

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The global community of science and technology has continued to advance and hence the requirements for communication in this area has become increasingly demanding. This is in line with the saying of Chinua Achebe that when the bird learns to fly without perching, the hunter learns to shoot without missing (Chinua Achebe, ii). In the field of science and technology in today's world, the English Language has made an indelible mark on technological advancement. A relationship of interdependency exists between the two. Technology is created, expressed, interpreted and transmitted through language, and the domains of phonetics, morphology, syntax and semantics are studied and investigated through technology (Gbenga Fakuade & B. Onyemachi 217). Communication is indispensable to everyone but, specifically, in the life of every student and professional. This is because one needs it to succeed both as a student and a practitioner in the industry. For the communicative needs in English of science and technology students to be achieved, language must be effective for what it is intended.

The communicative needs in English for students of science and technology is informed by a number of reasons. Technology oriented students engage in constant reading of what has been written by others. They also listen to lectures and various types of broadcasts and also engage in series of practical assignments which they have to report using language. To ensure these communicative activities are carried out without hitches, the language and communication courses designed for them

must recognize the principles of needs analysis. Needs analysis simply means looking at communication from the target situation point of view. According to Hutchinson Waters, the need is interpreted in the “discourse types” that manifest in the target situation. The implication of this to the effect of science and technology students’ communicative needs becomes imperative as it helps science and technology students succeed as students and also use the right English to consume their professional practices in communication. The National Board for Technical Education (N.B.T.E) designed the course contents of technological students’ language curriculum in such a way that they constantly engage in oral talks and listen to understand what others have to tell them. All these activities demand effective communication. Hence science and technology students need to be properly guided against “misapplying their pliers” through improper communication (Lubasa, N, vi). This can be achieved by ensuring that they are exposed to the right language courses that will facilitate their communication needs (Nwogu Kelvin vii).

Science and technology students refer to learners or persons studying or undergoing courses of study in a polytechnic or monotechnic system. Polytechnic students are variously referred to as undergraduates, technological students, students of science and technology among others. The polytechnic like its monotechnic counterpart is a non-conventional institution where the medium of communication, the English language, is taught as a general course for just one year for the engineering students, and the first and graduation years for the business-oriented disciplines. These calibre of students need to be guided appropriately considering their brief period of sojourn in school. Most importantly too, they need to be effective in English, the language of communication, hence

communication can hardly be separated from technology. For this reason, they need to communicate in English to be able to develop, transfer, market and carry out sundry technological activities.

Communication is a term that is difficult to pin down to one definition. This is because the concept of communication is very broad. However, it is a term that is so indispensable to science and technology students both “here and hereafter (Obi, I.V, 16). From ones point of birth to his school years of rigorous academic activities, and finally to when one settles down in the wider world of work, one is constantly communicating. Communication is indispensable to individuals, students and practitioners in various fields of work. This probably explains why Peter Little views communication as an act as well as a process of exchange of ideas within, between and among individuals and organizations by means of previously agreed symbols(2).

A major instrument of communication is language. In the globalized context, English is the Lingua franca of most countries, as well as the language for science and technology. The language is increasingly and predominantly employed in the communication of scientific and technological information, concepts, ideas et cetera. The language has become the “de facto international language of science and technology (S&T)” (Sasidharan,8). Polytechnic students of science, engineering and technology have a task to face this fact while in school since books, papers, handbooks and journals on science and technology written in English form the bulk of their recommended study texts. The medium of communication in Akanu Ibiam Federal Polytechnic Unwana (AIFPU) just like any other polytechnic in the country is the English Language. This is because Nigeria is an Anglophone nation that uses English as its official language of communication. According to Randolph Quirk,

Most people who speak English are not English and were not born in England. Not only has the 'National' sense of English no official political meaning: the 'language' sense of English'..... has no necessary link with the genetic sense either (2).

It is true that Nigeria cannot be said to be among the native speakers of English confined within great Britain, Australia, Europe and America, but as a colony of great Britain, it is a historical accident that has led to English language taking deep roots as a means of communication. Today, English has assumed the status of language par excellence as it has continued to play the role of language of commerce judiciary, education and international diplomacy among other official assignments. Writing on the dispensable place of English as a tool for communication, Egbe observes

all over the globe and in all fields of human endeavour, success in communication skills is frequently and directly linked to one's hierarchy of needs comparable in a way to Maslow's set of needs(14).

The English language is the most valuable legacy bequeathed to the Nigerian nation by the colonial administration. As an instrument of communication, it is one language that has helped to enhance the advanced state of man's mental development. It is also a language that is fundamental in the technological development and advancement of any nation. Effective use of English language for communication has become a parameter for measuring intelligence and one's level of education. In the field of science and technology, communication is said to be effective when the communicative needs of the user is attained through proper language use. Effective communication plays a vital role in science and technology. A number of people who desire to communicate through the English language do so not necessarily to have access to English literature or to understand more about the cultural life of the English speaking people, but simply because communication is the avenue through which the

desired information about western technology could be reached. For this reason, communication should be effective and functional.

As an international language, the English language is in a better position, more than any other language, to give meaning to the nation's much talked about technological transfer and development because of its official position, as language of education, commerce, politics, technology, judiciary and internal diplomacy. It is therefore imperative that those who use the language for various purposes should be functional in it so as to realize their communication needs. Bell rightly observed that language is a tool for the exploration and analysis of one's conceptual process (25). The survival of any nation can be linked to the nation's technological aggressiveness. Language, a means of communication, is fundamental to human transaction in general and technological transfer and advancement in particular. A nation that is isolated technologically can hardly achieve significantly on the technological sphere. As an instrument of communication, the English language cuts across the entire nation. It is understood worldwide and hence it will guarantee effective, efficient and functional communication for the targeted technological goal if used appropriately.

Language barrier is one factor that slows down the rate of technological transfer. With effective communication that recognizes Peter Little's "agreed Symbol" (02), users of English as a second language and medium of communication can be sure to overcome this factor. It is therefore important for polytechnic students to be effective in communication in order to accurately verbalise the scientific and technological concepts in them. Among the important goals of technological education as enshrined in the national policy on Education (NPE) are to:

train people who can apply scientific knowledge to solve environmental problems for the convenience of man;

give exposure on professional studies in the technologies (31).

These goals can hardly be achieved where these students are found wanting in their communicative needs in English language. The experience of this researcher as lecturer in two polytechnics and a monotechnic in Nigeria from 1995 to date, as well as reports from industries regarding technological graduates and Students' Industrial Work Experience Scheme (SIWES) show that there are lacunas between the skills science and technology products graduate with and their communication needs in the industry. This explains the peculiarity of Akanu Ibiam Federal Polytechnic, Unwana (AIFPU) that warranted this work focusing on it. Furthermore, this context of the situation for the study is as a result of the recent rating of the best twenty polytechnics in Nigeria by the Transparency International Agency (TIA) in which AIFPU was rated very low using the criteria of

Graduate employability, student's quality, good academic research and global recognition (05).

It is imperative to state that none of these criteria can be attained where the communicative needs of the students are found wanting and hence the observation of T.K Adeyanju that

effective communication otherwise referred to as linguistic competence is an index of good academic standard and by implication a parameter with which productivity is measured (15).

This implies that linguistic competence ensures effective communication. Communicative competence is a term which refers to a language user's grammatical knowledge of syntax, morphology, phonology and the like, as well as social knowledge about how and when to use utterances appropriately. Since language is a tool for representing knowledge it is imperative that science and technology students' communicative language needs should be paramount to all. It is against this background that the study is being carried out.

1.2 Statement of the Problem

There is a growing concern from reports from employers of labour in Nigeria that there are gaps between the skills polytechnic students graduate with, and the communication needs required by the world of work outside the classroom. These set of graduates according to the report are conceived to lack competency in English communication and presentation skills, technical writing and professional speaking skills. Such lack of employability skills affect both their opportunities to be engaged after interviews and also their performance in the work place. The communicative needs in English for students of technological institutions like polytechnic is not to use the English language to pass examinations per se. Their communicative language needs require them being able to use English language to execute a weight of communicative responsibilities in and out of school. Where this is not the case, the academic and professional world of work are at jeopardy.

Communication becomes ineffective the moment the intended meaning is misconstrued by either of the communicating parties (encoder and decoder). Statements encoded denotatively, connotatively, figuratively, proverbially and idiomatically for instance, should be decoded as such for effective communication that meets the communicative needs of science and technology students to take place. Similarly an imperative construction should be appropriately differentiated from interrogative statements and exclamatory sentences, in the same way that active and passive constructions are used for various purposes. The communicative needs of a group of learners are achieved when language is used to fulfill their specific goals. The study believes that the language expectations of technological students have not been adequately realised and hence their communicative needs using English language is in question.

1.3 Purpose of the Study

The purpose of the study is to identify the extent to which the communicative needs of polytechnic students in English have been met. The study is also designed to identify and describe the language use of polytechnic students as well as account for how their skill in English language-use enable them to produce, disseminate and utilize specialized knowledge, exploit available semiotic resources and mode of communication to achieve their professional goals. Therefore, it is the objective of this work to ensure that polytechnic students use the English language appropriately to actualize their communicative needs both in school and wider world of work by looking at the extent to which their language expectations are realised and implemented in their communication act.

1.4 Significance of the Study

Effective communication goes beyond the grammatical competence advocated by Chomsky to include the communicative competence of Halliday. This is what Umere-Okeke refers to, in her work, as “culturally suitable communication (17)”. Grammatical competence implies knowing grammar while communicative competence entails being able to use grammar to communicate appropriately. The current estimate of Nigeria’s population at about 170 million (Fidelity Bank Diary 2016) implies that Nigeria has the highest concentration of English users as a second language in Africa. In all tertiary institutions in Nigeria at present, language communication skills is a major parametre for admission, graduation and certification. As the most important and institutionalized language of science and technology in Nigeria, English language has remained and will continue to be relevant far beyond the foreseeable future. Therefore, science and technology

students of the nation's polytechnic need it to actualized their communicative needs. Implicit from the above is the fact that this study is significant to the designers of communication courses taught in polytechnics and technological-oriented schools, lecturers of communication skills, textbooks and course writers, educational change agents, researchers and the society at large.

The findings of this study are relevant to designers of the English language and communication courses in the nation's polytechnics. In this regard, the study promises to guide them in making corrections where the present courses are found faulty. Having adequately addressed whatever anomaly identified by the course designers, the findings of the study will guide science and technology students in the area of semantics which deals with meaning as it will make them to be wary of such errors of ambiguity, vagueness, redundancy and assist them understand formal and informal usages. To the polytechnic lecturers, the study promises to guide them in the understanding of the current trend in their profession and assist in advancing their frontiers of knowledge. In a situation where the nation's best brains have continued to drain on daily basis, coupled with the dearth of relevant textbooks, this study is significant as useful reference materials to be consulted by these teachers to make up for what they may have lost through poor exposure to workshops, conferences, seminars and symposia. To textbooks and course writers, this study is significant in the understanding of the strengths and weaknesses of the present communication courses taught in polytechnics, so as to determine where, how and when to make amends in form of curriculum revision and, or change.

The educational change agents stand to benefit from the study; hence, it will provide a basis upon which they will stand to agitate for a positive change in the language course of polytechnic students; in this case, a radical change from

studying English For No Obvious Reasons (SEFNOR) to Studying English for Specific Purposes (SEFSP). To future researchers, the study is significant as it provides basis for further researches aimed at furtherance of knowledge. Finally, the study is beneficial to the society in that it will guide against a situation where students will be graduated as liabilities rather than assets to the society.

1.5 Scope and Delimitation of the Study

The study focuses on the communication of science and technology students through the medium of English as the scope. Specifically, the research concentrates on the identification and description of language use of polytechnic students and how their skill in communication assists them in verbalizing their scientific and technological concepts in and out of school. The study is delimited to science and technology students of Akanu Ibiam Federal Polytechnic Unwana, in Ebonyi State of Nigeria.

1.6 Research Questions

To ensure that the researcher achieves the purpose of the study, answers to the following questions were sought.

1. To what extent has the communicative needs of polytechnic students been met?
2. To what extent is the language use of Polytechnic students acceptable to the general public?
3. To what extent does polytechnic students' skill in English language enable them verbalise their scientific/technological ideas?
4. To what extent does polytechnic students' mode of communication assist them in achieving their professional goals?

CHAPTER TWO

REVIEW OF RELEVANT SCHOLARSHIP

This chapter reviews the relevant literature by examining the conceptual framework before giving account of past researches under empirical studies.

2.1 Conceptual Framework

Communication and language are two basically related but mutually exclusive concepts which feature as operational terms in this study. Communication is necessary for the completeness of society. It is through communication that individuals reach out and co-operate with one another. Communication equally facilitates the induction of the young into the adult society. However, communication cannot be meaningfully carried out without language of some sort. According to Vitus I. Obi, communication and language are inextricably intertwined (12). Language is the first, and a major medium or vehicle through which communication takes place. Communication and language have a mutual relationship which biologists would describe as symbiosis. This simply implies that communication depends on language as much as language depends on communication to operate, to be alive and to grow.

The English language is an instrument of communication. It has presently assumed the status of language par excellence in the Anglophone West Africa and the world at large. An African child growing up in our environment has the task of contending with this language of wider communication in addition to his mother tongue (L1). The extent to which he does this determines the success or otherwise of one's academic pursuit and relevance in the societal work place. Hence, the

views of Obanya P.A.I and T. Okilo, that “academic failure is a feature of linguistic failure” (13). This position agrees with that of Adeyanju T.K who had earlier argued that consistent poor performance in English language is a fairly reliable indicator of an inferior education which in more current parlance is described as falling standards. (10).

Communication is a term that can be viewed from different perspectives. It is a term that changes its meaning from one author to another and from one environment to another. The commonest definition of communication is that of Gosham W. which sees the term simply as the exchange of ideas between one person and another (05). This definition is anchored on the belief that communication is a process whereby one person stimulates ideas in another person’s mind. This is as it has to do with interpersonal human communication. But other types of communication exist in forms of intra-personal, verbal, non-verbal, intentional, un-intentional, organizational, group, traditional and digital et cetera. Hambagda O.A quoting Lee Thayer identified more than twenty conceptually different definitions of communication in the literature. For the purpose of this study, a review of some of the definitions which it is hoped will throw light into the various orientations and assist in the development of tentative conclusions as regards the nature and dimension of communication is necessary.

