1.1 **The Status of English in Iraq**

The status of English in Iraq is that of a foreign language which has no internal communicative function. English is taught at both primary and secondary levels of education as a subject in itself. Iraqi students are instructed in English for eight years from fifth year of primary school till the last year of their high school. It is taught as a compulsory subject in schools with a minimum of six hours a week, and there is a feeling that students at different levels of the Iraqi educational system must know English because English is accepted as the language of science and technology and it is essential primarily in this domain. The specific uses of English in Iraq are confined to certain domains of specialization like medicine and engineering. At the university level, where English has to be absolutely purpose-oriented it is used in understanding spoken or written discourse in the various fields of specialization. Thus, English is either needed for doctors, chemists, pharmacists or for academic studies where students are required to read English journals and references, besides reading books in the library and listening to lectures delivered in English by foreign lecturers in their respective fields of specialization.

English Language Teaching (ELT) has become important in Iraq because it is believed that most of the scientific
literature is available in English and reading that is as important as reading textbooks in Arabic. Moreover, a candidate who applies for higher courses of study like, M.A., M.Sc., or Ph.D. has to pass a proficiency test in English conducted by the departments of English in the Iraqi universities. Besides, the process of Arabicisation of texts is accompanied by an emphasis on the role of English as a language of science and technology.

One of the aims of teaching English as a Foreign Language (EFL) in Iraq is to increase ease of contact with English language speakers outside the country. It is also necessary for the expansion of trade between Iraq and other countries. English also gives the Iraqi individual access to the culture of a group of people with whom he does not have daily contact. On the other hand, the motivation of Iraqi students for learning English may not be strong and the teacher may find it difficult to create motivation. In learning English as a foreign language, Iraqi students usually have very few opportunities to practice English outside the classroom and the overall progress through the structure of the language remains slow. Furthermore, when the number of hours devoted to its study is very low even practice may have to be dispensed with.

Unlike a second language situation, English in Iraq is not used in government, administration, politics, law and internal trade. In education, English is the medium of instruction only in higher education and particularly in some
fields of study like medicine and engineering. The use of English in Iraq does not symbolize prestige or elitism. English also is not used in general publication except for one daily newspaper, namely "The Baghdad Observer", and one journal "Gilgamesh", published specially for foreigners in Iraq. Moreover, on the Iraqi TV, there is only one daily programme in English which presents the news and some short duration entertaining programmes of miscellaneous nature. This contrasts with the situation in India where English continues to be a language both of power and prestige (Kachru: 1989: 8). One of the reasons for the teaching of English, particularly in the developing countries is that it affords a window on the world of economic growth, advanced technology and applied science (see Harrison: 1979: 56), and its importance as an international language continues to increase as more and more people require to learn English. Further, the growth of business and increased occupational mobility has resulted in a need for English as a common medium of communication in these countries.

Since we are concerned with English for biological sciences, we will make here some observations on scientific English. The language in which scientific facts are expressed is certainly not a different language from that of everyday life, but it presents the foreign student with a number of special problems. The most widely recognised is that of vocabulary. This problem is not as frightening as it looks. Many of the scientific words are fairly international and they usually have specialized meanings. More difficult
are the semi-scientific words which have a whole range of meanings and which are frequently used idiomatically e.g., force, load, matter, power and work. Again, we have the verbs, adjectives, and adverbs which are not specifically scientific but do belong to the phraseology of science.

However, scientific English should be presented not as a variety of English texts but as a textualization of a variety of discourse which is itself independent of any particular language expressive of universal culture which scientists acquire through education. The learner has some knowledge of the discourse which corresponds to his stage of learning in the area of science concerned, and he can use that knowledge as a base for learning the particular textualization of this discourse in English. The next section, therefore, will be devoted to EST/ESP definitions, types and development.

1.2 **ESP/EST Definitions, Types and Development:**

English has become the accepted international language of Science and Technology and this has created a new generation of learners who know specifically why they are learning English, e.g., students whose course of study includes textbooks and journals only available in English. The demand has been growing for English courses tailored to specific needs. The new studies shifted attention away from defining the formal features of language usage to discovering
the ways in which language is actually used in real communication.

Over recent years, ESP has emerged as a sub-division of the general activity of teaching English to speakers of other languages. ESP specialists are appointed to teach it; courses have been devised to impart the special mastery of its methodology; journals have been founded to promote its advancement; and publishers have produced separate lists of their offerings in the field. It has become an institution.

The reasons for the development of ESP have something to do with the changing pattern of requirements for English in the emerging third world. There has been a coincidence of two different kinds of movement. One created socio-economic changes which needed to be serviced by English language resources; the other seemed to provide a model of linguistic description which rendered the language particularly serviceable (see Widdowson: 1984:16).

