THE UNIVERSITY OF HULL

Designing a Communicative English Progamme for the Specific Purposes of Science Students in the Secondary Stage of Education in Jordan

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By

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ABSTRACT

The terminal objective of the study was to suggest a communicative programme of English for Scientific Purposes (EScP) for science students at the secondary schools in Jordan. The problem of this study was that the target students' needs for EScP were not assessed when introducing the English curriculum for this stage. Besides, the community concerned in teaching English for science students was not involved in developing this curriculum. Moreover, there was a lack of research on English for Specific Purposes (ESP) at the school level in Jordan

The researcher founded this programme on: 1) content analysis of the national philosophy of teaching English, 2) assessing the learners' needs for learning English for Scientific Purposes (EScP), and the concerned community's perspectives of teaching EScP, 3) Communicative and ESP approaches to ELT and course design and 4) the pertinent theoretical and empirical literature.

The research proceeded through two major phases, i.e. the documentary phase and the empirical phase. In the former, the researcher analysed: 1) the national documents related to ELT in particular as well as those related more precisely to English curriculum development in the country, and 2) the content of the existing curriculum and textbooks used in the public schools of the secondary stage.

In the latter phase, the semi-structured interview technique was applied to explore the actual situation by interviewing the concerned stakeholders to assess their needs and perspectives in learning and teaching English for scientific purposes (EScP). The stakeholders included the learners, teachers, education supervisors, curriculum developers and university lecturers. The quantitative data were collected by developing two questionnaires addressed to two target groups. The first questionnaire was devised to identify the scientific characteristics of the suggested programme in terms of the topics, concepts and terms. The second aimed to identify the English language-based

characteristics in terms of the language sub-skills, functions and contexts. The construction and the application of the data collection tools were co-operative processes executed mostly by teamwork that involved teachers, education supervisors and members in the national committees for developing educational curriculum and training. The pyramid network technique was also adopted to administer the questionnaires and the pre-post-test.

The main findings were that the First Year Scientific Stream Students (FYSSS) of the secondary stage in Jordan needed to learn EScP for future careers or to pursue their education at the university or college levels. The female students showed higher perception of their needs than the males did. The levels of agreement of the FYSSS on items of the Science-based Content Questionnaire were not as high as those of the university students, educators and university lecturers who were more supportive of the needs for EScP. However, 21 scientific items were identified and ranked as the most important topics to be introduced in the suggested programme. On the other hand, the respondents to the English Language Questionnaire agreed on 24 items as the important language functions to be presented in this programme. Thus, the researcher set the characteristics of the proposed programme in a framework describing the general and specific descriptions, components, layout and design exemplified in two trial units. These two units were constructed to test its applicability and effectiveness in actual classrooms at 12 schools selected randomly using the cluster sampling technique from the six regions in Irbid Governorate in the north of Jordan. Then, an achievement test was constructed and administered to 839 students chosen randomly and grouped into an experimental and control groups. The SPSS programme was used to analyse the two groups' scores on both the pre-test and post-test.

The results showed that the experimental group students were very much interested in the units and they gained more from them than the control group, because

they felt that their needs were met and they were involved and consulted in what they needed to learn.

The researcher concluded that applying ESP programmes needs a flexible system of education to meet the specific needs of the students, as there were significant differences between the males and females in some skills and between the regions where this study was conducted. Such a flexible system needs more active involvement of the stakeholders in developing such programmes.

Finally, the researcher recommended that on applying the ESP programme, the MOE in Jordan should revise the management system of education to meet the various needs of the learners taking into its account the effect of students' gender and differences among regions. Learners, teachers and the concerned community should be actively involved in the development of educational programmes. To make the ESP communicative programmes effective, teachers should receive special training on pair-group-work and on how to develop student-centred activities. Schools in Jordan should be delegated the authority to develop school-based programmes and activities meeting their students' needs and train the school staff to do so.

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Abbreviations Used in the Dissertation

AMRA: "Advanced More Relevant Activities" of English course of the secondary stage of education in Jordan.

EScP: "English for Scientific Purposes" is the core of the suggested programme of this study.

FFYSSS: "Female First Year Scientific Secondary Students" who are the target population of the present study.