One of the conceptualisations is that of Hudson which views communication as

an ability to convey in the simplest form information or ideas which the recipient can easily understand; and an ability on the part of the recipient to reciprocate in such a way that we can easily understand him (02).

Communication according to the above definitions is seen as a verbal activity that exists between the sender (encoder) and the receiver (decoder). The emphasis is on

the ability of the communicating parties to share information, idea, attitude and, or message. Communication is said to have been accomplished or successful when the message between the encoder and the decoder is interpreted uniformly even where they have to disagree in their thinking about the substance of the communication. Davis K. summarized the central theme of this perspective in the following expressions;

the essential features of communication is that one person infers from the behavior of another.... what ideas or feeling the other person is trying to convey. He then reacts not to the behavior as such but to the inferred idea or feeling. The other person then reacts to his response in terms of the idea or feeling... the meaning behind it. (02).

The second conceptualization is that of Little Peter which views communication as

the process by which information is passed between individuals and/or organizations by means of previously agreed symbols (02).

In this regard, communication is viewed in its broad sense involving an encoding process which encompasses ideation and media decision as well as its interpretation by the receiver which involves a decoding process. Ideation is a term derived from idea. It is the first stage of the communication process where the source (encoder) decides on the message and how to send it in order to get the desired response. Media decision on the other hand entails the medium through which the message will be sent, as in whether written or spoken media. This conceptualisation places emphasis on the relationship between objects, the thought processes involved in interpreting these objects and symbols and signs used in expressing a given thought or message.

The third conceptualization is that of Hambagda O.A which views communication in terms of the outcome of the communication process. This

conceptualisation stems from the belief that communication involves the active sharing of information such that a common attitude towards a subject or action can be seen and felt in the participants (03). Vickers articulated this line of argument as quoted in Hambagda that “the test of a successful communication is what happens at the receiving end” (03). In this regard, communication is essentially a persuasive activity which requires a common language, a common skill in using the language, a common fund of ideas and assumptions for it to be successful.

The fourth conceptualisation is that which views the term as a social process that relates to the functioning of groups, organization and the larger society. Katz and Kahn agreed with this conceptualization when they argued that communication needs not be seen as a process occurring between any sender and potential recipient but in relation to the social system in which it occurs and the particular function it performs in that system (03). This explains the place of phatic communication. The term phatic “is a linguistic term which refers to words used to convey any kind of social relationship rather than meaning. An example can be drawn from the expression: “How are you?” encoded in a polite mood. This is often not a literal question but a greeting. Similarly, the response “fine” is often not an accurate answer but a mere acknowledgement of the greeting. It is imperative to state that these four conceptualisations may have highlighted the various aspects of communication even though they may be inadequate to capture the complexities of communication. However, when the conceptions are taken together, they complement and reinforce each other to provide a complete picture of the dimensions of communication which can be condensed into four components:

- a. **Communication is Purposeful.** Communication is never carried out in isolation or just for the sake of

communicating. There is always a purpose which is the driving force that prompts up communication.

- b. Communication requires at least four elements:** source, message, medium and destination. The source is the encoder who initiates the communication act. The message is the content or team which may be mere information, request or command. The medium is the route through which the message can be passed on using an appropriately channel. While the destination is the decoder or recipient who react to the encoded message by interpreting the symbols.
- c. Communication requires two processes;** symbolic manipulation (encoding process) by the sender and symbolic interpretation (decoding process) by the receiver.
- d. Communication is symbolic.** For the encoding and decoding processes to be successfully accomplished, there must exist a common pool of symbols (that is language, facial and body expression, clothing, voice modulation, signs etc); and common skill in using the symbols; a common fund of ideas, and the same symbols and association.

2.1.1 Concept of Language

Language is the vehicle that facilitates communication. It is the avenue through which we put across our thoughts and feelings, though other means exist. “Cries, signs, gestures, pictorial representations, etc, also serve as means (Varghese, C. Paul 08). However, human language differs from other modes of communication because it is a system. According to Edward Sapir as quoted in Verghese.

Language is a purely human and non-instinctive method of communicating ideas, emotions, and desires by means of a system of voluntarily produced symbols (09).

A number of other experts definition of language in the literature include:

Language is a series of sounds usually strung together in groups, which convey meaning to listeners (H.G Widdowson, 50). Language is system that relates sound and meaning (Victoria Fromkin and Rodman Robert, 50).

According to Hall, R.A, language is the institution whereby humans communicate and interact with each other by means of habitually used oral auditory symbols (51). On his own part, Bloomfield L. views language as

a code whereby ideas about the world are represented through, a conventional system of arbitrary signals for communication (51).

There are many other definitions of language in the literature. However, a common denominator in these definitions is the agreement that language is a symbol used for communication and a means of communication by a group of people within a speech community.

2.1.1 The English Language and Communication

The English language is usually referred to as a world language because it is the world's most widely spoken language (1). There are quite a number of other world languages outside the English language. They include French, Russian, Spanish, Chinese, and Arabic (Albert C-Baugh & T. Cable, 7). These languages are widely used today as world languages not because of the number of people who speak them or the geographical territory they occupy. As Albert C. Baugh & T. Cable would have it:

The importance of a language is inevitably associated in the mind of the world with the political role played by the nations using it and with their influence in international affairs; with the extent of their business enterprise and the international scope of their commerce; with the condition of life under which the great mass of their people live; and with the part played by them in art and Literature and music, in science and invention, in exploration and discovery—in short, with their contribution to the material and spiritual progress of the world (04)

Hence for obvious reasons, the English language by virtue of its origin and other peculiarities, now has an upper hand in Nigeria. Hence it has continued to dwarf other foreign and local languages alike. According to Verghese, “it is man’s ability to use language for purposes of communication that distinguishes him from other animals” (08). The English language, is one of the colonial legacies which was formally introduced in Nigeria when Lagos was officially established as a colony in 1962 (17). Ernest Egbe had argued that prior to the official arrival of English language in Nigeria, the language had existed in subtle form (05). The advent of English at the time it came was seen as a big relief to Nigerian as a nation. This is because there were so many indigenous languages that it would be difficult to choose one without opposition from the other minority tribe whose languages were not selected. This problem gave rise to what is known today as WAZOBIA, a language coinage formed from the indigenous languages of the three big ethnic groups in Nigeria: the Yoruba, Hausa and Igbo. WA, ZO, BIA, simply means come in Yoruba, Hausa and Igbo. Is it unfortunately that this arrangement failed to give Nigeria an acceptable indigenous national language. Today, the English language has acquired the title of the “mistress of all subjects” since a good knowledge of it is sine qua non to mastering other subjects (Synonymous). There are quite a number of reasons outside communication why the language is studied in Nigeria. Nwaegbe outlined these reasons in Ubahakwe, E. *et al*:

1. English is the language of all official communication, including teaching, it is relevant to all the other disciplines and all students should be proficient in it.
2. Nigerians take on the leading roles in teaching, home and diplomatic services, mass communication, trade and industry, and determine the political future of their country, there is need to achieve a very high degree of oral and written competence. Thus even for the few who obtain

distinction grade at the WASC examination, the course (Use of English) is still very important.

3. Not infrequently, graduates of other disciplines within the faculties of art and social sciences find themselves teaching English in secondary schools, when there is nobody else to do so. Some of these graduates may not have done English beyond the school certificate level. For such people, knowledge gained from the course will be a valuable foundation.
4. Implicit in all this is the idea that education a continuing process. The student is encouraged to regard the course not as complete in itself, but as an illustration of the need to continue improving himself in all areas relevant to his life, even after he has left the university (20).

Granted that a number of reasons for the quest for English as a language abound, communication reason remains unique among these reasons. As the nation's lingua franca cum official language, the English language has proved to be a veritable tool for equipping students for effective communication. It is the language of education, commerce, politics, judiciary, religion, science and technology, as well as international diplomacy, Syal Pushpinder and D.V Jindal assert that aside language, humans can still communicate through gestures, nods, winks, flags, smiles, braille alphabet, mathematical symbols, sirens, sketches, maps, acting, miming, dancing etc (05). The truth remains however, that any of these means, outside language can hardly be flexible, comprehensive, perfect and extensive as language. Moreover, such a non-language means will have to depend on interpretation of language to be meaningful. The numerous achievements of man today is traceable to language which man uses for communication. In the field of science and technology, it is through language that breakthroughs recorded after conducting a research are created, expressed, interpreted and transmitted, that is, communicated to the appropriate audiences. Without language, human communication will be difficult and impossible. As Verghese

will have it, the many achievements of man would not have been possible without language and communication:

the conquest and exploration of the normally inaccessible regions of the earth and of outer space, the civilization man has built up so painstakingly, the art and craft that forms part of this civilization, the global network of communication system, etc are his (man's) noteworthy achievements (08).

Vergheze asserted that all these achievements of man are made possible because man can communicate through language. The fact that man communicates with language, and the fact that language is dual and productive implies that it is possible for one to communicate in a limitless variety of ways using the English language. Communication enables individuals to be complete in the society. Communication and language are inextricably intertwined. Language is the medium through which communication takes place and hence communication depends on languages as much as language depends on communication. Among the several devices of communication are verbal, non-verbal, inter and intra-personal, intentional and unintentional as well as traditional and digital (I.V Obi, 15).

2.1.2 Communicative Language Study

The field of English language study (ELS) according to Munby J, is characterized by frequent innovations (16). This is a good development as these innovations are geared towards making the field to stand the taste of time. A review of literature reveals a number of methods of language study which have existed over the years. Some of these methods according to Idoko V.C, include the natural, immediate, reading, serial, direct, grammar translation, audio-lingual and eclectic methods (25). The result of these multiplicity of methods to language study is the controversy which they have generated as to which of the methods is the

finest. Writing on the past and present views of language and language study, Keith Johnson asserts:

Many approaches to language teaching begin life as reaction to old approaches. Their starting point is often a belief in how language should not be taught, in how the old approaches have failed. Only after a while do the new approaches gain a more positive existence, as they begin to develop their own ideas as to what the task of their language pedagogy involves (02).

Invariably today, some of the approaches to language study have either been abandoned or have had their names changed after having been subjected to series of modifications. Others however, have been able to stand the test of time, having been found useful in the study of language. The earliest attempt in communicative language study was the Grammar Translation approach which was used in the study of classical languages like Latin (Nwoke, 27). Unfortunately, the grammar translation method happened to focus attention on rules rather than usage. This implies that students who are exposed to this method can hardly speak or use language effectively. This conclusion is drawn from the fact that Grammar translation approach is known to prescribed the “dos” and don’ts” of language grammar which fail to reflect deeper structural patterns and hence learners who passed through this method are usually in a better position to read and write, but can hardly listen and, or speak effectively. According to Rivers, the grammar translation method however has the advantage of reducing the work-load of the teacher as written exercises can always be given to students when the teacher is bored (17). Implicit from the foregoing is the inherent disadvantage in a wholesale adoption of the grammar translation method of language study albeit the stigma attached to the study of the so-called rules in English language lessons seems to be giving way. Dubin and Olshtain see this as a healthy development (31-34). They

therefore, uphold the recent emphasis in linguistics and psycho-linguistic researches into the cognitive function of language, pointing out that it has enabled teachers of English to understand the importance of having learners grasp both the meaning of new sentences in the target language and the grammatical rules the sentences illustrate.

The Audio-lingual approach to language study came up as a result of the inadequacies of the grammar translation method. It is a method of language study introduced to correct the ills of grammar translation method. Initially known as ‘Aural-oral’ method, the approach came into being as a result of emphasis on being able to communicate in a foreign language. Audio-lingual approach aims at developing listening and speaking skills, as the cornerstone or superstructure on which to build the skills of reading and writing. Rivers asserts that Nelson’s Books of Yale University came up with the term ‘audio-lingual’ to replace the former name of ‘aura-oral’ which was found to be difficult and confusing to pronounce (32). On his part Crymes observes that the method has its guidelines from the theory of first language (L1) acquisition which sees language as habit learned by imitation (36). This implies that the skills of listening and speaking must precede reading and writing skills. Echoing his support for the Audio-lingual approach, Lado Opines that students who have mastered the language orally can learn to read more or less easily by themselves or with limited help (12). According to him, students who learn the written forms before the oracy, tend to feel that speech is a distortion of what they imagined the pronunciation to be (15). This attitude invariably interferes with further reading. Despite the enthusiasm that greeted the advent of the Audio-lingual approach to language study, Rivers still views this approach with pessimism because of the following weaknesses:

- a) Students trained audio-lingually, in a mechanical way, can progress like well-trained parrots; able to repeat whole utterances perfectly when given a certain stimulus but uncertain of the meaning of what they are saying and unable to use perfectly, memorized materials in contexts other than that in which they have learned them.
- b) The techniques of memorization and drilling that this method implies can become intensively tedious and boring, causing fatigue and distaste on the part of the students (03).

These disadvantages as itemized by Rivers above point to yet another inherent danger in the wholesale adoption of the Audio-lingual approach of language study.

Next, is the reading method of language study which according to Rivers originated in the United States, after the Coleman report on the study of modern foreign language (30). The study reveals that students who have limited time to study a foreign language could be helped through the development of their reading abilities. This is also the thinking of Dechant et al who assert that if such students are equipped with the tools to identify the symbols and associate them with appropriate meanings it would enhance the students' interaction with a given text (25). On their part, Bright et al contend that what makes up a literate society is the ability of its skilled workers to read because it is difficult to think of any skilled work that does not require the ability to read, and hence professional competence depends on it (58). It is imperative to observe however, that general reading ability alone, which is devoid of reading in content areas is not enough to assure reading improvement. This is why students need to be equipped with special skills to meet their needs. Reading in content areas is reading designed specifically for learning

that requires specific skills and as Fay would posit, the teacher must know the “unique demands of social studies, science and the language Arts” (12). The general reading abilities needed for a successful content area reading as identified by linguists include the ability to interpret facts and data, apprehend the main idea, organize ideas, draw conclusions, appreciate the literary devices of the writer, evaluate ideas for relevancy and authenticity, interpret graphs and charts, follow directions and remember and use ideas. (Oyetunde, 05 Fay, 14).