The concept of ESP is still fairly new, although its practices may have existed for some time. Definitions of ESP are numerous, the concept being fluid enough to support a number of interpretations. For instance, "English for special purposes" is thought to suggest special languages; i.e. restricted languages, whereas "English for specific purposes" focuses attention on the purpose of the learner and refers to the whole range of language resources (Robinson: 1980: 5). Thus, by ESP is meant the teaching of English not as an end in itself but as an essential means to
a clearly identifiable goal (Mackay: 1963). However, it requires consideration of the following points:

a. **Course Duration:**
   The required level of linguistic competence normally has to be achieved in a minimum of stipulated time.

b. **Age Factor:**
   Since the learners are adults, the students of ESP are post-beginners. They have done a general English course at school and now, as young adults, wish to extend or adapt this competence to their particular field of work or study.

c. **Purpose:**
   The purpose for pursuing an ESP course can be expressed and tested. The teacher also should be aware of the purpose and not introduce non-pertinent material into the course.

1.2.1 **Definitions:**
   ESP is an important pedagogical system within the overall field of ELT. The nature of ESP rests on the ends to which English is put and the needs of the learner who experiences those needs. It always requires the appropriate selection of language content including not only lexical and grammatical items but also rhetorical and communicative capabilities, and sometimes requires the restriction of language skills to be learnt. ESP may be required for academic or occupational purposes. Moreover, every ESP group
of learners requires its own teaching materials and its own appropriate methodology. ESP, therefore, is based on an analysis of the learner’s needs.

Widdowson (1984: 201) defines ESP as an activity which is directed towards the provision of English for people who need the language as a means of achieving their occupational and academic purpose. Kennedy and Bolitho (1984: 3) state that "ESP has its basis in an investigation of the purposes of the learner and the set of communicative needs arising from those purposes". They also say that ESP has become a term available to any learner wanting to define his aims in coming to English in professional or discipline-based terms. Strevens (1980: 108-9) defines ESP as a pedagogical system that entails the provision of English language instruction in:

i) terms of the learner’s particular needs,

ii) themes and topics in designated occupations or areas of study,

iii) selective (i.e. ‘not general’) language content,

iv) particular language ‘skills’.

The most pertinent definition seems to be that of Hutchinson and Water (1987: 19) who state that "ESP is an approach to language teaching in which all decisions as to content and method are based on the learner’s reason for learning".

The study of ESP lies predominantly in the domain of the expanding EFL circle—learners are obliged to learn
English in order to use it in some immediate or future task or set of tasks (Alan Moller: 1985: 239). ESP has an important branch in English for Science and Technology (EST), though technology is not our concern here. The term EST pre-supposes a stock of vocabulary items, grammatical forms and functions which are common to the study of science and technology. It covers the areas of English written for academic and professional purposes and of English written for occupational (and vocational) purposes, including the often informally written discourse found in trade journals and scientific and technical materials written for the layman (Trimble: 1985: 6). Thus, it covers both occupational and educational uses; occupational when we are considering the needs of oil-field workers, engineers, computer programmes, etc.; educational when we consider school and university students around the world studying physics, chemistry, mathematics and engineering through the medium of English (Robinson: 1980: 8).

Following is a possible breakdown of EST/ESP fields:

<table>
<thead>
<tr>
<th>English for Academic Purposes</th>
<th>English for Occupational Purposes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EST Fields</strong></td>
<td><strong>EST Occupation</strong></td>
</tr>
<tr>
<td>Engineering</td>
<td>Engineering Technician</td>
</tr>
<tr>
<td>Medicine</td>
<td>Doctor</td>
</tr>
<tr>
<td>Forestry</td>
<td>Laboratory Technician</td>
</tr>
<tr>
<td>Mining</td>
<td>Plumbers</td>
</tr>
<tr>
<td>Computer Science</td>
<td>Mechanics</td>
</tr>
</tbody>
</table>
Scientific English is described as the realization of a type of discourse which is defined in functional terms and distinguishable from other uses of language in general terms of what concepts and procedures are communicated (Widdowson: 1980: 27). The general term "Scientific English" could be applied to school science text-books, popular journalism in newspapers and magazines, and learned articles in professional journals (Harrison: 1979: 61).

1.2.2 **Types:**

Within ESP, we have English for Academic Purposes (EAP), developed around reading comprehension as the basic skill. EAP is generally taught in educational situations where students need English for their studies programme. The language taught may be based in particular disciplines at higher levels of education when the student is specializing (in study) or intends to specialize (pre-study) in a particular subject (Kennedy: 1984: 5). Besides, English for Occupational Purposes (EOP) responds to the demands of the community at large, and includes familiar areas such as English for executives, for long distance Telephone Operators, for Air Traffic Controllers, and the like (Escorcia: 1985: 229). The relationships among EFL, EST, ESP etc. are brought out very well by Hutchinson in his ELT tree (see Figure 1).
Figure - 1

ELT TREE

EAP Courses often have a study skills component.