FYSSS: "First Year Scientific Secondary Students" who are the target population of the present study.

FYUS: "First Year University Students" from YU and JUST who participated in the study.

GD: General Directorate; there are 12 Gds. Distributed to 12 Governorates in Jordan.

IGD: Irbid General Directorate; the region of the present study.

JUST: "Jordanian University for Sciences and Technology" in the Governorate of Irbid.

LD: "Local Directorate of Education", there are 26 of them distributed around Jordan.

MFYSSS: "Male First Year Scientific Secondary Students" participating in this study.

MOE: Ministry of Education in Jordan.

NCSTD: National Committee of Science Training Programmes Development.

NCER: "National Conference for Educational Reform" that was held in September 1987 in Amman- Jordan.

PETRA: "Progress of English Through Relevant Activities" for the basic stage of education in Jordan.

ScE: "Science Educators" who responded to the science content-based questionnaire of this study.

YU: "Yarmouk University" in the Governorate of Irbid.

CHAPTER ONE

GENERAL PROFILE OF EDUCATION IN JORDAN

1.1. Introduction

Jordan was established in 1921 as an Emirate of East Jordan after liberation of the Arab world from the Ottoman reign for 500 years. It is one of the most modern states in the Middle East located on the northwestern corner of the Arab Peninsula. Jordan is a country of almost 4.9 million people in an area of about 89,000 square kilometres. Its national income depends mainly on taxes, tourism and aids from rich Arab States, USA and UK as well as some other friendly countries. Its natural resources are very meagre such as phosphate, potash and calcium. Most of its people work in agriculture, small industrial businesses, and government employment in armed forces and civil occupations. The majority of Jordan's population is concentrated in one-eighth of the land, mainly in the northwest lands. With almost 90 percent of its land as desert, clean water and arable land are two of the country's most valuable resources. In 1997, more than 70 percent of the population lived in three urban Governorates of Amman, Zarqa and Irbid [National Information Centre (NIC), 2000].

1.2. An Overview of the Current Situation of Education in Jordan

As the country is not rich in material resources, education at the school and university levels has had a crucial role in human resource development. Consequently, Jordan is trying to keep up with contemporary advances in education.

The following examples are a few indicators of the educational progress in the country. Firstly, the literacy rate in Jordan is among the highest in the world; it is over 90% for the 15-45 age group. The 1994 census indicated that about one third of the population was involved in formal education, and that illiteracy rates were 9.8% for

males and 20.7% for females. This represents major progress since 1979, when the rates were 19.9% and 49.6% respectively. Table1.1 shows the MOE budget increase from 1952 to 1997 revealing the government concern for education (Jaradat, et.al, 1997: 27).

Table 1.1: Percentage of MOE Budget to the Government Budget in 1952-1997

Year	The Government Budget	MOE Budget	Percentage
1952	5,698,447	302,574	5.31%
1962	39,241,000	3,384,000	8.62%
1972	124,860,000	6,795,850	5.59%
1982	765,000,000	61,563,000	8.05%
1992	1,270,111,000	115,217,000	9.07%
1997	1,916,000,000	210,750,000	11%

Secondly, the educational system in Jordan is subject to evaluation and development. At the school and the university level, the syllabi, instructional methods and teaching aids are continually revised and developed. The system is also responsive to current advances in education. The country has witnessed a rapid increase in the number of schools, teachers and students. Table two shows numbers of schools, teachers and students from 1952 to 1997/98 (Jaradat, et.al, 1997: 26).

Table 1.2: Number of Schools, Teachers and Students in the Period of 1952-1998

Year	1952/53	1962/63	1972/73	1982/83	1992/93	1997/98
Schools	958	1761	1892	2895	3807	4478
Teachers	4442	10631	14421	31008	55258	61704
Students	170777	322750	459672	820113	1181575	1346178

Thirdly, there has been a growing demand for postgraduate studies in education at the public universities as shown in table 1.3 (General Directorate of Planning, 1998, Mimeo.).