Eclecticism, which is a careful, purposeful and systematic selection of appropriate elements from the existing approaches with a view to producing a suitable method came up as a result of clamour against the inadequacies of the reading approach. According to Hair,

- a. Eclecticism strictly speaking is not per se a method, rather, it is just a principle of language study, at most a philosophy, an application of a doctrine that is tantamount to a line of conduct, an attitude towards most of the daily problems that language teachers encounter in the classroom;
- b. The term suggests that the language teacher has the liberty to deliberately select all that is good to constitute a complete and homogenous system.
- c. It is a multiple-line approach to language teaching, combining the best methods and their techniques to achieve the desired goals the teacher has set for the language teaching and learning task;
- d. The rationale behind this selection is the idea that there are many ways of solving problems but there exist no one solution that can be applied to all problems in language teaching situation (108-115).

In the words of Rivers,

Eclecticists try to absorb the best techniques of all the well-know language study approaches into their

classroom procedure, using them for the purposes for which they are most appropriate (21).

Contributing further, Rivers Opines that the eclectic language teacher adopts methods to suit the ever-changing objectives and types of learners he has to handle. Thus the method he applies would resultantly suit both himself and the learners. This would undoubtedly bring variety to the teaching and learning of the language and invariably, enhance positive result. The foregoing points to the singular fact that no methodologist has the whole answers as to the best method of language study. While there is the inherent danger in lifting any of the approaches wholesale, there is wisdom in using the eclectic approach to absorb the best elements from the many approaches in literature. This is exactly what Rivers has in mind when he advised the language teachers to avoid what he called 'the pendulum syndrome', that is merely joining the bandwagon of methods without due consideration to the learners unique situation [02].

The implication of this review on communicative language study is the need for language teachers to harken to the advice of Widdowson that;

...all kinds of factors come into play in actual teaching and study of languages and no one approach can be imposed in all situations. Teachers need more than an approach, they need a set of underlying principles which will allow them to adopt particular approaches to meet the requirements of varying circumstances (217-218).

The earlier the truth of Widdowson's assertion above is realized in our language classes, the better communicate language study environment we would be creating for science and technology students. The major features of second language learning are now gradually moving away from teacher to learner centered. Hence the current move in the field of English Language Study (ELS) is a realistic

outlook based on the analysis of the dimensions of learning situation of each set of learners. Eclectic language study approach helps in this regard.

2.1.3 Needs Analysis in English for Specific Purposes (ESP)

English for specific purposes (ESP) refers to the study and, or learning of English language clearly for utilitarian purpose. It is therefore, an approach to language study according to Nwoke(36). As an approach therefore, Needs Analysis is central to ESP and hence it should not be overlooked in a study of this nature. In the words of Hutchinson and Waters:

needs analysis involves examining communication in the target situation. The conventional procedure is then to incorporate these into the ESP teaching materials as texts, with exercise to teach the language in them... what is need, then, is an interpretation of discourse types in the target situation to discover what competence is required to cope with them (59).

The same way that individual needs vary from person to person, so also do the needs of one group of learners vary from that of another. It is the duty of the ESP practitioner, the educational system, the science and technology learner as well as the larger society to determine at each point in time, what constitutes the needs of science and technology learners of a particular class with a view to ascertaining how to go about satisfying those needs. As earlier observed, ESP is an approach to language study in which all the decisions as to content and method are based on the learner's reasons for learning. Therefore, ESP is geared towards meeting the needs of particular learners. To determine the learners needs presupposes an accurate design of the course based on the reasons why the learners need to learn the English language. It is the awareness of this need rather than the existence of the need that distinguishes ESP from the previous approaches of studying English for

no obvious reasons (Nwoke, 06). According to Ntia Lubasa, needs analysis is crucial in ESP because it helps to give proper shape to language study (3). There is no doubt about the truth of this assertion because when students' needs for studying a language is appropriately identified, it will give language study the shape of "narrow but deep" structure as against that of "broad but shallow" structure (Nwoke 05). If students of science and technology as well as lecturers of English language in our technological institutions should know why learners need English, that awareness will have an influence on what will be acceptable as reasonable content in the language courses of technological students.

Nwoke has no doubt about this and hence his assertion:

as a matter of fact, it is the awareness of a definable need to communicate in English that distinguishes the ESP learners from the learners of general English (61).

He cites example with a recent study by John Mumby whose "communicative syllabus Design" presents a highly detailed set of procedures for discovering target situational needs. This set which Mumby referred to as Communicative Needs Processor (CNP) consists of a range of variables such as the topic, the participant, as well as the medium to be used in identifying the target language needs of any group of learners. Hence needs analysis implies what the learner needs to do in order to learn.

Nwoke identified two types of needs to include "target and learning needs" (61). Target needs refer to what the learner needs to do in the target situation. Learning needs on the other hand, refers to what the learner needs to do in order to learn. Identifying the target needs involves a number of processes. Foremost is the gathering of information about target needs. Hence, information about needs can be

gathered by means of questionnaire, interviews, observation, data collection (gathering tests), informal consultation with sponsors, learners and others.

Hutchinson and Waters came up with the following target situation analysis framework as itemized by Awa Nwoke.

- a. Why is the language needed? It is for study, for work or for training? Or is it for a combination of all the above? Is it for some other purposes such as status, exams or promotions?
- b. How will the language be used: what is the medium? Is it through speaking, reading or writing? What is the channel? Is it through telephone or face by face?
- c. What types of test or discourse would the language be used to generate? Is it academic tests, lectures, informal conversations, technical manuals, catalogue? Etc.
- d. What will the content areas be? What subjects for instance: is it medicine, biology, architecture, shipping, commerce, engineering or what?
- e. What is the level? Is it for technicians, craftsmen, post graduate or secondary school students?
- f. Who will the learner use the language with? Is it the native or non-native speakers? What is the level of knowledge of the receiver? Is he already an expert, layman or a student? What is the relationship, example a colleague, a teacher, a customer, supervisor or a subordinate?
- g. Where will the language be used? What is the physical setting? Is it in an office, in a lecture theatre, in a hotel, workshop, library or where? What is the human context? Alone, meeting, demonstrations, telephone or what? What is the linguistic context? Is it in Nigeria or abroad?
- h. When will the language be used? Is it concurrently with the ESP course or subsequently, seldom, in small amount or in large chunks? (63).

The target situation analysis presented above is self explanatory and explains the importance of needs analysis in ESP. The target situation analysis framework enables the language teachers to arrive at the knowledge and abilities which learners would require to be able to perform to the required degree of competence in the target situation. However, the target situation analysis is not all that is required in needs Analysis. The second type of needs, the learning needs is no less

important in ESP. Writing on the need for equal consideration of both needs in designing the ESP course, Nwoke asserts that the target situation analysis is the starting point if the needs in ESP are to be likened to a journey. According to him,

in looking at the target situation, the ESP designer is asking the question: what does the expert communicator need to know in order to function effectively in this situation. This information may be recorded in terms of language items, skills, strategies, subject knowledge etc. what the analysis cannot do however, is show how the expert communicator learnt the language items, skills and strategies that he or she uses (64).

It is this vacuum which the target needs creates that the learning needs is out to fill. The whole ESP process centres not with knowing or doing, but with learning and hence the analysis of what people do only reveals little or nothing about how they learn or do those things. For a comprehensive and realistic approach in analyzing learners' needs therefore, both the target and learning needs analysis are paramount in ESP approach to language study. Tom Hutchison and Alan Waters have the following framework for learning needs.

- a. Why are the learners taking the course. is it compulsory or optional? Are status, money, promotion etc involved? What do learners think they will achieve: what is their attitude towards the ESP course? Do they want to improve their English or do they resent the time they have to spend on it?
- b. How do the learner, learn — what is their learning background? What is their concept of teaching and learning. What methodology will appeal to them? What sort of techniques are likely to bore them?
- c. What resources are available — the number and professional competence of teachers? What is the attitude of teachers to ESP? what are the teachers' knowledge of the subject content and attitude? What are the materials (aids to teaching) and what are their opportunities for out-of-class activities?
- d. Who are the learners their age, sex, nationality? What do they know already about English? What subject knowledge do they have? What is their interest? What is their socio-cultural background? What teaching styles

- are they used to? What is their attitude to English or to cultures of the English speaking world?
- e. Where will the ESP course take place — are the surrounding pleasant, dull, noisy, hot or what?
 - f. When will the ESP course take place? Time of day is it daily or once a week, full time or part time? Etc. (62-63).

The unmistakable message from the foregoing is the fact that needs analysis in ESP is not a haphazard affair in the same way that it is not an all-comers affairs. To analyse the language learners' needs is systematic business. It takes a lot of skill and hence only the language teacher with adequate exposure to ESP and wit will be able to design a realistic and holistic ESP course after due analysis of the learners' needs.

2.1.4 ESP and Technological Communication

English for Science and Technology is a major sub-division of English for Specific Purposes (ESP) and a good example of both occupational and educational use of English. Strevens contributes to the notion of ESP when he identifies two major subdivisions of ESP to include English for Science and Technology (EST) and others which he called English for Academic Purposes (EAP) and English for Occupational Purposes (EOP) (41). English for Academic Purposes entails training learners of higher educational setting to use language appropriately to succeed as students. It is one of the most common forms of English for Specific Purposes (ESP). An EAP programme focuses instruction on skills required to perform in an English-speaking academic context across core subject areas generally encountered in a tertiary setting. Programmes may also include a more narrow focus on the more specific linguistic demands of a particular area of study, for example, business subjects. In addition, programmes may be divided into pre-sessional course and courses taken alongside students' other subjects. In the former case,

sometimes EAP courses may be intended to raise students' general English levels so that they can be admitted to a higher level. EAP instruction centres on the study of vocabulary, grammar and the language skills of listening, speaking, reading and writing but usually tries to tie these to the specific study needs of students. For example, a writing lesson would focus on writing essay etc.

EST is said to be occupational use of English when the focus is on the occupational needs of workers and employers among others. On the other hand, it is said to be academic use when emphasis is on studies through the medium of English language. A case in point is when the medium of English is used to study physics, mathematics and mechanical engineering among many other disciplines. The unmistakable implication from the foregoing is the fact that English language can be used to advantage in the field of science and technology depending on what it is intended for. This is the logic behind the ESP maxim "tell me what you need English for; and I will tell you the English you need" (Nwoke, 04).

A review of literature reveals that EST has its credit attributed to Larry Selinker who originated the term to mean the written discourse of scientific and technical English (Nwoke, 6). Today however, the term has gradually shifted to embrace what L. Tremble would explain as:

English written for academic and professional purposes and English written for occupational and vocational purposes, including informally written discourse found in trade journals and in scientific and technical material written for the laymen (69).

EST has continued to broaden in its meaning such that it is presently used to refer to both oral and written discourses in the field of science and technology. Further review of literature reveals series of arguments on whether science and technology

students actually require a specialized course in English in order to function as scientists and technologists. Ekeh has no doubt about this since the general English course is insufficient to form the curricular content of English language needed in science and technology programme. According to him:

It is known that the English learnt under the general education does not form a very strong or broad background for the learning of language designed for an aspect of specialized education (67).

Ekeh's contention is further confirmed by C.B.A Okunuga in E. Ubahakwe when he asserts that there are quite a number of science and technology students,

whose command of the English as a language of communication is out of phase with the scientific and technological ideas they possess (267).

This explains the language needs in English for science and technology students which among others include being able to use the English language to verbalize their scientific/technological ideas. Science and technology students who can hardly process scientific and technological concepts through communication have failed in their language needs. Communication is presently the index for measuring success in all fields of human endeavour including science and technology and as Ekeh would posit,

I know a scientist/technologist who cannot recognize how the concept and procedures of science and technology are expressed through communicative acts; who cannot give instructions on how experiment is carried out and who cannot define and exemplify scientific/technological concepts and procedures through communicative acts, and I will show you a scientist/technologist who has been denied EST (68).

The immeasurable role of English language to science and technology cannot be overemphasised. This is so in "the production, distribution and utilization of scientific knowledge" (Balogun, 298) would seem utopian if the appropriate language

to carry out these scientific activities is found wanting. It is argued that the present English language courses coded GNS 101-402 and titled Use of English (1st Semester) and communication in English for second semester, designed by the National Board for Technical Education (N.B.T.E) and studied by polytechnic students across the nation is not the best for students of science and technology. If these same language courses are studied by students of humanities, arts and social sciences in the nation's conventional higher institutions, there is no justification why it should be studied by science and technology students whose needs invariably differ from those of students of other disciplines. The position of this researcher in this regard is to make ESP the focus of communication courses for polytechnic students. This can be achieved through Needs analysis to identify the learning and target needs of these group of learners. It can be argued therefore, that the present language course arrangement can be anything but satisfactory, hence it negates the doctrines of both the English language needs of the student beneficiaries as well as the goals of EST. The language needs of students of science and technology (S/T) should be able to expose the beneficiaries to the right language skills in agreement with the goals of EST. Okunnuga outlines these skills thus:

- a. Listening comprehension training in spoken, scientific and technological English (lectures)
- b. Reading comprehension and fast reading training to the satisfaction of science and technology departments to facilitate intermediate study in science and technology.
- c. The ability to write scientific and technological English.
- d. The ability to speak scientific and technological English (tutorials, seminars and conferences (271).

These skills are appropriate in the polytechnic situation to science and technology students' communication needs. Science and technology students require a lot of information through listening to lectures. A variety of methods could be used to achieve this goal. Science and technology situations could be stimulated through

passages which students would be required to read and attempt questions on them. The S/T language lecturer may equally wish to use a recorded lecture on science and technology (S/T) in a tape-recorder for students to listen and answer questions on the recorded lecture. Questions in this method should be geared towards testing of understanding or comprehension of the passage on recorded lecture rather than emphasizing on the students' ability to lift relevant facts from a given passage. On the area of reading comprehension and fast reading training, emphasis should be on developing the different kinds of reading skills such as skimming to grasp the idea contained in a passage and scanning for specific information. S/T students need both skimming and scanning considering the volume of material they are required to read in the course of their study. They also need extensive and intensive reading for a thorough digestion of reading materials.

To ensure that students derive maximum benefits from the reading skill, Okunnuga suggests that the EST teacher tailors his questions in two ways;

- a. Questions on skimming and scanning skills should be read first before reading the passage....
- b. Questions that require total comprehension of a text should come after the reading passage.... (72).

