaching – learning process and the content vis-à-vis the learner needs. This is a common feature in every ideal syllabus for whatever course. However, language syllabus is associated with certain distinctive characteristics. A typical syllabus in ESL/EFL is tied to the applied linguistic theories in addition to several other linguistic variables.

More so, the pedagogies involved in second language teaching are largely purpose-dependent. Even the learning strategies and approaches are determined by the level of learning and language background.

Second language syllabus aims at determining what particular component of the language to teach and at which level, using which method as well as deciding the materials to employ. In the words of Rodgers (1989), "language syllabus prescribes the content to be covered by a given course (and then forms)… only… a small part of the school programme (p.26)." However, it would be seen in the subsequent part of this paper that syllabus design is not solely a question of prescription. All the same, as a key segment of the language curriculum, the syllabus design seeks to measure language based instructional outcomes.

EAP/EST Syllabus Design at the University level

Second language learning at the university could be either remedial or developmental. In the former, the students' O' level language deficiencies are remedied. This way, the basic skills are carefully identified and treated separately before the introduction of more advanced skills. Such a syllabus focuses mainly on the learners' deficit needs. This is to involve individual student and teacher contact. The latter addresses the common core before delving to the specific subject area needs and keeps the learners in contact with the language. The syllabus design is also for integrative and instrumental goals. The developmental English is either for general or occupational purpose or both. It is in most instances known as 'Use-of-English'. Depending on the need, the programme may also be narrowed down to 'English for Academic Purposes' (EAP), 'English for specific/special purposes' (ESP) or 'Vocational English'.

According to Hutchinson & Waters (1987), while General English (GE) at whatever level is usually studied for examination purpose, ESP could be split into EAP and EOP (i.e. English for Occupational Purpose). However, this is perhaps dominantly viewed from the American perspective. Hutchinson and Waters (1987) explained what course design involves in the context of ESP application. In this sense, as in EAP, the highlighted areas are syllabus, material preparation and its evaluation and methodology. These are nonetheless central to every ESL curriculum regardless of learning level or purpose. Although, in theory, ESP is not about a completely different type of English, in practice, the design has its own identifiable peculiarities.

In general sense, ESL at the tertiary level specifies the kind of language needed most immediately. It is most often the English that can be used most widely and most frequently. Therefore, it requires the linguistic, psychological and social strategies necessary to avoid communication breakdown. In its fundamental principles, ESL at the higher level focuses on processes which trigger fluency in specified skill areas.

Some years back, ESL at the higher educational level used to focus on understanding a large number of complex grammatical rules and second language translation. Today, the design is mainly concerned with objective learning – teaching situations and individual learner functional communication as against a mere linguistic competence loaded with grammar and lexis. Twenty years ago, for instance, Swales (1989) suggests that decision making on tertiary ESL course design should take into account cultural and political factors. In his view, the need analysis should also consider the time allocated to the course. In Nigerian context, however, all these are in addition to class-size and number of teachers as well as the availability of lecture venues.

III. THE SCIENCE AND TECHNOLOGY-BASED WRITTEN ENGLISH

The increasing demand for English in professional careers has necessitated a shift in emphasis in both content and approach of ELT. As can be rightly seen, there is a 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 idea 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 p.8).

Science and technology based texts are, in this sense, expected to 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 idea aimed at producing readable and standard scientific documents through the skills of reordering sentences to achieve coherence. Science and technology students could also be exposed to 'sentence combining' which was followed by 'the sentence combining plus' (Crowhusts, 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 combining bits and pieces of sentences but also goes as far as to re-organise or re-order jumbled sentences to make meaningful texts. These techniques immensely help 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) points out 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 disputable. Scientific writing tends to require compliance to grammatical rules and diction. This is where 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 limited 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; Leki, 1990; Baynham, 1995; Marcu, 1997; Kanoksilapatham, 2005; Swales, 2000; Leki, 2003; Fabricius, 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 (Ransdell & Levy, 1996; Marcu, 1997; Kehler, 2002 and Olaofe & Mesembe, 2006) have also lent support to this fact.

Although several linguists seem to view cohesion and coherence as interchangeable terms, Olaofe & Mesembe (2006) have identified a line of distinction between the two. The difference becomes clarified when the authors cite other studies relevant in the field. In a nutshell, the explanations therein reveal that cohesion is an element of coherence. Textual planning and polishing are effective strategies capable of ensuring the cohesion and the coherence of a written document. 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), 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. Furthermore, technology-based writers are cautioned to avoid transposing lengthy additions between subjects and verbs, as they impede the flow of meaning. Such interruptions unnecessarily elongate a sentence, thereby making it hard-to-read. Any sentence that is as long as twenty-six words should be split into a manageable number (Quitman, 2004). However, such rules apply to all forms of writing, whether scientific or not.

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 & Courter, 1984). 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).