Table 1.3: Percentage of Students Joining Postgraduate Educational Programmes at the Public Universities from 1984-1997

Year / University	85/86	86/87	87/88	88/89	89/90	90/91	91/92	92/93	93/94	94/95	95/96	96/97
Jordan	51	41	36	36	37	14	8	17	20	42	40	42
Yarmouk	29	14	13	11	9	6	8	21	17	9	15	45
Mu'tah	0	0	0	0	0	0	4	5	2	1	10	15
Al-Albayt	0	0	0	0	0	0	0	0	0	0	0	6

The trained Jordanian labour force and qualified community college and university graduates in various specialist subjects have contributed not only to Jordan's development but also to that of many Arab countries in the region. Teachers, in particular, have been exported to many neighbouring countries, both through privately negotiated job opportunities and through secondment via the MOE. The number of teachers presently on secondment, for example, to the United Arab Emirates is 467, to Oman 614 and to Saudi Arabia 2,000 (Jaradat, et.al. 1997).

1.3. The Structure of General Education in Jordan

General Education refers to the stages of education prior to community college and university. In Jordan, the general-education stage begins with the kindergarten and ends with the secondary school. This stage is organised as follows:

1.3.1 Pre-school Stage

The Kindergarten Stage marks the beginning of formal voluntary education. In general, most Jordanian children start going to kindergarten at the age of four, and they spend two years there. Almost all kindergartens throughout Jordan are owned and run by the private sector. In most kindergartens, children are offered a variety of purposeful recreational programmes supported by elementary instruction in such subjects as Arabic language, arithmetic, religion and English. According to article eight in the Education Act Three for 1994 (MOE, 1994:12), the pre-school stage aims to:

> "1. Provide appropriate atmosphere for the balanced education of the child including the personal, cognitive, spiritual and affective domains enabling the him/her to make up the right healthy habits, develop the social relations, reinforce the positive attitudes and love the school life.
> 2. Establish MOE's kindergartens within the available resources and according to strategic plan."

Table 1.4 shows the number of kindergartens, teachers and students in 1998/99 and it may shed light on the parents' demand for the education of their children at

kindergartens. The table also reveals the involvement level of the private sector in this educational service (General Directorate of Planning, 1998, Mimeo.).

Table 1.4: Number of Kindergartens, Teachers and Students in 1998/99

Authority	Kindergartens	Teachers	Children	Classes
Ministry of Education	1	2	56	2
Other Government	1	10	219	5
UNRWA	0	0	0	0
Private Sector	1048	3633	79826	3408
Total	1050	3645	80101	3415

1.3.2. School Stages

The educational policy in Jordan stipulates that the school period starts at the age of six and extends for twelve years. This period is divided into the Basic Stage and the Secondary Stage.

1.3.2.1. Basic Stage

The basic stage of education is a compulsory one. It starts at the age of six years (Grade 1) and usually ends at the age of sixteen years (Grade 10). Students in this stage receive an average of 27-34 class periods per week (45 minutes each period); the lower the grade is, the fewer formal teaching hours that the students receive. At this stage, students are given a variety of school subjects including Arabic language, English language, mathematics, religion, general science, social studies and civic education, arts and sport education. Throughout the basic stage, repetition of grades for students who fail to obtain the required pass marks is allowed only once in each grade.

However, students who exhaust their right to repetition are automatically promoted to their respective higher grades. From the first to the fourth grade, promotion is automatic to all. This is also the case for grade ten: all students of this grade, regardless of their final scores, are promoted to the subsequent secondary stage.

1.3.2.2. Secondary Stage

Secondary education includes two major streams: comprehensive (academic and vocational) and applied education. The two-year comprehensive secondary education programme ends up with sitting for the General Secondary Education Certificate Examination in the following specialisations: academic (scientific, literary and Sharia'h) and vocational (industrial, commercial agricultural nursing, hotel and home-economics) (www.moe.gov.jo).

At this stage of education, the students are offered a variety of specialist subjects from which to choose according to their achievement average in the last three grades and their aptitude. Comprehensive Education is composed of the Academic and the Vocational tracks. The process of channelling students into either of these two latter types is a criterion-based process that operates individually and/or collectively. One criterion is related to the student's personal preference to follow one rather than the other of the two types. The other criterion is related to the cumulative average of the student's scores for the last three grades of the Basic Stage. The higher the average, the more eligible one is to follow the Comprehensive type of education. In contrast, students of lower cumulative averages are channelled into the Applied one.