Ability to write scientific and technological English can be imbibed in the students through careful discourse organization. Science and technology students need systematic exposure to both oral and written discourse to be able to write scientific and technological English. This is imperative because the ability to produce grammatically correct patterns at the sentence level, in most cases, does not necessarily “guarantee the eventual production of acceptable continuous writing” (Nwoke,72). Okunnuga outlined three stages required to achieve success in this regard:

Stage 1: This is the beginning stage where the EST teacher would be required to select the discourse content and direct practice at the sentence level.

Stage 2: Here, the practice focuses at the level of inter-sentence relationship with a view to bringing out how grammatical structure of one sentence affects that of the other in the same discourse

Stage 3: This is the last stage where science and technology students are made to bring to bear, all what they have been taught in steps one and two to ensure a free flow discourse. (73).

The ability to speak scientific English fluently and coherently demands that students be exposed to tutorials, seminars vivas, conferences, symposia and debates among others. The logic is when S/T students listen to educated Nigerians speak, they will learnt to speak the educated Nigerian English, not necessarily the received pronunciation (RP) or Queen's model. To facilitate this, the EST teacher should make use of photographs, drawings, tape recorders, film projectors and other technical aids. Contributing to the notion of S/T English, Streven emphasized on communicative competence. As he would have it,

...being a scientist or technologist entails learning a number of habits or thought, that these habits or thought directly affect his use of language, and that the scientist can only function as a scientist if he learns how to use a language appropriately to these habits of thought (74).

The researcher believes in the position of Strevens above which is unarguably correct. The truth has been established that the English learnt under the general education does not form a very strong or broad background for the studying of language designed for an aspect of specialized learning. With this in mind, it is expected that the content of English for science and technology should take cognizance of this and thus, place emphasis entirely on the language needs of science and technology students.

The goal of the English language courses taught under the general studies programme at the National and Higher National levels are.

to provide a broad-based education designed to sharpen students' communication skills, their realization of the need for cross-fertilization of ideas and the inter-relatedness of the various disciplines as well as bridging the gap between what would have been otherwise two separate cultures, i.e.; the Literary and the scientific. (NBTE, 03).

This perhaps accounts for the broad and shallow content nature of the course description as opposed to the ESP based narrow but deep course content (See Appendix).

If the science and technology students need to study the English language, the content of such an EST programme should be such that would make them to be able to transfer their knowledge of language into real life situations and apply it successfully outside their place of work. Jupp and Hodlin share this same view when they recommended that the language course work for science and technology students should aim at

the English a learner needs for his immediate job and for making simple social contact....the English which would

enable him to communicate...and to express his personal problems and needs at work (79).

Such a language course work does not necessarily need to be too broad while presenting a shallow posture.

A cursory look at the course description currently offered in Nigerian polytechnics (see appendix). Shows that they are too broad, yet shallow, rather than narrow but deep in content. This stems from the fact that the vital content components of ESP programme are either totally absent or insufficiently represented. Granted that the present EST programme contains enough tips on reading strategies which is likely to enhance comprehension in science subjects as advised by Davis, one would not hesitate criticizing the designers of the programme for neglecting some aspects of writing considered the most problematic demanding aspects in English for Science and Technology. Some specialised writing strategies as technical writing and technical report considered germane to EST programme are completely absent. Writing has over the years served to preserve science and at present, there is an expected growing channel of communication between the scientists and their audiences. This is why the technical aspects of writing considered problematic in EST programme should not be overlooked. It is for this same reason that Friederichs and Pearson advised that the writing components of the EST programme

demands scientific information from the students and teaches the passive method of reporting, so as to remove subjectivity and the semantic idiosyncrasies that reduce comprehension (81).

2.1.5 Strategies for Effective Communication in Science and Technology

The important place of English as a world language is not in doubt. The advent of the 20th century witnessed a massive and phenomenal leap of English from being the exclusive possession of Britain to the world's foremost means of international communication. In Nigeria, English language has become our official language and the language of instructions in our educational institutions. Though, Nigeria boasts of over 250 native languages (Ahmed, 160), English has, and will continue to remain a language par excellence far beyond the foreseeable future. It therefore follows that there is a compelling reason or motivation to be proficient in the language for national and international communication. According to Nkem Okoh:

The motivation for learning is said to be instrumental when the language is learned as a fulfillment of and educational requirements for advancement, either socially, educationally or economically. The motive becomes integrative when we are concerned with learning the language to become a member of the society whose L1 is in question. In other words, the learner is seeking social acceptability from the community or group with which he wishes to be identified (15).

Diminishing competence in the use of English at different levels of educational institutions and among other users in business, technology, including the general civil service workforce is becoming a matter of concern to educators, researchers, employers of labour and policy makers. The supreme role which communication plays in social and official interactions and transactions explains its importance and continuous clamour for training and retraining of language users. Official interactions is inevitably characterized by an inter-connection of vertical and horizontal lines of communication which are sustained and made effective only through appropriate and accurate use of language.

Communication, whether written or spoken (verbal) or non-verbal, should be effective by being objective, error-free and in conformity with appropriate style

and register known, recognised and accepted in a given discipline. A number of recent developments has resulted into changes in the level, status and priority accorded polytechnic as an institution and have had unforeseen consequences on the products of the system. These products are naturally the subsequent operators of the work-force in private and public industrial sectors. This requires that polytechnic students should communicate effectively to succeed as students and survive as technologist when they eventually find themselves in the wider world of work. English is the fastest growing language of the global village and coincidentally the language of technology and instruction in technological schools. This invariably makes it easy to prepare polytechnic students to join the global advancement in communication mechanism using the English language. The three key strategies for effective communication are reading, writing and oral/speaking (Ahmad 160-161). These strategies are relevant as they apply to effective technological communication.

Reading is a receptive skill which is used to interpret the author's mind. Oyetunde, T. asserts that reading is a complex language processing behaviour that entails interpreting or getting meaning from written or printed materials (05). This suggests that the ultimate goal of reading is comprehension or understanding. Technological students have a lot to read to succeed in their communication endeavour. They need to read textbooks, journal articles, encyclopedias and other reference materials as well as on-line materials. I.V Obi classified what students read into intensive and extensive (17). These types of reading, including the fast reading types known as skimming and scanning are crucial in students' learning process. Through reading, the decoder's eyes get accustomed to correct English sentence patterns, and spellings, as well as become familiar with different styles of

the use of language. To cope with the phenomenon of reading different texts for different purposes, a reading strategy known as SQ3R or Survey, Question, Read, Recite and Review (in full) was developed. (Alderson, C.J and A.H Urqhart, 19). Survey involves the fast reading of the text to have a general impression of its contents and organization. Survey also enables the reader to identify the main ideas the text contains. Question is where the reader raises fundamental Question concerning the subject matter of the text, the why and how the matter could be resolve or be dealt with. Read is where the reader reads the text, more slowly this time, to enable him answer satisfactorily the questions raised. Recite is where the reader recalls the main points of the text without necessarily referring to it. Review is the final stage where final quick check on some sections of the text to reconfirm particular word/phrase is made.

Writing on the other hand is a productive language skill which technological students need as much as reading. It is a process rather than a product (Eyisi *et al*, 20). As a process, writing is not an exercise that is executed in a fiat. Technological communication in form of writing can take the form of memo, report, proposal, project, term paper, class assignment and writing for examination and employment purposes. Effective communication through writing requires adequate mastery of the basic mechanics of grammatical sentences, paragraphing, spelling, punctuation and appropriate choice of vocabulary and the avoidance of poor habits such as illegibility and wordiness. In addition, writing required thinking-up ideas, organizing them, making a first, second and possibly several draft before writing. This also requires a knowledge of editorial and proof-reading skills. It is for this reason that a strategy known as RECURSIVE PROCESS cited by I.B Garba in S.

B Ahmad is useful in this context. The process involves four distinct but related steps of planning, drafting, revising and editing (162).

The planning stage includes any activity the writer needs to do before embarking on the actual writing of the draft. Here the writer has to brainstorm on the overall conception of the subject matter. Next, he prepares note from books and reference materials related to the subject matter. Then “he conducts interviews, gather raw data, figures, maps sketches etc from libraries and the internet” (162). The drafting stage is where the writer starts putting his ideas into sentences and paragraphs. The writers’ main concern at this stage is the development of necessary ideas by supporting them with arguments, facts and figure so as to make the writing convincing. In addition, this is the writing stage where the ideas should be coherently put together and logically connected. According to J.J.L Cannington, this is an important stage in writing because the effort one puts in thinking and planning towards writing can be marred at the drafting stage if there is no systematic order (6-7).

The revision stage is central to writing strategy hence it confers order and coherence to a written document. It is the stage where the writer thinks much more deeply about his or her readers’ expectations. This is the stage where the writer ensures that his draft is not writer centred but reader centred. This is equally the stage where every technical jargon should be appropriately defined and questions asked about the language use and general organization of the written work. Finally the editing stage is where the grammar and technicalities of punctuation, spelling and capitalization are examined.

Aside from the strategies discussed above, oral strategy is equally an important skill required in technological communication, and hence, a strategy for effective communication. Technologists like other professionals are expected to attend and contribute intelligently at meetings and social gatherings. Their speeches are presented orally, while a number of technologists who work in workshops and laboratories have to be properly equipped with the necessary communication ability to be able to verbalize their technological concepts. This calls for a strategy that will make such students' oral skills more effective. Ahmad recommends constant practice as good strategy for effective oral communication (163). This strategy can be facilitated in the present era of globalization and Information Communication Technology (ICT). It is now possible to listen and watch native and competent speakers of English language communicate on radio, television and on-line devices on regular basis. This strategy helps not only in the understanding of the subject-matter but also in learning the pronunciation of words and stress patterns. The following areas of oral communication are cited by Isa, M.A in Saleh Abdu (563). They include salient letters, spelling pronunciation and first language interference in pronunciation among others.

English, unlike many other languages, has in its spelling or orthography, letters which do not feature in pronunciation at all. This could be attributed to a number of factors which are mainly historical. Examples are: receipt, castle, wrong, pneumonia, plumber subtle, debt, phlegm, knight, gnaw, gnat, mnemonic, gnostic, diaphragm, sign, reign, muscle, knew, knit, isle, limb, lamb, bomb, thumb, comb doubt, judge, badge, lodge, adjacent and adjust.

Spelling Pronunciation

Exposure to the written word before the spoken form often breeds a phenomenon called spelling pronunciation. This is an attempt by a language learner to pronounce a new or strange word exactly the way it is written, which may produce undesirable linguistic forms (Ahmad, 164). Granted, there is no procedure in language acquisition process that teaches writing before pronunciation, Mark Attah contends that the attempt is often encouraged by the commonly held view that the written word is the norm to which the spoken word should confirm (07). This assumption lacks merit because researches have proved that there is a striking non-correlation between pronunciation and spelling, a phenomenon which linguists described as the bane of language. The following can be seen as examples of spelling pronunciation (SP):

Word Form	SP wrong form	correct
Debt	debt	/det/
Castle	kastl	/kasl/
Receipt	Risipt	/risit/
Wednesday	wenezde	/wenzdi/

The above examples can be explain thus: the line headed **word form** shows the correct spelling of the words. **SP** represents how they are wrongly pronounced because of their spellings (hence, spelling pronunciation), while the last line headed “**correct**” represents the correct pronunciation as opposed to spelling pronunciation.

First Language Interference in Pronunciation

Virtually all Nigerians learn English as a second language. This implies that these learners will have already mastered their first language prior to contact with English. In this situation, features of the first language inevitably get transferred into the second language. For instance, Hausa speakers of English are known to have problems with the sounds p/f, b/v and s/z as reflected in the pronunciation of people as feofle or typhoid-fever as typhoid-peber, feeling as pealing and very as berry. The Yorubas have problem with h/t as in ouse for house hegg for egg, tatti for thirty and dis for this. In Igbo language, the Ibos are known to have interference problems with the r/l sounds, while y is usually nasalized as in lula for ruler, ruck for Luck, lice for rice and nyam for yam.

To ensure that the communication needs of technological students are met, students should be guided to understand that the pronunciation of English sounds in communication must be geared towards English sounds alone. This is why Onyemachi asserts that technological English is scientific and empirical (viii). Scientific inquiry is a specific process which relates to control, manipulation and observation of situation; and involves research assumptions, hypothesis formation and theory construction (Ary D., LC Jacobs and A. Razavic, 38). The language used in technical communication therefore is expected to help the user to better described, interpret and explain various steps in the technological process. The vocabulary in the form of technical terms and language structures become critical and essential elements for this purpose. Bolsyhakova, E holds that the global purpose for technical communication is to convey new ideas and results of technical research, as well as explain and rationalize them (15). Hence technological discourse involves reasoning that is organized as a sequence of

mental operations of informing and arguing, defining, describing, classifying and making of deductions (Onyemachi, iv). According to Nwachukwu et al, it is not just enough for a technological communicator to have what to say or write; it is also important to decide how to say or write it to achieve “sentence sense” (i). A sentence that is wrongly or poorly constructed does not make logical sense, hence a sentence is said to be a group of words that makes a complete thought. To achieve logical sense and consequently arrive at complete thought, the grammar of the language provides the essential tool for clarity of expression, complete and effective sentence construction. Clarity is the main purpose of effective communication. Lack of clarity in speech and writing results in incoherent and unclear sentences (Newfield, 1-2).

2.2 Empirical Studies

Empirical studies give account of past researches related to the topic under study. In this section, the contributions of some scholars and researchers in the area of English for Academic Purposes (EAP), English for Specific Purposes (ESP), English for Science and Technology (EST) Technological communication and I.C.T will be examined. Different aspects of spoken and written forms of communication pose different problems to students of various disciplines. This has given rise to what is referred to as English for Academic Purposes; a situation where emphasis is usually given on the training of students in the areas of vocabulary, grammar and the four language skills of listening, speaking, reading and writing.

In a study entitled Assessment of the performance in English of the Civil Law Students of Borno State College of Legal and Islamic Studies, Maidugurui in 2001,

Michael Offori conducted a research to determine aspects of written English language that pose problems to legal students. In addition, the study aimed at ascertaining the extent to which the students' problems with the use of legal terms is attributable to the language lectures who are not legal professionals. Fifty hand-written essays of final year diploma students were analyzed using the simple percentage. The findings showed that technical control (mechanical Accuracy) and grammar proved the most problematic aspects of written English for these final year diploma legal students. The study further revealed that more than half of the students examined did not only use legal terms in their works, but used them appropriately. The study subsequently recommended legal students be exposed to constant practice in debate, speech making and similar oral presentations from where they hope to learn to build their writing skills. This position is in consonance with that of C. Paul Varghese who asserts that "demonstration nearly always get better results than explanation" (64).