EOP is also known as EVP (English for Vocational Purposes) and VELS (Vocational English as a Second Language).

GE is usually studied for exam purposes.

ESL can be divided in the same way as EFL.

In American ELT the dominant branch is ESL.
What distinguishes ESP from General Purpose English (GPE) is the way in which purpose is defined, and the manner of its implementation (Widdowson: 1984: 5). ESP is essentially a training operation which seeks to provide learners with a restricted competence to enable them to cope with certain clearly defined tasks (Widdowson: 1984: 6). These tasks constitute the specific purpose which the ESP course is designated to meet. GPE, on the other hand, is essentially an educational operation which seeks to provide learners with a general capacity to enable them to cope with undefined eventualities in the future.

1.2.3 Development of ESP/EST:

The recognition of the importance of relating the teaching of language to the particular needs of students is not as recent as might be supposed by some writings on ESP. In 1921 H.E. Palmer (1964: 129) made the point:

We cannot design a language course until we know something about the students for whom the course is intended, for a programme of study depends on the aim or aims of students.

He also adds that much time and energy would, therefore, be served if both aims and methods were subordinated to the special purpose. The late 1960's, and early 1970's, were significant in witnessing maximum expansion of research into the nature of particular varieties of English. (Hutchinson and Waters: 1987: 7). Robinson (1980: 5) considers 1969 as a starting point when the first conference on language for special purposes was convened.
Five main phases of development in ESP can be identified. The rate of growth varied from country to country. EST has been particularly important in the development of ESP and for a time ESP and EST were regarded as almost synonymous. The main phases of development are:

1. The concept of special language: Register Analysis.
2. Discourse Analysis.
3. Target Situation Analysis.
5. A Learning Centred Approach.

Register Analysis, proposed in the 1960's and early 1970's, was associated in particular with the work of Peter Strevens, Halliday and McIntosh (1964); Jack Ewer (1969), Swales (1971), Selinker and Trimble (1976). The aim of the analysis was to identify the grammatical and lexical features of registers. Teaching materials then took these linguistic features as their syllabus. A good example of such a syllabus is that of "A Course in Basic Scientific English", by Ewer and Latorre (1969).

At this stage, ESP had focused on language at the sentence level. Register, therefore, is a characterization of texts in respect of their formal linguistic properties. The criteria of any given register are to be found in its grammar and its lexis (see Halliday, McIntosh and Strevens: 1964: 88-89). The English needed by a particular group of learners could, therefore, be identified by analysing the linguistic characteristics of their specialist area of work.
or study. However, register does not reveal how language is used in the discourse process. It does not emerge as a function of the analysis itself because linguistic forms do not reliably signal their pragmatic value in particular contexts of use (Widdowson: 1979).

In the next stage, *Discourse Analysis: Beyond the Sentence*, Widdowson (1977) proposed that the term "discourse" be used to describe a stretch of language which is a unique piece of communication. In this phase of development attention shifted to the level above sentence and ESP became closely involved with the emerging field of discourse. The leaders of this movement were Henry Widdowson in Britain and Selinker, Louis Trimble, John Lackstorm and Marry Todd-Trimble in the United States. This brought about a shift in focus to understand how sentences were combined in discourse to produce meaning. The concern of research became to identify the organizational patterns in texts and to specify the linguistic means by which these patterns are signalled. (Hutchinson: 1987: 11). These patterns then constituted the syllabus of an ESP course. Thus, the units of discourse are identified by the way in which, "sentences are used in the performance of acts or communication" (Mackay: 1979: 125).

A Target Situation analysis relates language analysis more closely to learners' reason for learning. The purpose of an ESP course is to enable learners to function adequately in a target situation, that is, the situation in which the learners will use the language they are learning. The target
situation should be identified and then an analysis of the linguistic features of the situation carried out.

The Munby (1978) model produces a detailed profile of the learners' needs in terms of communication, language skills, functions and structures. It seems, therefore, that the learner's need was apparently placed at the centre of the course design process, but the concept of needs that this analysis was based on was far too simple.

Skills and Strategies is an attempt to look below the surface and consider not the language itself but the thinking processes that underlie language use. They "enable us to extract meaning from discourse" (Hutchinson: 1987: 73). These underlying processes are not specific to any subject register. The emphasis is on reading or listening strategies. The language learners are treated as thinking beings who can be asked to observe and verbalise the interpretive process they employ in language use.