Academic Track

This track of secondary education diverges into three streams known as Arts, Science and Sharia'h (Islamic Education and Culture). Again, the channelling of students into any of these three streams is determined by the student's personal preference and/or the cumulative average of the school marks in the last three grades of the Basic Stage. According to the rules of the MOE, students with the high scores join the Scientific stream, whereas those with the lower scores join either the Arts or Sharia'h stream. In the Scientific stream, the major subjects are mathematics, physics,

chemistry, biology, geology and environmental sciences. In addition, there are a few subjects in the humanities, such as Arabic, English, religion and social studies that are common basic requirements of all the Secondary Stage students. This Scientific Stream has become the necessary route to a number of favoured professional occupations.

Majdoubeh (1996: 6) states that:

> "This emphasis on scientific disciplines qualifies Scientific Stream students to the more 'prestigious' specialisations at the university level. Such specialisations include medicine, pharmacy, engineering, nursing, computer science and other related disciplines.."

Table 1.5 shows the numbers of students in each stream, (General Directorate of Planning, 1996/97: 241).

Table 1.5: Numbers of Students' Enrolment by Type of Comprehensive Secondary Education In 1996/97

	Academic Track			Vocational Track	Total
Grade	**Arts**	**Science**	**Sharia'h**		
First	30571	25155	994	20700	77420
Second	31937	24063	764	14879	71643
Total	62508	49218	1758	35579	149063

Vocational Track

The students who are channelled into this track can choose from different vocational specialisations including industrial, commercial, agricultural, hotel management, nursing, nutritional and printing. Students who follow the vocational track are given both theoretical and practical training in their respective fields. Upon graduation from the secondary stage, only a very small minority of vocational graduates may have the opportunity to join the university; most of them join the labour force.

Applied Education Track

The two-year applied secondary education provides vocational education and training for the skilled labour force both at vocational centres and through apprenticeship schemes served by the vocational training centres, (www.moe.gov.jo).

This type of education is mainly managed by the Vocational Training Corporation (VTC) which was established in 1976/77 under the authority of the Ministry of Labour. The VTC supervises the work of three basic programmes. The first is called the Applied Secondary Education Programme or Vocational Apprenticeship. Students joining this programme must have finished the basic-stage education and be at least 15 years old. They spend three years in the programme. In the first two years, they receive the type of training they choose according to their preferences and capabilities. In the third year, they put into practice the information and skills they have acquired. The VCT co-ordinates with the local workshops to involve the trainees in their real life work. At the end of the programme, they are awarded the Applied Secondary School Certificate. The second programme is considered an intermediate training.

1.3.3. General Secondary School Certificate Examination (GSSCE)

The secondary education stage ends with an annual national examination known in Arabic as Tawjihi. This examination (GSSCE) is by far the most objective and impersonal instrument of evaluating students' achievement throughout their entire school life. The student's score in this examination is, until now, the sole criterion that determines the student's chance of pursuing higher education in public and private universities in Jordan. The student's score in the Tawjihi examination plays a decisive role in assigning him/her a particular specialisation at the university. The Scientific Stream students with the highest scores the are eligible for popular specialities such as medicine and engineering. Scientific Stream students with low scores have no choice but to attempt to go into the less popular pure sciences and the humanities. Arts and Shria'h stream students cannot be accepted in scientific specialisations.

1.4. Education Management and Organisation

In Jordan, educational management is distributed among various authorities other than the MOE but under its supervision. These institutions also participate in the delivering of educational services. The MOE reports that (www.moe.gov.jo):

> "Several institutions under the Ministry of Social Development are concerned with the education of students with special needs and those with learning difficulties. The Directorate of Education and Culture of the Armed Forces administers 19 specialised schools. UNRWA is responsible for the administration of (198) schools for Palestinian refugees in which (143.893) students were enrolled in the academic year 1997/98...Moreover, there are non-governmental organisations such as: the Queen Alia Fund for Social and Voluntary Work, and the General Union for Charity Societies, that are concerned with providing educational institutions to the kindergarten pupils, and students with special needs. The Noor Al-Hussein Foundation (NHF) administers the Jubilee School, which is established in 1989, to meet the needs of the gifted students beyond the ninth basic grade."