In a study on the role of grammar in effective writing Ebele Eko in 1982 identified grammar as "the system of rules of governing the use of words and their different forms in a language (39). Hence grammar is sine qua-non to communication. Using one hundred year one undergraduate English and Literary undergraduates of the University of Calabar as her target population, Ebele Eko classified a number of grammar errors found in the students' written essays to include common grammatical errors, words most commonly misspelled, American and British English spellings, words frequently confused, subject-verb agreement, subjective and objective cases, uses of who and whom, countable and non-countable nouns, use of definite articles, punctuation marks, superfluous or misused commas and dangling modifiers (39-64). The study which adopted textual

analysis approach revealed that all the students used in the study were found culpable in American and British English spellings, punctuations errors and misplaced commas. In addition the study showed that majority of the students could not spell the following words: “truly”, pronunciations”, “duly” and “marital status” which they spelt as truely, pronounciation, duelly and marrital status. The study however revealed that errors of subject-verb agreement and countable and uncountable nouns emerged as lacks. The study therefore concluded that the undergraduate English and Literary studies students in the corpus lack the grammar skills needed to engage in effective communication.

Meanwhile, Mansur Saleh Kiyawahad in 2008, carried out a comparative study of undergraduate English language students’ writing skills in selected Nigerian universities. The study which aimed at comparing the performance of Bachelor of Arts (B.A) and Bachelor of Art (Education) (B.A Ed) English language students in written English focused on the variables of grammar, stylistic variation, discourse organization, mechanics of writing, idiomatic expressions, vocabulary and text format. In addition the study was aimed at identifying error patterns of these students. The data were drawn from three sources which include the students’ take-home assignments, classroom tests and terminal examination scripts. The result showed that the errors committed by the two groups were radically not different. This researcher appreciates the use of students’ written texts in the study. It however disagrees with the method of take-home assignment as a source of data in the study. This might make the study to be unreliable as students were likely to have been assisted in doing the assignment.

Akinmade T. Akande researched on nonstandard syntactic features in the English of Nigerian University Graduates (NUGs) in 2013. The objective was to

ascertain the extent to which NUGs use of English agrees with the standard variety of English across the globe. The subjects from whom the data were drawn were 30 university graduates from the three major ethno-linguistic groups (Hausa, Ibo and Yoruba) in Nigeria. Data for the study was elicited through face to face spontaneous interviews. The findings showed that NUGs do make use of non-standard syntactic features such as Be deletion, absence of concord, double comparative, regularization of regular verbs and the use of the base form of verbs in perfective aspect in spontaneous speech. Jawi in a related development, studied students' competence in grammar and grammatical contents (15). The study centred on the B.Ed language Arts students of Ahmadu Bello University Zaria. The purpose of the study was to identify implications for curricular renewal. A total of 90 students and 15 lecturers were used for the study. Two instruments, a set of questionnaire and an objective test were used. The set of questionnaire was administered on the lecturers while the students were tested with an objective test on different aspects of grammar. Findings revealed that the students had significant problem with grammar. Details showed that they made more errors in tenses, prepositions and adverbs than in spelling, punctuation and pluralization. While the former represent 47% the latter accounted for 36% of all the errors committed. The remaining types of errors account for 16% of all the errors found.

Errors of pidgin in standard English, wrong idiomatic expressions, wrong use of articles and adjectives appeared as lacks. This study deserves commendation for using what was close to written test as well as classifying and rating the quantity of errors committed in percentage. These measures taken by the researcher made the study meaningful for analytic and comparative purposes.

Bertha Chioma Onyemachi and Gbenga Fakunde conducted a study on syntax and cohesion in engineering text: A Discourse Analysis of Project Reports of Higher National Diploma (HND) Engineering students in 2014. The purpose of the study was to examine the linguistic, organizational and discourse characteristics and communicative functions of the discourse structures of the project reports of the Higher National Diploma Engineering students of the Polytechnics in the North-East zone of Nigeria. The study adopted Theory Triangulation for its methodology. Theory triangulation method uses more than one theoretical framework in the study of the same phenomenon. The study employed two models of analysis. The Halliday and Hassan's (1976) model of cohesion was used to analyze the cohesive elements identified in the texts of the corpus, while Halliday (1985) functional grammar analysis was used for the analysis of syntactic features of the text. Result of the study showed that the HND engineering students of the polytechnics in the North-East zone of Nigeria made use of the syntactic device of passivisation, syntactic negation and opposition among others. The study also revealed that the students made use of three main cohesive types (lexical, inferential and conjunctive devices). Substitution and ellipses emerged as lacks. The study concluded that the HND engineering students in the corpus lack the competence to tie sentences together by the use of cohesive devices of substitution and ellipsis. It argued further that the consistent use of a particular lexical device, such as lexical repetition rather than lexical collocation connote poor writing skills as this tended towards lexical redundancy. The implication of this findings suggest the need for English for science and technology or English for engineering discipline in the polytechnics in Nigeria. This will assist the beneficiaries to use the skills so acquired to function in their different fields of studies.

In a related study, Fakunde conducted a research on Thematic structures in the project reports of Higher National Diploma (HND) Engineering students of the polytechnics in Nigeria. The objective of the research was to examine thematic progression and the organizational characteristics of the project reports of the Higher National Diploma Engineering students of polytechnics in Northan Nigeria. Danes (1974) theory of thematic progression was used to analyse the organization of information in the texts of the corpus. The result indicated that texts analysed in the study exhibited simpler linear progression and constant theme progression. Both linear and constant theme progression are good features of scientific texts and hence the result of the study emerged with lacks. Scientific communication gives systematic attention to both functional as well as structural aspect of language, thus combining the two into a more fully communicative view. Littlewood observes that these two aspects of language must be present in a piece of writing to proof the writer's linguistic competence that enables him/her to produce new sentences that match the meanings the writer needs to express(01). This goes to explain the fact that the structural view of a language has not been superseded by the functional view. However, it is not sufficient on its own to account for how language is used as a means o communication.

Emmanuel Ekeh carried out a study on the content of the English programme offered in institutions of Technology in Imo state of Nigeria in 1984. The objectives of the study was to find out the communicative effect of the general English course offered in the department of General Studies to technological students. Three technological institutions were used for the study and they include the Federal University of Technology (FUTO), the College of Technology (COTECH) Owerri, now Federal Polytechnic Nekede, Owerri and the then Imo

state College of Agriculture Umuagwo, now Imo State Polytechnic, Umuagwo. Two hundred students were used as subject of the study while the simple percentage was used to analyze the data gathered from questionnaires. Result of the findings revealed that the respondents agreed on the relevance of the general English course to students of technological background but expressed doubt on the possibility of the general English courses assisting students to communicate outside the school environment. In the words of Ekeh,

it is known that the English learnt under the general education does not form a very strong or broad background for the learning of language designed for an aspect of specialized education (67).

He concluded with a recommendation for a content review of the English programme offered in these institutions. Implicit from Ekeh's conclusion is that the present language programme has no utilitarian value hence it does not assist the beneficiaries to operate functionally outside the school shores. Ekeh's argument had earlier been confirmed by Okunnuga who argued that there are quite a number of science and technology students,

whose command of the English as a language of communication is out of phrase with the scientific/technological ideas they possess (267).

Science and technology students need not just English language. They need not general English per se; they need English that is specific. This is the English language that will assist them process their scientific and technological ideas through communication.

Outside the shores of the African continent, a study carried out by the America Society of Engineering Education (ASEE) to determine which academic subject needed for engineering career in industry voted in favour of communication skills. The study which adopted a survey approach collected responses from 4,057 engineers with

several years of on the job experience. The result revealed that communication skills which include technical writing, public speaking, working with individuals, working with groups and talking with people came topmost out of the nine (9) categories listed in the study. This study demonstrate the importance of technical communication and the clamour in favour of technical communication skills. Communication has been described as “a critical tool for success”(02) in organizations and in real world environments. This importance has been noted by a number of scientists and technologists. Raney observes that organizations in present day societies are composed of internal units including engineering unit. He observes that these units work in concert to succeed and, or manage whatever crises in the organization and this is done through communication. This researcher agrees with Raney and observes that such communication must be truly meaningful by being specific.

A similar study by Gilbert in 1975 produced an even stronger emphasis on communication skills. The study showed that 245 distinguished and younger engineers going for a promotion interview identified writing skills as critical and important to success in life. There is no doubt about the truth of this assertion because the frequency and amount of time spent on communication in organizations make it necessary for one to have a repertoire of communication skills in order to function effectively in an organizational set-up. The frequency and time spent on communication tasks in organizations vary from job to job. However, the average distributions of communication tasks have been verified by Gilbert (03). As he would have it;

a junior engineer spends about 20% of the time writing and 20% talking for a total of 40%. This percentage increases approximately to 77% for a chief executive mostly in the verbal medium (05).

This figure on communication time is supported by a recent study carried out by the University of Wisconsin College of Engineering which discovered that 75% of engineering undergraduates who take up jobs in industries spend 25% of their time in reporting processes (communication). The study further revealed that as an engineer moves up the managerial ladder, the communication time increases as much as 80%. The implication of this finding is that if such technical employer can make such time-consuming activities more efficient, both the employee and the establishment will be served more effectively and successfully. The empirical studies so far presented suggest that technical communication by technical students and workers is highly necessary. Ironically enough, most scientists, engineers and technicians are ill-equipped for the communication tasks because they fail to appreciate the truth of this statement. This is attested by a study conducted by Kimel and Monsees in 1975 of civil, electrical and mechanical engineers. The study while showing the extreme importance of communication skills for technical people also stresses the inadequate preparation of most engineers for the communication tasks before them.

The result of this study for civil engineering ranks writing and speaking as the most important area of competence in civil engineering practice, but ranks two-third (2/3) of recent graduates inferior in this area. In like manner, the result of electrical and mechanical engineering ranks writing and speaking as the first and second most important areas in electrical and mechanical engineering practices respectively, but ranks about half of the current graduates deficient in communication skills. This abysmal lack of communication skills as observed in the citations above is plainly stated by the Industrial Advisory Board of the University of Tulsa thus;

engineers cannot communicate...cannot spell,
cannot make a sketch... have difficulties in all phases of
communication with others (04).

Indeed, our technological students need more ability now than ever to communicate. They need therefore, to be well grounded in communication both in speech and graphics; as opposed to aspects of language and communication alone.

A cursory look at the empirical studies above reveals undue emphasis on English language study. However, a situation where students use the English language to pass exams but find it difficult to use it actualise their professional goals in the wider world of work shows that their communicative needs are in question. This explains the lacuna which this study intends to fill. It has been observed that a number of ESP related literature encountered by this researcher in empirical studies have concentrated on aspects of language and communication such as syntax and cohesion, style, semantics, grammar etc. The researcher is not aware of any work done specifically on communication needs as it applies to the polytechnic sector. In addition, the researcher is unaware of any work done on language, communication and professional practices of polytechnic products other than being proficient in the English language. It is the need for which polytechnic students study English that differentiates this work from similar works encountered in the empirical studies. This researcher therefore seeks for authorization, based on the gaps stated above to go on with the study.

2.3 Summary

This review of relevant scholarship started by examining the conceptual framework of the study. In this regard, the concepts of communication and language were examined and the relationship between language and communication addressed. This was followed by a discussion on communicative language study as the whole essence of the existence of any language is for communication. Considering the fact

that language needs of individuals may not necessarily be the same, an attempt was made to review the topic on Needs Analysis as recommended in English for Specific Purposes (ESP). English for Science and Technology (EST) was also reviewed considering its dual role as Academic and occupational use of language. Finally, the various strategies for effective communication of technological students were reviewed before rounding off the chapter with empirical studies of past researches on related topics.

CHAPTER THREE

THEORETICAL FRAMEWORK AND METHODOLOGY

3.1 Theoretical Framework

The framework of this research is fundamentally based on Genre Analysis Theory (GAT), with emphasis on Critical Genre Analysis (CGA) and Theory of Contextualisation. These are forms of content and language integrated learning theory which linguists believe enhance the acquisition of language, and hinders not the acquisition of contents. (<https://www.researchgate.net/publication/267631524>).

3.1.1 Critical Genre Analysis

Genre Analysis gives rise to Critical Genre Analysis. Vijay K. Bhatia initiated this theory (G.A.) which draws its inspiration from applied sociolinguistics, which has primarily been concerned with analysis of language use in real life contexts (14). To use this framework in the analysis of data, the researcher collected samples of graduating students' SIWES and project works and grouped them appropriately according type and style. This is to determine the extent to which the communicative needs of polytechnic students have been met. Based on the quality and quantity of communication lacks identified, the researcher drew conclusion on the extent as above average, average or below average. As the offshoot of G.A, Critical Genre Analysis (CGA) studies genre to describe and explain language use as well as account for professional practices in an attempt to investigate why and how professionals create, disseminate and consume specialized knowledge and exploit available semiotic resources (underlining, mine) and modes of communication to achieve their professional goals (14). CGA in exploiting available semiotic resources, “understands,

explains and accounts for the kinds of professional practices in which specialized users of language are engaged in their everyday professional life”(14). The notion of critical in CGA comes from the second perception of critical theory: this “denotes a rigorous intellectual analysis...which aims to demystify, understand, explain, and account for the kinds of professional practices in which we are engaged in our everyday life”(11). Bhatia explains that critical theory encourages a framework that allows rigor and depth in investigation...and attributes equal...importance to practice in addition to the semiotic means (underline, mine) that are often employed. It is in this sense that the researcher use the term critical in Critical Genre Analysis.

The communicative needs of students of polytechnics are encapsulated in the semiotic resources or semiotic means of professionals. A rigorous analysis of the writings of students and lecturers (respondents) would be carried out to investigate the extent students rightly or wrongly make use of the semiotic resources of English in their professional writing.

The levels of language use together with their inherent aspects to be investigated are writing skill, speaking skill, reading skill and listening skill. These frameworks upon which competence of students rests were in line with critical theory which encourages a framework that allows rigour and depth investigation.