Projects like the National ESP project in Brazil (Maciel et. al, 1983) and the University of Malaya ESP Project (ELT Document 107, 1980) were set up to cope with study situations where the medium of instruction is the mother tongue but students need to read a number of specialist texts which are available in English. The projects have, therefore, concentrated their efforts on reading strategies. This is very much similar to the situation that will be dealt with in the present research where Arabic is the medium of instruction.
A Learning - Centred Approach, as already discussed, is a truly valid approach to ESP which must be based on an understanding of the processes of language learning" (Hutchinson: 1987: 14). Attention, therefore, has been paid to learning. All the previous stages, however, are concerned with what people do with language (language use), while our concern in ESP is with language learning. It is important, therefore, not to regard ESP as an area of development separate from the rest of English language teaching (ELT) but as a "part of the recent move within the ELT sphere towards a more communicative basis for teaching and learning" (Kennedy: 1984: 7). It is also important here to discuss briefly the General and Scientific English Courses, definition of the terms, and Language Learning Theories.

Although long courses in general English have been followed at schools in Iraq for eight years from the fifth year primary school to the end of secondary school, there is no guarantee that the students manage to acquire a practical grasp of the common core of English. The purposes of learning general English in Iraq are to cope with some unidentified eventualities like watching television, requirements of the educational system, knowing more of the culture and values of the foreign language group, and to make contact with the speakers of English when they travel abroad.

In the university, biology students who have already completed a general English course in their secondary schools need scientific English mainly for use in their studies and
jobs, to read reference works and biological texts in English, to understand lectures and participate in seminars, to read reports and conduct business transactions, to improve examination grades, widen knowledge and interest in their subject of specialization (biology). These demands have resulted in the expansion of one particular aspect of ELT, namely the teaching of English for Specific Purposes (ESP).

A course in scientific English for training M.A. students of English to be ESP teachers after graduation was originally started in the university of Mosul, College of Arts in 1974 to serve the needs of Science colleges where Arabic was the medium of instruction (except for one subject which is randomly chosen to be taught in English every year) and each one of the science colleges requested for a scientific English course with limited objectives. The Department of Biology introduced this because it wanted to enable students to read and comprehend academic texts and references related to the field of biology written in English. Later, in Chapter IV when we discuss and analyse the English learning needs of Biology students, we shall see that the kind of English needed is based on the requirements of the learner. The language skills to be taught may also be restricted.

The definitions of some of the terms and ideas related to ESP like syllabus, course design, and language theories, though outside the scope of this research, are defined very briefly here. A syllabus is a working document that should
be used flexibly and appropriately to maximise the aim and processes of learning. It helps provide a practical base for the division of assessment, text-books and learning time. A syllabus, therefore, is an important document in the teaching/learning process and satisfies a lot of needs. As far as ES/ESP is concerned, there are six types of syllabi, namely, the evaluation syllabus, the organizational syllabus, the teacher syllabus, the material syllabus, the classroom syllabus, and the learner syllabus. A model for syllabus design has been set out by Munby (1978) with the focus on the communicative needs of students. "Course design is the process by which the raw data about a learning need is interpreted in order to produce an integrated series of teaching" (Hutchinson: 1987: 65). A course design can follow a language-centred, a skill-centred, a learner centred, or a learning centred approach. However, "it would be a mistake to insist on the inherent superiority of one approach" (Widdowson: 1984: 90). The effectiveness of an approach depends on establishing a relationship between course design and methodology. To design a course we need to know both language description and learning theories. Language description is the way in which the language system is broken down and described for the purposes of learning. This description can be either based on traditional grammar, structural linguistics, transformational-generative grammar, register analysis, functional/notional grammar, or discourse (rhetorical analysis). A learning theory provides the rhetorical basis for the methodology by helping us understand
how people learn. In the area of learning theories the relevant terms are behaviourism, which says that learning is a mechanical process of habit formation, mentalism, which says that learning consists of acquiring rules, cognitive code, which treats learners as thinking beings, and the effective factor, which considers the learning of a language as an emotional experience. However, it is wise to adopt an eclectic approach, taking what is useful from each theory.

1.3 The Present Research: Aim, Hypothesis, Existing Research Contribution, Method and Structure of the Work

1.3.1 The Aim of the Research

The aim of the present research is to discover the types of proficiency and competence needed by the students of Biology department, College of Sciences, University of Mosul, Iraq who have studied English for eight years in the primary and secondary schools. The research is an attempt to determine the sort of English that the learner will need, his purpose in learning, and the specificity of his purpose. So, we have to look at various aspects of the learning situation and the language to be learnt by the students.