The Education Act 3 for 1994 regulates the work of the MOE and specifies the job of other authorities. This act also describes the philosophy and objectives of education, the educational policy, the functions of the Ministry, the job of the Board of Education, the curricula and school textbooks, GSSCE, the Ministry's structure, in addition to private and foreign educational institutions, (www.moe.gov.jo).

Table 1.6 shows that the MOE shoulders more than four-fifths of the whole educational load, (General Directorate of Planning, Mimeo.1998).

Table 1.6: Number of Schools, Students, Teachers and Classes Managed by the Education Authorities in 1998/99

Authority	Schools	Students	Teachers	Classes
Ministry of Education	2791	967887	45763	32643
Other Government	25	20364	1094	701
UNRWA	198	141849	4041	3468
Private	1662	250622	12988	10239
Total	4676	1380722	63886	47051

The MOE constitutes Boards, Committees and Directorates at central national level; such as the Board of Education (BOE), Board of General Examinations (BGE) and the Planning Committee. The Minister heads these boards and committees. At

Governorate and Local levels, the MOE forms General and Local Directorates. The BOE takes decisions concerning the national curricula of all the school stages, the curriculum of each grade and its textbooks for all the public and private schools. (Ministry of Education, 1994: 24-26).

Meanwhile, the Secretary General heads the committees of General Examination, Training and Certification, Educational Publications, and the Scientific Research Developing Education. The latter committee involves three university professors at the faculties of education in addition to senior staff at the MOE's centre.

In order to control educational quality standards, the MOE has delegated some of its authorities to six General Directorates of Education (GDE), which are headed by a General Director, in Amman, Zarqa, Balqa', Irbid, Mafraq and Karak. Each General Director reports directly to the Secretary General of the MOE. The GD heads a Liaison Committee involving all the Directors of the Local Education Directorates (LED) to manage the administrative, financial and technical affairs at Governorate and Local levels. LEDs supervise educational policy in their local districts. Each LED is assisted by two directors for technical and administrative affairs, (MOE Website, 2000). On the whole, there are 26 Local Education Directorates situated in the major city of each district.

This structure indicates that the education system in Jordan is centralised where the MOE central directorates are responsible for developing the educational policy and plans as well as implementing and following them up.

1.5. Indicators of Educational Development in Jordan

At the time of Jordan's independence from Britain in 1946/47, the number of schools was 77, with 214 teachers and 10729 students. The MOE budget was 35248 JDs. A comparative study of the tables 1.1 and 1.2 reveals the extent of the educational

progress since 1952. The following features are some examples of the educational development that Jordan has witnessed recently.

1.5.1. Pre-Service and In-Service Teacher Training

The increase in the number of schools throughout the Kingdom was paralleled by a rise in the demand for teachers. As a result, the MOE, then known as Al-Maa'rif, had to employ secondary school graduates as teachers. When these graduates were not available, others who had even less than the secondary certificate were employed too as teachers. These teachers had never been subjected to any kind of pre-service training. Consequently, all newly appointed teachers were expected to sit for an examination called the Teachers Lower Examination, (Majdoubeh 1996: 11). It focused on testing general knowledge and on specific knowledge of school subjects. Those teachers who did not have the secondary school certificate took this examination to upgrade their level to that of secondary-school certificate holders. In 1961-1962 the examination was discontinued since the majority of teachers had by then become holders of the secondary certificate and/or two-year college diploma.

Over the years, teacher education opportunities have improved noticeably and received the constant attention of the various authorities concerned. Today, more than 50% of the teachers have a bachelor's degree in a certain subject and a higher diploma in Education. Some are holders of the Master's degree mainly in educational specialities. The MOE has started to upgrade about 22000 teachers since 1989 through teacher certification programmes in co-ordination with the public universities.

1.5.2. Teacher Certification

In 1955, government concern about teacher education development was reflected in the establishment of the Educational Training Department. This ran the

early programmes on a short-term basis, with the aim of training teachers both inside and outside Jordan. The constant feedback from the field pointed to the need for longer and more extensive training.