This assertion is also in support of Journal of Young Investors' (2005) view that, 'every journal addresses a specific audience, and an author must write his/her paper with that audience in mind' (p.14). This is in consonance with the notion of considering audience purpose and text type which is the order of the day as far as recursive writing is concerned. For this reason, modern writing techniques emphasise context over and above text.

It is important at this point to note that the convention of a scientific document differs not only on the bases of audience and specific discipline, but also in the type, of writing. Each of the writings in respect of students' assignments, term papers, projects, theses, SIWES reports and job proposals differs slightly from one another in terms of formats. In any case, unlike a scientific journal article which is written in sections, each of these is broken according to chapters. However, with the exception of a written assignment, all other forms of students' writing share a common feature. On their own part, most science related articles have a characteristic of consisting of a title page, an abstract, an introduction, methods, results, and discussion.

The writing programme of the science and technology universities should be made to address not only the special needs but to also eliminate or reduce the students' both deficit and common-core needs. To do so, require so many rigorous drills which include un-jumbling passages, restructuring, sentence combining and completing missing gaps. The idea, would no doubt, enhance logical sequencing of science and technology related documents. The activities are to also involve collaboration for additional input from colleagues and the teacher. This category of students is also required to consider ahead of drafting, the reader, the purpose, the content, the style and the writing medium. Table 1 shows the way composing and revising strategies could address students writing difficulty needs.

Table 1: Addressing Students' Writing Difficulty Needs Using In-put from Planning, Composing and Revising Strategies

Students' Writing Difficulty Needs	**In-put from Planning and Composing Strategies**
Deficit Needs: wrong words, tenses, aspects, errors in verb usage, complement, subject and predicate, subject-verb agreement, shift in voice, number and person, omitting determiners	Intra sentential link, inter sentential boundaries, reordering text, text and chart completion, sentence combining, idea structuring, discourse organisation, planning frame, consistent topic focus
Common-Core Needs: paragraph structure and development, general description, classification, citation, bibliographical documentation, overcoming writing blocks, definition, description	list making and clustering, information synthesising, brainstorming, thesis identification and thesis development
Special Needs: process description, formal and expanded definitions	categorising, fast/free writing, loop writing, thesis development
Students' Writing Difficulty Needs	**In-put from Revising Strategies**
Deficit Needs: syllabification, splitting, amalgamation a single word as well as a compound word	horizontal and vertical proofreading, self monitoring for error correction, self editing, group editing, structuring

Common-Core Needs: comparison-contrast, grammatical errors, cause-effect relationship, summarisation, overcoming writing blocks	restructuring, text completion, teacher scaffold, proofreading, group editing, revising
Specific Subject Area Needs: laboratory report writing, supplying answers based on non-linguistic information (figure, chart, map, table, etc.)	self monitoring, peer editing, small group editing, time allocation, crafting, teacher scaffold, tabulation, idea formulation, text and chart completion

Implications for EAP/EST textbooks writers and publishers

Writers in the area of English for academic purposes should also dwell on English for Science and Technology. The content of their published materials is to further place emphasis on the writing process that consists of practical exercises regarding composing and polishing of drafts. The activities involve writing activities such as intra-paragraph sentence completion, (transitional signals, for instance), sentence combining/un jumbling texts and writing tasks that require learner collaboration. Publishers are to ensure that particular attention is paid to outlining, sequencing of ideas, and cohesion/coherence. Other key components to include in the books are editing, revision, redrafting and peer as well as student-teacher conferencing. These vital areas, as pointed out in the preceding paragraphs, are crucial to the writing process. They should, therefore, be reflected in the textbooks written for science and technology based university students.

Implications for Curriculum Review and Renewal

It is evidently clear that planning and revising are effective in addition to composing steps in enhancing the writing performance of the science based students. This calls for an overhaul of the EAP/EST course content of the science-related universities. The purpose of the review is to focus on the writing activities that include the skills of brainstorming, list making, fast writing and patch writing. Others are loop writing, thesis development and pragmatic consideration (purpose, reader and content). Since the language component of writing is even neglected at the expense of such other components as study skills and grammar, should there be any cause for a renewal of the present curriculum, the EAP/EST content ought to be loaded with writing activities relevant to planning, composing and polishing of the drafts. Tables 3a and 3b provide sample written English curriculum renewal package based on a proposed science and technology-based university

IV. CONCLUSION

As a recent trend, the analytic approaches look at the language learning from a global perspective. The formats are, therefore, the order of the day since they reflect communicative performance. The preoccupation of this paper is to focus on science and technology-based university EAP syllabus with specific reference to the writing component. As an important segment of a curriculum, the language syllabus proposed here is basically concerned with learner needs, objectives, content and material. Such a design is dynamic. It, therefore, ensures changes in terms of formats and evaluative procedures.

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