This research, in the process, tries to examine closely the concept of needs, its incidence in the development of methodologies and the implications of this relationship for the learner. The researcher wants to see how the data of a needs analysis can be used to design effective ESP materials. The research is also an attempt to discover the utility of
register analysis in language teaching, and the use of translation as a teaching device. In addition, the research tries to recommend a technique for teaching English in the department of Biology, through suggestions for course designers and material writers so that the linguistic, methodological and administrative requirements of the students, can be met. However, this work is not intended as a syllabus design, though it may be useful for syllabus designers as well as researchers, learners and English language teachers.

1.3.2 Hypothesis

It is believed that the present course, i.e. "A Course in Basic Scientific English" by Ewer and Lattore (1969), taught to the biology students in the college of sciences, University of Mosul, does not meet the linguistic needs of students because it leans heavily on the structural approach. This approach may fail to provide the learner with an understanding of the communicative use of the structures and cannot explain relationships of meaning which are not realized in the surface structure. Besides, most of the content of this course is not related to the subject matter of biology which will be reflected in the preference for use of biological terms, grammatical structures and scientific concepts.

The explanations, exercises and examples in this textbook applied in the teaching of micro-acts too are clearly designed to implant items of knowledge in the
learner's mind and not to develop a capacity for using this knowledge. This textbook leaves considerations of appropriate methodology entirely out of account. It would be more appropriate for these students to have an ESP course which can enable them to understand the communicative use of language in the register of biology in a functional way. A needs based course is what is required.

1.3.3 **Existing Research in this area**

R.A. Close in *The English We Use for Science* (1961) deals with the special problems of English for students of science and technology. He discusses the choice and grading of texts, and the characteristics of English for Science (ES) so that teachers and students can concentrate on the most relevant ones. Lexical, syntactic and morphological characteristics of ES are dealt upon. Besides, Close also compares the style of ES and General English (GE).

Allen and Widdowson in *English in Physical Science* (1978) say that learning a language is not merely a matter of learning sentence patterns and vocabulary but must also involve an understanding of how people use these linguistic forms in order to communicate. They assume that students already have a knowledge of basic science. Their aim is not to teach the subject-matter of science but to develop in the reader an understanding of how this subject-matter is expressed through English. Both language and subject matter should be combined in a meaningful situation. They hope that
the types of exercises they provide would persuade students of the relevance of English learning to their own speciality.

This idea is further carried by Allen and Widdowson in their book *Teaching the Communicative Use of English* (1980). They emphasise that English teaching has been called upon to provide students with the basic ability to use the language, to receive and to convey information associated with their specialist studies. They propose that language should be presented in such a way as to reveal its characteristics as communication. They give examples of the types of communicative exercises that take the science students needs into account and are to be practised by them such as exercises on pronoun reference, rephrasing, relationship between statements, statements based on diagrams, definition in scientific discourse and formation of the imperative passive. They also discuss the methods of teaching scientific discourse.

Brooks in *Scientifically Speaking* (1978) shows the characteristics of specialized English of Science and Technology and gives examples of many words, grammatical structures and sentence patterns which are frequently found in a number of scientific and technological fields.

Mackay and Mountford in *Reading for Information* (1979) have written on reading for information with reference to students of science and technology. Their aims were practical and three fold:
1. to offer advice which could help teachers of English for specific purposes to orient themselves to the students, specialist fields of study and provide them with practical criteria for text selection,

2. to discuss what kind of linguistic knowledge appears to be necessary in order to master the skill of advanced reading comprehension.

3. to suggest materials for and methods of exercising these skills in the learner.

Harrison in *English as a Second and Foreign Language* (1979) gives reasons for the teaching of English in developing countries. One of which is to read reference books in the registers of Science and Technology. He examines closely the nature of scientific writing. The lexis of the various sciences obviously differ from one another. He also states that "the mastery of a technical language requires technical knowledge in the field concerned. One cannot separate out the language from the science" (p.61). He distinguishes three stages in the teaching of ES. The first is the common elementary course in the language. The second encompasses a superstructure that could serve any scientific purpose. The third is a subsequent superstructure serving specialised scientific purposes.

P. Strevens in *Teaching English as an International Language: From Practice to Principle* (1980) defines and analyses ESP as contrasted with general English and
emphasises the analysis of learners' needs. He discusses the role of the ESP teacher, saying that "the competent ESP teacher knows that learning can be successful, and he or she can enjoy bringing the realization of this success to the ESP learner" (p. 121). He also points out that there are some grammatical and rhetorical features of Technical, Technological and Scientific English (T.T.S.E.). There are also general concepts expressed in TTSE which are important in advanced thought. These general concepts are expressed by the use of linking items such as although, because, if, unless... etc. which state the rhetorical function and grammatical consequences of the text. The vocabulary of TTSE contains words and expressions of three main kinds:

1. the vocabulary of scientific concepts,
2. a stock of words composed of Greek and Latin roots and suffixes having international acceptance,
3. special scientific and technological coinages.