3.1.2 Theory of Contextualization

This is also a sub-theory of Genre Analysis. Its author/theorist is Vijay K. Bhatia. According to Bhatia (2004), “the notion of context in discourse analysis has led to analysis of the real world of discourse, in particular the analysis of the world of professions”(15). David Crystal (103) explains contexts as ”a general term in linguistics and phonetics used to refer to specific parts of an utterance (or text) near or

adjacent to a unit which is focus of attention. The occurrences of a unit (e.g a sound, word) is partly or wholly determined by its context, which is specified in terms of the units relations, i.e the other features with which it combines as a sequence”. He further says that the everyday sense of the term is related to this, as when one puts a word in context (contextualizes), in order to clarify the meaning intended, as in dictionary entries. Providing a context in this way is referred to as contextualization. Words, it is suggested, have meaning only when seen in context, Crystal explains. Real world of discourse is understood and/or skillfully communicated by the meanings of words in context i.e contextualization.

The communicative performances of the respondents are therefore investigated to ascertain how they were able to exploit correctly the resources of language (words) to express their private organizational intentions within the constructs of professionally shared communicative purposes Bhatia(16).

3.2 Methodology

This section consisted of sub-headings such as research design, population of the study and method of data analysis. The study adopted a combination of quantitative and qualitative approaches. The data collected in the analysis of findings were processed quantitatively while the last open question of the questionnaire was processed qualitatively. Using the quantitative approach, figures were generated from the instruments of questionnaire and interview. On the other hand, aspects of content analytical technique represented the qualitative method in the study.

3.2.1 Research Design

The research design is descriptive survey which uses questionnaire, interview, observation and textual analysis to elicit information from respondents and investigate what lecturers and students think about the communicative needs in English for students of Science and Technology. The choice of survey research design was to be able to make comparisons and evaluation of the existing conditions as well as to be able to collect possible factual information on the study.

3.2.2 Population of the Study

The population of this work is represented by the Higher National Diploma (HND II) final year students of Akanu Ibiam Federal Polytechnic Unwana. The research sample of 150 students and 20 lecturers is represented by those in Science and Engineering disciplines who offered the Use of English and Communication Courses. The range of a sample for the research examination is not stipulated here as the notions of small or big sample are considered relative. The researcher however, is not unaware that statisticians consider a big sample with more than 30 items and that the bigger the sample, the more it draws near to the population. To eliminate bias in the study, the systematic random technique in which every member of the study group is given equal chance of being selected was adopted. Based on the result obtained from the sampled population, inferences were made.

3.2.3 Method of Data Analysis

The research made use of the instruments of questionnaires and textual analysis rather than hypothesis. Therefore the study employed the choice of descriptive statistical analysis as tool. This is accompanied with tables and graphic representations where necessary. On the other hand, samples of written texts were subjected to

qualitative form of textual analysis. Qualitative analysis uses descriptions or distinction based on some quality rather than on some quantity.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS OF FINDINGS

The data presented in this chapter were drawn from two major sources. They are the students' written works and four research questions. These were supplemented by the result yielded from the questionnaire and interview sessions which were carried out to determine the extent to which polytechnic students' communicative needs in English have been met in Akanu Ibiam Federal Polytechnic, Unwana. To ascertain the extent of the facts above, a number of questionnaire items were drawn from the four language skills of listening, speaking, reading and writing as applicable to science and technology students. All the one hundred and fifty students (150) who responded to the questionnaire unanimously affirmed that the language skills are of paramount importance to science and technology students' needs but disagreed on the difficulty level which they encounter in performing each task. The lecturers in an interview equally agreed on the importance of the language skills which they asserted had helped to achieve the communicative language needs of the students. Result from the textual analysis however indicated the opposite, as reflected in the successive tables.

Listening Skill

4.1 TABLE 1(A): IMPORTANCE OF PERFORMING EACH TASK COMPETENTLY IN ENGLISH.

Listening skills	Important	%	Not important	%
Listening to lectures	150	100	0	0
In seminars	150	100	0	0
To instructions	150	100	0	0
To lab. Demonstration	150	100	0	0

To educational programmes	150	100	0	0
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The presentation on table 1(a) shows that all the 150 respondents agreed on the importance of listening skill to science and technology students. This is confirmed by the 100% recorded in each of the types of listening on table 1(a).

This acceptance of the importance of listening skill affirms Critical Genre Analysis postulate on its “concern with language use in real life contexts” as well as contextualization theory which specifies that units (sound, word) relate when they “combine as sequences”.

TABLE 1 (B): NO OF STUDENTS WITH PROBLEMS OF PERFORMANCE IN LISTENING

Listening skills	No.	%	No.	%
Listening to lectures	50	33.3	100	66.7
In seminars	70	47	80	53
To instructions	50	33.3	100	66.7
To lab. Demonstration	100	66.7	50	33.3
To educational programmes	95	63	55	37

However, the story was different in table 1(b) regarding the problem students encounter in performing each of the listening tasks where listening to laboratory demonstrations and educational programmes happen to be their greatest listening problems. Ironically, students of science and technology require a lot of listening to instruction and laboratory demonstration as communication needs. Listening is the first language skill needed in communication and has been described as a less complex skill to speaking, reading and writing. If science and technology students cannot listen in this regard, it becomes doubtful how they hope to graduate to other higher complex skills.

This problem of listening negates CGA’s statement that is saddled with investigating how professionals “exploit available semiotic resources and modes of communication to achieve their professional goals”. So, the problem of listening by polytechnic students, shows that they fail to understand semiotic resources (words, morphemes, phrases, clauses, sentences) which are the dresses of the ideas being conveyed.

In listening to laboratory demonstrations, 50 respondents representing 33.3% scored the pass mark of 40% and above, against 100 students or 66.7% who scored less than the pass mark. This is an indication that students’ communicative need in listening is in question.

TABLE 2 (A) SPEAKING SKILL

	Important	%	Not important	%
Asking questions in class	150	100	0	00
Answering questions	150	100	0	00
Engaging group discussions	150	100	0	00
Addressing class	150	100	0	00
Discussing academic problem	120	80	30	20

Table 2(a) shows that the respondents affirmed that speaking skill is equally of importance in the communicative needs of students of science and technology. This assertion was represented by the score of 100% recorded in four of the five speaking types assessed. The only aspect of speaking skill that recorded a negative score of 30 (20%) was discussing academic problems.

TABLE 2(B): STUDENTS WITH PROBLEMS OF SPEAKING

	No.	%	No.	%
Asking questions in class	30	20	120	80
Answering questions	50	33.3	100	66.7
Engaging group discussions	135	90	15	10
Addressing class	100	66.7	50	33.3
Discussing academic problem	146	97.4	04	2.6

In table 2(b), it was discovered that the highest percent of problem of performance were recorded in engaging in group discussion with 135 respondents or 90% and discussing academic problems where 146 respondents or 97.4% did not reach the pass mark of 40%. Discussion of any nature is sine qua non to science and technology because technologists and scientists attend conferences, workshop and symposia on regular bases. Where students are found deficient in discussion of any nature indicates that their communicative needs through speaking is not encouraging as it portrays communication lacks

TABLE 3 (A) READING SKILL

	Important	%	Not important	%
Reading textbooks	150	100	00	00
Journals	80	53	70	47
Newspaper/magazines	120	80	30	20
Literary works	37	24.7	113	75.3

Workbook instruction	150	100	00	00
Handouts	120	80	30	20
Laboratory manuals	150	100	00	00
Areas of concentration	150	100	00	00
Specifically for assignment	150	100	00	00

In table 3(a), 9 reading types were assessed and the respondents affirmed that they were all important except reading literary works where 113 respondents or 75.3% believed otherwise.

TABLE 3 (B): STUDENTS WITH PROBLEMS OF READING

	No.	%	No.	%
Reading textbooks	0	00	150	100
Journals	130	86.6	20	13.04
Newspaper/magazines	0	00	150	100
Literary works	135	90	15	10
Workbook instruction	05	03.4	145	96.6
Handouts	10	06.6	140	93.4
Laboratory manuals	0	00	150	100
Areas of concentration	7	04.7	143	95.3
Specifically for assignment	3	02	147	98

Table 3(b) showed that reading journals and literary works were the problematic areas of reading encountered by science and technology students. These were represented by a high number of 130 respondents (86.6%) for journals and 135 or

90% for literary works. Both journals and literary work are necessary requirements in science and technology. Reading of scientific journals helps to uplift the frontiers of knowledge, while scientific genres help in analyzing the semiotic resources used in professional genres, as well as assist technologists understand and clarify professional practices in the field of science and technology.

TABLE 4 (A) WRITING SKILL

	Important	%	Not important	%
Writing report of experiments	150	100	0	00
Workbook exercise	150	100	0	00
Term paper	133	89	17	11
Essays/letters	150	100	0	00
Answering exam questions	150	100	0	00
Notes in class	150	100	0	00
Notes from text	150	100	0	00
Dictation notes	100	66.7	50	33.3
Summary	101	67	49	33

TABLE 4 (B) STUDENTS WITH PROBLEMS OF WRITING

	No.	%	No.	%
Writing reports of experiments	06	04	144	96
Workbook exercise	11	07	139	93
Term paper	50	33	100	67
Essays/letters	32	21	118	79
Answering exam questions	05	03	145	96.7

Notes in class	10	07	140	93
Notes from text	13	09	137	91
Dictation notes	50	33.3	100	66.7
Summary	82	55	68	45

Key:

0-39 - Poor performance
40 and above - Average and above

All the respondents also confirmed that writing skill is equally of importance in the communicative needs of science and technology as shown in table 4(a). The few number of respondents who opined otherwise were insignificant. On the difficulty level of writing, it was discovered that the students encountered no difficulty in writing as all the respondents scored a pass mark of 40% and above. This finding invariably contradicts reports from industries that students of science and technology can hardly apply their knowledge from school, in the wider world of work (Agwu, 04). This equally confirmed that the communicative need of students of science and technology has no issue with writing problem.

The respondents, as noticed in their responses about listening, speaking, reading and writing skills, show overt acceptance of the relevance of these skills to their professions. This tacit acceptance confirms CGA postulate that “equal importance to practice in addition to the semiotic means that are often employed” should be rigorously encouraged. This overwhelming agreement to these skills, in spite of the individual differences in approaching the inherent aspects as noted in ‘B’ tables, depicts that these skills are indispensable in their public, professions or private entrepreneurial engagements. The respondents’ stance also confirm the theory of contextualization which says that “words have meaning only when seen in context”.

The tools for these skills are words, and words capture ideas spoken, read or written as they are sequentially arranged.

TABLE 5A – 5E: ADEQUACY OF THE PRESENT ENGLISH LANGUAGE COURSES VIS-À-VIS COMMUNICATIVE NEEDS OF SCIENCE AND TECHNOLOGY.

	Adq	%	indq	%
(a) State your view on the English language courses as applicable to your course	150	100	00	0
(b) State your view on the teaching arrangement by your school/institution	32	20	128	80
(c) State your view on the lecture method used by your lecturers	97	65	53	35
(d) State your view on the effect of the present practice on your academic work in school	113	75.3	37	24.7
(e) State your view on the effect of the present practice on your professional practices	147	98	03	02

Key:

0-39% =inadequate

40% & above = Adequate

From table 5(a) above, we accept that the language courses are adequate to meet the students' communicative needs. This is because of the 100% score recorded in that table. However, it was discovered in 5(b) that the teaching arrangements of the English courses were not adequate to meet the students' communicative needs. This is confirmed by a score of 20% for, and 80% against the adequacy of the teaching arrangements. Finally, table 5(c), 5(d) and 5(e) affirmed that the lecturers' methods were adequate, the present practice on students' academic work was adequate as well as the present practice on students professional practices. This is confirmed by pass marks of 65%, 75.3% and 98% respectively recorded against the three questions.

Again, the respondents accepted the adequacy of the English language courses meeting their communicative needs. This response proves CGA theory which encourages the “exploitation of available semiotic resources and modes of communication to achieve their professional goals”. The semiotic resources taught, their effects on respondents’ academic work and their expected effect on the professional practices of the respondents are clearly enunciated in curricular and spelt out in the course outlines. Also, the semiotic resources are context based, and therefore exemplifying English for Specific Purposes.

TABLE 6: MODIFICATION/CHANGE OF THE PRESENT LANGUAGE COURSES

	Adq	%	Indq	%
(a) Would you assent to a modification of the present English courses?	111	74	31	26
(b) Do you want the English courses dropped in your programme?	141	94	9	6
(c) Give your reason by making a free comment				

Table 6(a) showed that 111 respondents (74%) did not want the present English courses modified while 31 (26%) would want change as for now. Table 6(b) indicates that 9 respondents, representing 06% wanted the present English courses dropped from the curricula of their programme, 141 others representing 94% would want to continue with the present language programme, implying that their communicative language needs were being met by the present language courses.

From the free comments made by the respondents in Table 6(c) it was gathered that the respondents recognised the indispensable role of communication in science and technology. However, they were of the view that the issues of grammar, syntax, phonology and other linguistic terms used in English courses make the study of language of communication too abstract for science and technology students to comprehend. The unmistakable message here is the need to focus attention on the ways in which language is actually used in real communication and hence the emphasis on communicative rather than linguistic competence which is implied in the theoretical frame of this study.

This emphasis on communicative competence confirms CGA position about the necessity of understanding, explaining and accounting for the kinds of professional practices in which specialist users of language are engaged in their everyday professional life. They accept the adequacy of the English courses, they do not want them dropped, as those aspects of English are veritable in their professional communicative purposes.

4.2 DATA FROM STAFF ORAL INTERVIEW

The researcher's interview with a randomly selected number of Academic staff revealed as follows:

Table 7.