Strevens thus offers an approach to the teaching of TTSE and discusses the problems of learning and teaching science through a foreign language.

Widdowson's Explorations in Applied Linguistics 1 (1980) is a selection of his papers written over the past eighteen years for presentation at courses and seminars in various parts of the world. He makes a number of practical suggestions for an approach to the teaching of English for Science and Technology. All proposals about how language
should be or might be taught derive from notions about the nature of language and language learning. Widdowson considers ES as a kind of discourse, a way of using English to realize universal notions associated with scientific enquiry. His aim is to prepare science students to encounter scientific communication in English such as they will find in their textbooks. He has proposed particular language learning exercises and considered English as the realization of universal modes of thought and practice and not as a formally defined register. He also tries to discover the utility of translation as a teaching device for ESP.

Widdowson in *Explorations in Applied Linguistics 2* (1984) points out that ESP courses are designed to a specification derived directly from a description of the required target repertoire, and so can exactly define the language that the teachers need to deal with. He suggests that we should consider academic purposes in terms of learning processes reflected in specific methodologies rather than as static goals defined as language knowledge.

P. Skehan in *Teaching Team and the ESP Teacher* (1980) discusses the role of the ESP teacher, his relationship with specialist teachers, the importance of lexis, and finally, the authenticity of language teaching materials.

Kennedy Chris and R. Bolitho in *English for Specific Purposes* (1984) deal with the approaches and types of ESP. They distinguish between English for Occupational Purposes
and English for Academic Purposes (EAP). They trace the development of ESP as a part of the recent move within the ELT sphere towards a more communicative basis for teaching and learning. They look at its development since the 1960s. Kennedy and Bolitho also discuss the role of the ESP teacher, the needs of the learners and the types of texts. They also describe the features of English for Science and Technology (EST) like the use of symbols, formulae, abbreviations and types of vocabulary. Besides, they deal with the skills and activities like reading, writing, listening and speaking and focus on the importance of these skills. Finally, they identify the problems in approaching ESP courses.

S. Holden in Teaching and the Teacher (1984) emphasizes factors such as the role of the students and the relevance of their needs as regards syllabus design, choice of materials and organization of the course. This has led the researchers, she says, to neglect the most important factors in the success of a course, that is, the teacher. The teacher is supposed to have knowledge of the features of scientific language and the general concepts of the subject in which his students are specializing.

Widdowson in Learning Purpose and Language Use (1984) distinguishes between ESP and General Purpose English (GPE), and says that purpose refers to the eventual practical use to which the language will be put in achieving occupational and
academic aims. He also distinguishes between aims as eventual behavioural targets and objectives, which are the pedagogical constructs designed to facilitate learning. Specifity can then be seen as the degree of correspondence between objectives and aims. Widdowson also states that "learning needs will have to be taken into account in the methodological implementation of course proposals" (Widdowson: 198: 20).

J. Swales in *ESP the Heart of the Matter or the End of the Affair* (1985) presses for closer relationships between ESP and research communication and the interactions between ESP and its parent profession of ELT which focuses on the learner and cognitive behavioural profile of that learner. He proposes the extension of ESP into the research field.

B.A. de Escorcia in *ESP and Beyond* (1985) takes up some issues that have recently dominated the field of ESP, and examines them more closely in the South American context. He states that "needs analysis has become the dynamic impulse underlying course design" (p.28). His main concern is to examine closely the concept of needs, its incidence in the development of methodologies and the implications of this relationship for teacher training.

Louis Trimble in *English for Science and Technology* (1985) starts his approach from the premise that in order to understand the written EST found in textbooks and papers, it is necessary to understand the discourse structure of such
textbooks. The book describes the features of EST discourse and covers the problems of specialized lexis, the paragraph in EST, the rhetorical techniques and functions, the grammatical relationships, lexical problems and the teaching of rhetorical process.

T. Hutchinson and A. Waters in *English for Specific Purposes* (1987) define ESP as "an approach to language teaching in which all decisions as to content and method are based on the learner's reason for learning (p.19). It is an approach to language teaching which is directed by specific and apparent reasons for learning, thus making it a needs based approach.

K. Karunakaran in *Translation as a Synthesis* (1988) emphasizes the role of translation as a prime medium of information flow across languages. He says that the information on science when translated should be capable of expressing the concepts completely and unambiguously in the target language. He analyses the phonological, lexical and grammatical problems faced at each of these levels during translation.

R.R. Jordan in *English for Academic Purposes* (1989) divides ESP into two branches: English for Academic Purposes (EAP) and English for Occupational Purposes (EOP). He discusses study skills vis-a-vis EAP, syllabus design and needs analysis. Each macro and micro-skill is also discussed in some detail.
It is useful at this point to give a brief summary of the main stages in the development of ESP. They include an interest in register, discourse analysis, the specification of learner's needs, study skills, and various methodological approaches to the development of communicative competence.

The first stage of ESP development was that of register analysis which helped identify the grammatical and lexical features of texts. Teaching materials then took the linguistic features of texts as their syllabi. The main motive beyond register analysis is to make the ESP course more relevant to learners' needs. The ESP course should give precedence to language forms which are commonly found in science texts. In this stage of development, ESP had focussed on language at the sentence level.

In the second stage of development attention shifted to understanding how sentences were combined in discourse to produce meaning. The results of the research into the discourse of subject-specific academic texts were also used to make observations about discourse in general. The teaching materials based on the discourse approach are taught to students to recognize textual patterns and discourse markers mainly by means of text-diagramming exercises. Students needs can be met by a course which develops a knowledge of how sentences are used in the performance of different communicative acts.
Another area of current interest and activity in ESP is the development of content based programmes, where the language course is developed in conjunction with the target academic subject. Further, there is a debate on the question of the use of authentic as opposed to simplified texts in ESP, and the relationship between the ESP teacher and specialised subject matter. Yet, another area of debate concerns the role of methodology in ESP. Much work in practical ESP curriculum development has, nevertheless, focused on the development of innovative methodology. The matching of teaching to the learner's needs extends freedom to innovate in methodological terms. The ESP teacher should not be constrained within methods consecrated by years of repetition.

In short, ESP has its basis in an investigation of the purposes of the learner and the communicative needs arising from those purposes. These needs then act as a guide to the design of course materials. The kind of English to be taught and the topics through which it is taught are based on the interests and requirements of the learner. The skills to be taught may also be restricted. In ESP, the learners need specific materials and methodology to suit the specialist group.

1.3.4. In What way this Research will be Different from Existing Work in this Area

This research is different from existing work in this area in that it follows a learning-centred approach in which
attention has been paid to learning. All the previous stages of ESP development are concerned with what people do with language learning. This approach takes account of the learner at every stage of the course design process though this is not the only factor to be considered in the learning process. In a learning-centred approach "we must look beyond competence that enables someone to perform, because what we really want to discover is not the competence itself, but how someone acquires that competence" (Hutchinson: 1987: 73). We need, therefore, to ask further questions and consider other factors before determining the content and methodology of the course.

This contrasts with the language-centred approach, for example, in which the target situation is allowed to determine the content of the course with little further reference to the learner. In a skill-centred approach, on the other hand, we must look behind the target performance data to discover what processes enable someone to perform. These processes determine the ES Course.

The present research is also an attempt to discover the potential utility of translation for the teaching of English as a foreign language. Translation may be a very useful pedagogic device notably where a foreign language is being learnt for special purposes. It can provide the most effective means of learning. If one considers the way English is used in Science as the realization of universal modes of thought and practice and not only as a formally
defined register, it follows that it should be presented in association with corresponding uses of first language and with those non-verbal means of expression which realize the concepts and approaches that define different scientific disciplines. In the process the research will also deal with major issues and problems in translating ES texts into Arabic. In the Department of Biology, all the courses are conducted entirely through the medium of Arabic except one. The Biology Department expects its students to be able to read references relating to the field of biological sciences written in English. However, students are often required to translate certain pages of textbooks in order to write reports and projects. Pages of photocopied ES texts are given to students to be translated into Arabic.

1.3.5 **The Method Used**

This research lends itself to empirical methodology. To achieve the aim of the research the following methods have been used:

A. **Text analysis**: Two texts are analysed on the bases of frequency count, a method of analysis adopted by researchers since long. One of the texts is the original biology text in English which is analysed in order to identify the vocabulary and structures more frequently used in English for biological science. This analysis, it is hoped, will prove to be of use to learners, teachers and syllabus designers. The other
text is the translated Arabic biological science text. This text is analysed to specify some of the issues and problems encountered in the translation of science texts into Arabic.

B. A questionnaire based on Hutchinson (1987), Strevens (1980) and Munby (1978) has been designed to specify the linguistic needs in terms of macro and micro skills. Questions about the target situation and learning needs were distributed to 49 first year biology students, 30 biology teachers, 10 M.Sc. students, and 10 ESP teachers.

C. Two tests have also been conducted, a structural test to see the effectiveness of the structural programme and a test based on the communicative/functional approach to see how biological notions are realized in English.