(a) Do Science and technology students really need English language as a course?	Response	N=20	%
		Affirmative	17
	Negative	03	15
(b) Are the present English courses adequate to make them succeed in school?			
	Affirmative	2	60
	Negative	08	40
(c) Do you see the present English courses adequate enough to enable them to function as technologists upon graduation?			
	Affirmative	12	60
	Negative	08	40

(d) Would you advocate that English courses be taught these students by their departmental lecturers or the present English language lecturers?			
	Affirmative English lecturers	11	55
	Negative Departmental lecturers	09	45
(e) Do the present lecturers of English have what it takes to teach English in a non-conventional institution like polytechnic?			
	Affirmative	13	65
	Negative	07	35
(f) Would you recommend alternative communication courses for students of science and technology?			
	Affirmative	12	60
	Negative	08	40
(g) Have you ever taught an English Language or related language communication course in this institution?			
	Affirmative	05	25
	Negative	15	75
h. Please give your reason on 'f' above. Responses include:			
i. Language-needs of students vary, so language courses taught them should not be the same.		05	25
ii. Language is dynamic just like the society hence the communicative needs of yester-years cannot be the same now.		09	55
iii. Science and technology students do not need the technicalities of English; they need the language they required to produce and market their technology (it could be foreign or local language).		03	15
iv. Not applicable		03	15

From table 7 (a) -7 (b) above, it could be summarized that:

(a) Science and technology students require English as a course (85%)

(b) The present English courses are adequate to make them succeed in school (60%)

- (c) The present English courses are adequate to make them function as technologists upon graduation (60%)
- (d) English and related communication courses should be taught by lecturers who studied English (55%).
- (e) The present lecturers who teach the courses have what it takes to teach communication courses in a non-conventional institutions like polytechnics (65%).
- (f) Alternative language courses different from the present general English be upheld for students of science and technology (60%)
- (g) Out of the 20 academic staff who responded to the staff questionnaire, 5 (25%) are teachers of English while 15 (75%) are lecturers in science and Engineering departments.
- (h). The various reasons given for an alternative courses for students of science and technology are contained in (h)i-iv

The oral responses of staff overwhelmingly affirms the adequacy of the semiotic resources of English as presently taught. This conspicuous affirmative responses shows that language use, according to CGA, portrays real life situation to account for professional practices. Their response equally affirms contextualization theory which says that putting words in context is “to clarify the meaning intended”. These respondents therefore know that students would be competently prepared, after receiving courses in English, linearly, by placing words in their contexts to put across intended meaning.

4.3 DATA FROM STUDENTS WRITTEN WORKS

This section of data presentation seeks to assess the students' written works using the research questions in section 1.6 of chapter one. This is to achieve the purpose of the study specified in 1.3 of chapter one. The sources of data items used for this exercise were the S.I.W.E.S and project reports of the students. The texts were grouped in the categories of A-F to reflect each particular discipline thus:

A = Electrical/Electronic Engineering Technology

B = Mechanical Engineering Technology

C = Civil Engineering Technology

D = Science Laboratory Technology

E = Statistics

F = Agricultural Science Technology

The findings were grouped in two categories drawn from A (projects) and B (SIWES Reports). Example: AA indicates project from Electrical Electronics Engineering Technology while BB indicates S.I.W.E.S report from Mechanical Engineering Technology. Samples from the students written works are contained in appendices 2 – 4.

Research Question One:

To what extent has the communicative needs of polytechnic students been met?

Research question one sought to find out the extent to which the communicative needs of polytechnic students of A.I.F.P.U has been met. This is based on the premise that language is the instrument with which technological students use to

create, express, interpret and transmit the technology of their respective fields.

Discoveries made in this regard include:

4.3.1 Faulty Sentence Expression (Structure, Function, Style)

The underlined showed the location of a problem in the sentence.

A A (p.9) Because the alternating current is letting the magnet, many times per second, the charge of the magnet back and forth rapidly causing it to push the voice coils up and down like a piston.

This is an incomplete sentence that failed to communicate. Moreover, the context in which “Because” is used to begin the sentence is ungrammatical.

FA (p.10) for broiler, you feed day old chicks with starter for 4 weeks.

Scientific writing does not welcome expressions in the active voice in this context. A better alternative is...for broiler, the day-old chicks are fed with starter for four weeks.

AB (p.38). The following were the component used to construct the compressor driver unit, compressor motor, air pressure reservoir, relay and transmitter.

Components of a compressor is acceptable but not “component used to...”. A better alternative to “component” will be “materials”. Moreover, the verb “were” should be “are” since the writer is not making a reported speech.

EB (p.23). The compilation by the trained officials from INEC and the input data provided by Nigerian that are 18 years and above.

This expression is hanging, as it cannot be called a complete sentence.

4.3.2 Grammar Error

The underlined indicate wrong or imperfect grammar.

C.B (i)...Nigeria's transportation infrastructure is in insufficient to meet...

The underlined word "in" is redundant and hence, an imperfect grammar.

C.B (p.3) Railway transportation offers much potential because of its relative safety, reliability, lower cost to the users and being capable of...

This expression is marred by grammar errors. A better alternative will be "Railway transportation offers potentials to the users because of its"...

Other discoveries as regards how the languages courses taught the science and technology students meet their communicative needs are presented below:

A.B (p.14) soldering is a process in which two or more metals are joined together by melting a filler melt having a lower melting point in than the work piece.

A.B (p.4) In soldering the power rating of a soldering from Λ determined the kind of soldering you want.

***E.B** (p.47) (Spelling). The author also dim it necessary to design and implement a system that will restore losses and brings about accuracy and efficiency in INEC^ Afikpo South^ Ebonyi State and other areas or state ^ of the federation.*

E.B (p.16) - GOE explained what is called TAXNONY OF QUEUING MODELS" ^by this it means that the general framework that described waiting line models is generation.

BB (P1) Workshop can be described as any sectors were engineering outfit is carried out to enable an engineer carry out some engineering operation, which.....This signs and regulations is of immersed important because with this signs a message is conveyed to you and prompt actions are taken. Some of the signs include ;

Red.....Danger

Yellow.....Faulty (machine)

Blue.....Save

Grammatical/structural expressions were marred by errors of number (singular-plural), (*this signs* for *these signs*), errors of omission of letters in block expressions, errors of concord (*Nigerian that are...for Nigerians that are....,Signs and regulations is for signs are regulations are....,*) errors of combination of preposition and participle (*from? determined... for from metal is determined*). Also, noticeable in the writings of the students are mechanical errors (*sign include; for sign include*), morphological (spelling) errors e.g (*dim for deem, taxnomy for taxonomy; were For where....., immersed important for immense importance*): unwanted initializism/abbreviation (INEC for I.N.E.C), comma omissions as indicated in carets. There are also the problem of coherence as in (*Red.....Danger, for Red implies Danger, Yellow.....Faulty For Yellow means faulty and Blue.....Save For Blue equal to safe*)

It is evident upon going through these samples that many students lack the requisite skill of writing to put across their communicative purposes. Any genres of writing require that semiotic means of writing them are competently used to make the piece of writing understandable, explainable to account for the professional

knowledge, infuse clear and exact meaning according to CGA. It is evident also that the ignorance manifested in the use of structures and mechanics of writing contradicts contextualization theory which requires that the intended meaning of words are determine by placing words or sound properly in context.

Research Question Two

How would the language use of polytechnic students be described?

To give appropriate description to the language use of polytechnic students, the researcher carried out an error analysis of errors of usage identified in the written works of polytechnic students thus:

Table Showing Usage Errors in Students' Written Works.

SOURCE OF DATA	DATA COUNT	ERROR FREE OF USAGE	1-5 ERRORS	6-10 ERRORS	ABOVE 10 ERRORS
S.I.W.E.S	10	09	01	-	-
PROJECT	10	10	-	-	-
TOTAL	20	29	01	-	-

Subsequently, an analysis of the N. B. T .E course curricula where the course contents of polytechnic students are specified was carried out. This was to ascertain whether the errors were caused by inadequate or wrong course contents of what the students are taught.

Table Showing the Course Contents of Polytechnic Students As Approved By the N.B.T.E.

FIRST SEMESTER HND I.

S/N	Topic	Group
1	Sentence types & parts	A – F & Bus
2	Tenses, types & usage	A – F & Bus
3	Concord, types & usage	A – F & Bus
4	Logic, logical thinking, principles of logic (facts & opinion) deductive & inductive reasoning, premise & conclusion	
5	Essay, types, characteristics	A – F & Bus
6	Logical orders of presentation	A – F & Bus
7	Literature: meaning, terminology of poetry, analyzing a poem	
Second semester HND 1		Business school
1	Written communication principles of letter writing, components of a business letter, memo & presentation techniques of portfolio of correspondence	Business school
2	Comprehension & how to trace the logic in a given passage	Business school
3	Project report characteristics	A – F & Bus
4	Parts, format & style of project, secondary & tertiary sources.	A – F & Bus
5.	Data gathering technique: primary, secondary and	A – F & Bus

	tertiary sources	
6	Citation and documentation styles	A – F & Bus
7	Procedure for writing a project report	A – F & Bus
8	Outlining a project report using appropriate numbering, ranking and phrasing	
First Semester HND II		
1.	Theory and practice of communication, Definition of communication, Explain communication theories, Analyze communication process and Explain different methods of communication	Business only
2.	Organizational communication/Directors of communication flow	Business only
3	Classify communication variables by content, source, channel, receiver, message and effect	Business only
4	Analyzing critically, the barriers of effective communication	Business only
5	Verbal and non-verbal communication	Business only
6	Impact of environmental, power status and role variables on communication	Business only
7	Procedures for communication in debates, meeting, seminars and conferences	
Second semester HND II		
1.	Literary Genres	Business only
2.	Literary Essay: Explicating a Novel, Short Poem. Receiving a Novel or play and criticizing a	

	Television/Radio drama.	
3.	Oral presentations, oral composition speed making and delivery techniques	
4.	Language style of the media, Radio Broad cast for classroom presentation	
5.	Techniques of debating	
6.	Acting plays, reciting poems and reading short stories	

The table above shows that the same English language courses are taught science and technology students as well as school of business studies by the Department of General Studies in the First Semester of HND I. The English language course contents for the students are the same as all the schools and departments receive certificates of polytechnics. English for Science and Technology though expected to embrace all the technical jargons of the discipline surely obeys the structures, the unit, the groups and the system of the language. This obedience to the operations of the language system makes professionals to be at home with their colleagues as well as the lay people. The course contents outlined from assessing the English language courses attest to the CGA theory that requires investigating the communicative performances of respondents to ascertain how they were able “to express their private organizational intentions within the constructs of professionally shared communicative purposes”. It also substantiates that respondents and students are expected to possess requisite semiotic resources at their disposal, according to CGA, to enable them to communicate effectively “to achieve their professional goals”.

Research Question Three

To what extent does Polytechnic students' skill in English language enable them verbalise their scientific/technological ideas?

In this section, the researcher used the information provided by the research data to answer the question on the extent to which polytechnic students' skills in the English language enable them verbalise their scientific/technological ideas.

The emphasis centered on the appropriate use of the English language to express technological/scientific terms. Technological terms are both various and varied. However, the researcher has concentrated on those which occurred in the data as will be shown in the presentations below.

4.3.3 Mechanical Accuracy/Technical Control

B.A (p.17) The mechanical properties of the assembly considered were as follows;

C.A (P.13) To hold xx ^

To change xX^

For easy XX ^

For XX pipelines

In the above "functions of Joints", every line ended without a punctuation. This is unconventional. The carets (^) indicate the omission of comma or semi-colons as the case may be.

Omission of Punctuation Marks

E.A (p.6) The long term cost of maintaining reliable and secure fuel supplies for future.

The absence of any punctuation in the above supposed sentence makes it fail to communicate.

Wrong use of capital letter/omission of comma

A. A (p.25) considering xx The relative absorbance and transmittance xx formulas.

Wrong use of abbreviations

E.A (p. 20) table shows XX in NNPC from (2001-2013)

C.A (p.12) xx types of pipe materials and PVC xx pipes

C.A (p.11) xx soft drink etc including xx.

In A.A (25) above “The” is wrongly started with capital a letter and hence it is not starting the sentence. In C.A (12) and C.A (11) the abbreviations were written without the necessary punctuations.

The presentations above indicate that errors of punctuation notations run through many students’ pieces of writing. The use of semicolon instead of colons, the use of commas instead of periods lace through many students’ writing. Many students would want removing certain English topic from their courses. Punctuation is one.

Punctuation in writing helps to draw out intended meanings, as contextualization theory emphasizes. The omission or badly use of punctuation marks distorts meanings and invariably sends a false signal to readers, as well as presenting the writer as careless and never-do-well.

Research Question 4

How does Polytechnic Students' mode of communication assist them in achieving their professional goals?

Research question four sought to find out how polytechnic students' style of communication make or mar them in achieving their professional goals. Reports from S.I.W.E.S assessors (Industry and Institution Based Supervisors), External Examiners, employers of labour in Industries and samples of students' written works are in concord that polytechnic students' mode of communication assist them to pass exams but mar them in their professional practices according to the following excerpts:

Engineers cannot communicate.....cannot spell, cannot make a sketch, have difficulties in all phases of communication with others.

- *Industrial Advisory Board of the University of Tulsa.*

The implication of the excerpts above is that the language which the engineers used to succeed in school has not been adequately utilized in the world of works. Else how come an engineer who passed through various stages and levels of schools before becoming an engineer cannot write and read. The message of the Industrial Advisory Board of this University is that the engineers language needs while in school were not taken into consideration in planning their communication language programme.

Students Industrial Work Experience scheme (S.I.W.E.S) is aimed at bridging the gap between theory and practice.

- *Engr. A.A Orjinta S.I.W.E.S*

Coordinator Akanu Ibiam Federal Polytechnic, Uwana.

The message from the coordinator is an affirmation that there is a difference between theory and practice.

This handbook is produced to be a guide to the students in the field, to check what they are doing against what they should do.

- *Ven. Dr. Ogonnia Ibe-Enwo*
Rector Akanu Ibiam Federal Polytechnic, Uwana

The message from the rector is an indication that there are quite a number of technologist/scientist who go to the field and misapply the plier.

4.4 Summary

In the preceding subsection of this chapter, an attempt has been made to answer research questions one to four by using examples from the data to show the extent to which science and technology students' communicative needs have been met using the medium of the English language. Language as a major instrument of communication plays a vital role in the lives of science and technology students. Therefore, it is important to ensure that while advocating for a specific language that will address their specific needs, such a language is not expected to deviate from the established linguistic rules of grammar, style, structure, technical control as is applicable in the field of science and technology.

CGA is concerned with the analysis of language use in real life context, and contextualization theory expatiates contexts as words having meaning only when seen with other words (contexts). These two theories were superimposed on the data presented and analyzed. Many of the data met the demands of the theories, but the expressions errors, the mechanics of writing, which form part and parcel of real language use and contributes to intended meanings of writing still challenge English for science and technology and students' professional communicative purposes.

4.5 PRESENTATION OF ANOVA DUMMY VARIABLES RESULTS

Dependent variables: SSTECHN

Method: Least squares

Sample (adjusted): 1-7

Include observation: 6 after adjustment

Table 1

Variable	Coefficient	Stu Error	t-statistics	Prob.
Text A	0.026549	0.003117	8.516848	0.070
Listening	-0.656338	0.088796	-7.391529	0.00
Reading	0.113862	0.098542	1.155473	0.00
Speaking	0.415289	0.096383	3.280732	0.00
Writing	0.554129	0.155224	3.569862	0.00
Oral interview	0.558348	0.079990	6.569862	0.050
C	3.706872	0.113845	32.56055	

R-square	0.534969	Mean dependent variable	4.793390
Adjusted R- square	0.523984	SID Dependent	0.83277
S.E. of Regression	0.575600	Akaike infocriteria	1.759648
Sum square	84.15421	Schwars criteria	1.855248
Log likelihood	-2226340	Hanna-Quinn	1.998076
F-Statistics	48.70008	Dulin-waston Stat	1.85336
Prof.(F-statistics)	0.000000		

4.5.1 Interpretation of Anova Dummy Variables

The ADV regression result was presented, analysed and discussed using dummy variables as a proxy for science and technology students' communicative

needs in English, while the data generated from questionnaire, oral interview and students' written works (project/SIWES) were used as explanatory variables. This is to find out the extent to which students' specific communicative needs have been influenced through the study of English language. The statistics test, i.e T-test, was carried out to evaluate the statistical significance of the individual parameter estimates. The R-square was used to measure the goodness of fit of the regression equation while the f-test was to evaluate the joint significance of all the parameters' estimates. In other words, the f-test evaluates the robustness of the regression equations.

The results showed that students' communicative needs through language more positively related to textual analysis of students' project and S.I.W.E.S than to oral and questionnaire responses. However, there seems to be no practical difference in the contextual analysis and other parameters used.

The coefficient of the dummy variables are to be interpreted as differential values from the reference category. Thus, the coefficient of the speaking and writing variables suggests that the communicative needs of the students were largely influenced by textual analysis of their writing skill.

The r^2 values of about 0.535 means that only 54 percent of the variation in the students' communicative needs are explained by the result of the textual analysis as regards speaking, reading and writing skills. This might seem a rather high value since the r^2 is greater than 0.05.

T-test

t-test evaluates the statistical significance of the individual parameters estimates. T-test proceeds as follows:

Null hypothesis: parameters estimates are not statistically significant

Test Statistics and decision rule;

The test statistics for the t-test is probability value of the 1-statistics $\text{prob}(t_a)$. At 5% level of significance, the null hypothesis is rejected if $\text{prob}(t_a) \leq 0.05$. From the result obtained, it could be noted that all the parameters (i.e explanatory variables $\text{prob}(t_a)$) are equal or less than 0.05; except the coefficient of textual analysis and oral interview which are greater than 0.05 are level of significance. Therefore, we conclude that textual analysis and oral interview have significant influence on the communicative needs of science and technology students of the institution.

F-test

f-test is employed to evaluate the joint significance of all the parameters' estimates. In other words, it evaluates the robustness of the regression equation.

Null hypothesis (H_0): $B_0 - B_1 \dots = B_6 = 0$:

The parameter estimates are not jointly statistically significant.

F-test statistics and decision rule

The F-test statistics of the probability value is f-statistics $\text{pro}(t_a)$. The decision rule is to reject the null hypothesis if $\text{prob}(t_a) \leq 0.05$. as shown in table1 of 4.4, the f-statistics is 48.7000 and $\text{pro}(t_a) = 0.0000$. In other words, $\text{prob}(t_a)$ is less than 0.05, thus, the null hypothesis is rejected and we conclude that estimated parameters of the communicative needs of students of science and technology using the English language are jointly significant. The statistical analysis of the communicative needs of students in the use of English is significant. Significant is just bare, i.e there is no modifier/qualifier/amplifier to tell the extent of significance. It is therefore likely that the word "significant" may mean the same as average. The word average suggests positive (realization) and negative (unrealization) of the needs. This shows that some of these needs as gleaned from the data tabulated were noticeable, while the deficiencies notable in their structural, mechanical and expressions take up the lacks of

the students. And so, the theories applied to determine their language use in real life and how their intended meanings of certain units show that some areas in the English language course need more touch

4.6 Summary of Presentation and Analysis

The data generated from questionnaire were based on the four language skills of listening, speaking, reading and writing. Data from oral interview were the responses of randomly selected Academic staff of Akanu Ibiam Federal Polytechnic, Unwana. Finally, data from written works were derived from S.I.W.E.S and projects of final year students of science and technology of the institution. This analysis which was initially presented manually using percentages was subsequently subjected to a higher statistical analysis using the Anova Dummy Variable as Proxy.

CHAPTER FIVE

DISCUSSION OF RESULT, RECOMMENDATIONS AND CONCLUSION

5.1 Discussion of Result

The purpose of this study was to ascertain the extent to which the communicative needs of students of Akanu Ibiam Federal Polytechnic have been met using the medium of English language. The communicative needs of a group of learners is met when they use language to communicate effectively in school and out of school. Granted that a number of studies have been carried out in the area of English studies since Nigeria joined the Anglophone countries, most of the researchers had concentrated on either language pedagogy or analysis of aspect of the English language. Very limited study has been conducted in the areas of English for Specific Purposes (ESP) generally and, English for Science and Technology (EST) for polytechnic students in particular. In this study, science and technology students of a non-conventional tertiary institution were investigated. Responses from one hundred and fifty (150) students, Twenty (20) Academic staff, twenty (20) final year students' project and SIWES report each provided the data used in answering the four Research Questions formulated for the study. The findings reveal as follows:

Research Question 1.

To what extent has the communicative needs of polytechnic students been met?

Based on data gathered from research question one, the answer to it appears to be below average. Students' projects and SIWES reports analyzed contained preponderance of communicative lacks arising from structural, functional and stylistic faulty sentence expressions, ambiguities as well as grammar and mechanical blemishes. This finding is in concord with the responses in the students

questionnaire where they agreed on the importance of the language skills in the communicative needs of science and technology students but complained of the difficulty they encounter in performance (see tables 1(a) - 4(b)). Perhaps the difficulty which the students encounter in performing these communication tasks is the reason a significant number of the lecturers recommended for an alternative communication courses for polytechnic students of science and technology as seen in 4.2 (f) on data from staff oral interviews.

Research Question 2.

To what extent is the language use of Polytechnic students' acceptable to the general public?

Data generated from research Question two showed that errors of usage were minimal as shown in students' written works. An error is a bridge of a linguistic code. S.I.W.E.S report examined showed that one was error free while nine others have error usages of between 1 – 5 which can be interpreted as below average. One has between 1 – 10 errors which is high. Similarly, 10 of the projects recorded usage errors of between 1 – 5 which is also insignificant and hence the appropriate description of the language use of this students is said to be average. From the Course Specifications of the National Board for Technical Education, the supervisory body of polytechnics in Nigeria, it was gathered that there was no difference between the language courses of science and technology students of the polytechnic being examined and those of other students of Business. This finding agreed with Questionnaire responses of the students where 74% of the respondents agreed to a modification of the present English language courses as against 26% that opined that the status quo be maintained.

It is interesting to note that this uniformity does not make polytechnic students to commit a bridge of the linguistic code even though it is the reason that prompted academic staff (60%) to opt for an alternative communication courses for students of science and technology in 4.2 (f). Therefore, with an improved English for Specific-based English courses for these calibre of students, the language used of polytechnics will improve beyond average

Research Question 3.

To what extent does polytechnic students' skill in English Language enable them verbalise their scientific/technological concepts?

Data generated from students' written works as regards appropriate use of scientific/technological jargons appeared to be in the negative. The nature and spread of poor technical use of jargons identified were 16 and 22 errors respectively for project and SIWES reports of the students' works examined. The result of this research finding may have been the reason for the high percentage of writing problem recorded in students' questionnaire under writing skill in table 4(b). Technical/scientific vocabulary is used by polytechnic students to incorporate the resources of technical communication into their various professional disciplines. Appropriate use of technical jargons in technical communication will provide students with language needed to communicate information in a specialized subject matter in line with the theory of Critical Genre Analysis (CGA) and contextualization. A cursory look at the presentations on 4.3 in respect of research question three showed that quite a number of samples looked as if the students were writing to a generalist audience. A significant number made use of language and presentations that are based on the writer's

imagination, emotion and exaggeration which are usually abhorred in scientific/technological writings. See appendices 2 – 4

Research Question 4.

To what extent does polytechnic students' mode of communication assist them in achieving their professional goal?

Data generated from research question four showed that students' mode of communication has not helped them to actualize their professional practices. The research data which were derived from their written works, comment from employers of labour in industries, as well as external examiners and institution based supervisors showed that polytechnic students can hardly translate what they learnt in theory into practice when they get to real world of work. Examples from industries abound of student technologists/scientists who cannot differentiate among letters, memos and circulars in writing. Quite a number apply the structure of writing a term paper learnt in school in writing a work seminar. Majority of others can hardly differentiate between a workshop and exhibition presentation while an insignificant number can hardly differentiate between a proposal in project report and proposal writing in industry and proposal to attract donor agencies. (See the comments in 4.3 on data from students written works in respect of research question 4). A technologist/scientist can easily mar his/her professional goal through faulty communication and this is responsible for cases of building collapse, administration of drug overdose which have sent many to their early graves as well as unsuccessful surgical operations by doctors in various hospital theatres which may daily headlines today. Though a significant number of the students followed the appropriate procedure in writing a project but the reverse was the case in SIWES where a significant number did not provide titles to their work. (See appendix on guidelines for writing S.I.W.E.S report) Similarly, all the

SIWES work examined recorded content lacks which were written out of context. Other areas of communication lacks different from the established linguistic rules include coherence, development, unity and paragraphing as shown in section 4.3.6.

Coherence is one of the features of effective communication. However, science and technology discourses occasional abhor coherence which is seen (though erroneously) as a contravention of conciseness in English for Science and Technology (EST). The same is applicable to discourse development, unity and paragraphing. Therefore, the aspect of communication of these students which can be said to differ from established linguistic rules is the style of communication in EST which is a combination of words, images, tone and types of sentences adopted by science and technological students in their written communication.

5.2 Recommendations

Results from this study confirmed some of the findings of earlier researchers on ESP. These include:

1. ESP is not a different English language per se. It is the same English language we use in general language study but tailored towards specific needs of the beneficiaries.
2. ESP is an umbrella concept that houses EST and other technical forms of communication
3. EST as an offshoot of ESP, enables the beneficiaries to achieve their communicative needs through language.

The researcher, therefore, recommends that linguists and literary artists in Language Departments in tertiary institutions should organize regular conferences and workshops aimed at using research findings on English for Specific Purposes (ESP) to

agree on all aspects of specific communication so as to produce standard books and dictionaries as guides to specific forms of English usage for students of different disciplines. This move will help to ensure that the communicative needs of students are taken into consideration in preparing the course contents of their respective language courses. The present practice of “Kite flying” (Nwoke 05) whereby English is taught to polytechnic students for no obvious reason makes the course content of the language courses taught in AIFPU broad and shallow as opposed to narrow but specific programmes of other tertiary institutions.

To reduce and completely eliminate the problem of using the English language to verbalize technological and scientific concepts, language lecturers of the nations polytechnics should be exposed to certificated short term studies in the discipline they handle. This is necessary because engineering as a discipline for example, is not as specific as civil, mechanical or electrical engineering. A number of technicalities have been found to exist in the same discipline as in B.A Hons (Ed) English and B.A (Hons) English or B.A (Hons) English language and B.A (Hons) English Literature. In the medical field for instance, the communicative needs of a medical doctor is specifically separated from that of a medical laboratory scientist, a midwife and a Nurse. Therefore, exposing Polytechnic language lecturers to short term courses will assist them to learn not only the vocabularies associated with their specific disciplines but also, the style, language and other acceptable diction (formal, informal, slang and colloquial) usages of the Specific discipline.

The National Board for Technical Education should take a step further to ensure that the curricula and syllabi of English courses taught in the nation’s polytechnics are specifically separated, reviewed and revised as is the case with some monotechnics, Colleges of Agriculture and schools of Nursing. In carrying out the

review, emphasis should be given to neglected aspects of technical and scientific communication in the present NBTE course curricula such as mechanical accuracy. This is necessary because a little comma can make a great semantic difference.

In addition, teachers of English in science and technological institution should endeavour to teach according to the established linguistic rules. Granted that EST is specific in style and diction, it still employs the grammar of English language with which it communicates specific meanings in specific purposes. To succeed in this regard the federal government should ensure that teachers of English language in the nation's technological institutions are encouraged and motivated like their counterparts in other disciplines. A situation where language lecturers in the nation's polytechnics cannot rise to the position of chief Executives of their institutions because they belong to a service department can hardly gladden or motivate language lecturers in the nation's polytechnics.

5.3 Conclusion

The researcher arrived at the following conclusions based on this research.

1. Science and technological students of the nation's polytechnics have difficulty in achieving their communicative needs.
2. The NBTE General studies course specification used in teaching Science and Engineering Students failed to recognize the specific needs of polytechnic students. This is responsible for the students inability to achieve their communicative needs through language.
3. The role of technical control in effective communication is yet to be recognized in the communication of polytechnic students. This is responsible for the students inability to use language to communicate specific needs.

4. There is no significant difference between the communication of polytechnic students and the established linguistic rules.

5.4 Suggestions for Further Research

The present study investigated the extent to which the communication of polytechnic students, using the medium of English, has helped to actualize the users needs. Similar studies of using English language to achieve the communicative needs of legal and medical professionals are suggested for further studies. This will provide appropriate materials for writing texts to be used in our institutional set ups.

Most of the research findings in EST are at present, several years old. Many of them concentrate on only aspect of EST such as thematic structures of projects, syntax and cohesion in science and technology discourse etc. Many see EST as English different from the Queen's variety. Thus suggestion for further research on English and Communication based on departments or professions will assist in building a framework for analysing learning needs as recommended by expert in ESP. (Hutchison & Waters, 62).

Finally, there is need for finding out the areas and method of communication in English which pose problems to science and Technology students so as to research and document them while proffering the best methods to get them addressed.

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Appendix 1:

Samples from

Students Projects

Appendix 2:

Samples from

Students' SIWES

Reports

Appendix 3:

Objectives and Guidelines

for writing Industrial

training reports

Appendix 4:

Reports from

Industries

Appendix 5:
English Language and
Communication Course
specifications for Nigerian
Polytechnics

Appendix 6:

Questionnaires