1.4 Structure of the Work

The present work is divided into six chapters:

Chapter One is an introduction. In this introduction we discuss the status of English in Iraq, EST/ESP definitions, types and development. We also define some of the terms and ideas which are related to the field of ESP like the syllabus, course design and language theories. Then we state the aim of the research, the hypothesis, and account for the most important works done in this area. We also describe in what way this research is different from existing
works in this area. The method used to achieve the aim of the research is also discussed. The introduction ends with a preview of the coming chapters and a summary of their content.

Chapter Two is an attempt to characterize scientific English as used in the students' biological texts. It deals with scientific style, how a scientific article is organized and the use of non-verbal devices. Vocabulary is analysed on the basis of frequency count. Frequency count here is not an end in itself, but a step towards interpretation which may lead to a characterization of English for Science (ES). In the vocabulary section, we have discussed content vs. function words, technical terms, sub-technical terms, compounding, adjectives, verb tenses, passive vs. active constructions, stative vs. dynamic verbs, transitive vs. intransitive, types of adverbs, pronouns, linking devices, definite vs. indefinite article, word formation and sentence patterns most frequently used in the analysed biological text. Each of the above mentioned categories is discussed on the basis of its frequency of occurrence in the text analysed. Reasons are given for the use of each one of these categories in ES supported by tabulated figures and percentages. We shall also try to see whether there is any vocabulary, grammatical structures, function or discourse structure that can be identified specifically with the subject, that is biology. We shall discuss the utility of
register analysis in language teaching. Some of the features of ES will be underlined so that teachers and students can concentrate on the most relevant ones.

**Chapter Three** deals with the translation of scientific texts. It includes a discussion on scientific discourse, translation as a reading strategy/teaching device, native language as a medium of instruction/translation, issues and problems in bi-directional translation between Arabic and English, i.e. the problems of phonological and lexical transfer like direct borrowing, nativization of scientific terms, development of hybridized forms and the use of revived Arabic forms with new semantic content. The chapter also gives some recommendations for effective translation of scientific texts. At the end of the chapter we shall briefly mention some of the major morphological and syntactic differences between Arabic and English which may be a source of problems in translation from English into Arabic.

In **Chapter Four**, students’ learning needs are analysed on the basis of a questionnaire distributed to 30 biology teacher, 10 ESP teachers, 49 B.Sc biology students and 10 M.Sc. students of biology. We first analyse the learning situation in the Department of Biology, College of Sciences, University of Mosul, Iraq. The concept of needs, and the use of ESP as an approach to needs analysis is discussed in detail. The chapter shows the difference between **objectives** and **aims**. The needs of the ES teacher, the kinds of problems encountered by him, and his teaching needs are dealt
with in this chapter. The chapter also includes a section on motivation to see whether the students of biology are motivated to learn English or not, and what motivates them to learn English. Attitudes to learning are also investigated. Language skills and micro-skills needed by biology students are identified and discussed in detail. Figures and percentages have been tabulated to support the discussion.

Chapter Five is on Materials and Methodology. In this chapter we discuss the relation between materials and students subject specialisation, and the link between ES materials and the skills required by biology students. We also discuss the characteristics of good materials. The questionnaire includes questions on whether the present course materials are interesting or not, whether the course is adequate or inadequate in terms of the needs of biology students, and whether it is difficult, not so difficult or easy. The chapter contains suggestions on the amount of time to be devoted to teaching ES in the department of biology, and also includes some methodological implications - what activities the biology student would normally engage himself in when putting language to use for particular purposes like stimulation, enjoyment, variety of skills and topics, variety of exercises, preparation, students' involvement in the lesson, and creativity. The chapter deals with the selection of reading texts, i.e. modified, unmodified, and specifically written texts. The chapter also deals with sample exercises which draw the biology students' attention
to the process by which a piece of language is interpreted as a discourse like pronoun reference, relation between statements, substitution, definition, rephrasing and equivalence, completing a passage by referring to a diagram, and reordering jumbled sentences, etc. These exercises, it is hoped will take into account the needs of the biology students and the nature of abilities which must be developed to meet them.

Chapter Six deals with testing and evaluation, definitions, types and qualities of a good test - reliability, validity, practicability, and comparison. Two tests have been administered, a grammar based test and a discoursal test. A homogenous group of 43 first year biology students took the test at the end of their course. The results have been analysed using arithmetic average (mean), standard deviation; and (r) formula to see the reliability of the tests. Grades are represented in graphs and tables so that they can be understood and compared at a glance. We also discuss how an ES course is to be evaluated.

The present work ends with conclusions and recommendations, a bibliography of the books, journals and articles referred to during the writing of the present work, followed by appendices which contain the text analysed, questionnaire distributed, the tests conducted, and the grades obtained by biology students.