Majdoubeh (1996: 12) mentioned that:

> "...Recognising the urgent need to further upgrade the level of teacher qualification, the Ministry of Education took a decision in 1971 to open the Educational Certification Institute. This Institute provided a two-year training programme for those teachers who already had the General Secondary School Certificate (GSSCE). Teachers who fully attended the two-year course were subsequently given the Diploma degree. In addition, in 1974 the task of the above Institute was extended to provide training in school administration for those teachers who already had the Diploma degree. On the whole, the Institute carried out its mission considering that it succeeded in qualifying about 75% of the teachers and school principals in the country."

The public and private universities offer pre-service educational programmes to the student-teachers to prepare them for future teaching careers. The MOE plans, implements, supervises and develops the in-service training programmes of teachers through the General Directorate of Educational Training. The MOE has launched training programmes in co-operation with local and international educational institutions (Jaradat, et.al, 1996: 51).

The MOE, in co-operation with Jordanian public universities, has initiated teacher certification programmes. According to the Education Act Three for 1994, these programmes aim to upgrade the qualifications of the teachers, supervisors and senior staff to higher degrees in educational specialities (Ministry of Education, 1994: 22). These programmes include education supervision, counselling, school management, educational psychology and teaching methodology. The Faculties of Educational Sciences at these universities plan and organise these programmes.

These programmes can be graded into three levels. The basic level aims at upgrading the qualifications of teachers of the basic educational stage from the community college Diploma degree to BA in education. Teachers who join this

programme fall into two broad groups known as Classroom Teacher and Field Teacher. A Classroom Teacher is qualified to teach all school subjects to the pupils of the first four basic grades, whereas a Field Teacher is qualified to teach one subject from grade five through ten. Teachers have to have specialist qualification in this subject if they are to teach at the senior classes of the basic stage or the secondary stage. Therefore, the intermediary programme upgrades the qualifications of teachers at the Secondary Stage from the BA degree in their speciality to the Higher Diploma degree in Education.

On the general education level, teachers of English enjoy good opportunities in terms of qualifications and pre/in-service training. Besides the concern of the MOE for their development, they receive voluntary training from both the British Council and the Language Centre of the USA Embassy in Amman. These two centres in liaison with the MOE organise in-service training workshops dealing with recent ELT trends and methods.

1.5.3. The First National Conference for Educational Reform

The First National Conference for Educational Reform (NCER) (www.moe.gov.jo) was held in 1987 to tackle comprehensively all the aspects of the education system including educational policy and structure, school buildings and educational facilities, curricula, school textbooks and educational technologies. Similarly, the MOE plans covered training and certification of teaching, administrative and supervisory staff. As a result, the MOE revised and developed the general objectives of education. It also restructured the educational cycles by extending free compulsory education from nine to ten years and reducing the Secondary Stage to two grades.

1.6. Higher Education

In Jordan Higher Education (HE) refers to the education levels beyond the secondary school. This sector is managed by the Higher Education Council (HEC) with its authority over and responsibilities for (www.moe.gov.jo):

> "..establishing the independence of these Universities through providing them with the necessary financial resources, forming a trustee council for each university, appointing its members, as well as identifying the duties and tasks that it undertakes, so that it will become capable of designing the university policy and supervising it to improve education and to create competition between universities."

Higher Education seekers can join the two/three year community colleges, the four-year colleges or universities according to their average in the GCSSE and their choices of the specialities. Graduate and postgraduate qualifications (Master and Ph.D. programmes) can be attained at the Jordanian universities with four-year pure arts and sciences programmes. These universities offer programmes in all disciplines within the realm of the humanities, the social sciences, and the pure and applied sciences. Many of the existing universities also offer studies leading to a Master's degree in most specialities (i.e. Arabic, English, History, Computer Science, Engineering, Education, Economics, Business Administration, etc.) and Ph.D. in a few specialities.

All the public and private universities offer the BA in English language and literature and Teaching Methods of English. Some public universities offer MA programmes in English Linguistics, Literature, Translation and TEFL, and the University of Jordan has recently launched a Ph.D. in linguistics only.

1.6.1. Public Universities

Seven public universities have been established as described briefly in the following sections.

1.6.1.1. The University of Jordan

The University of Jordan was established in 1962 as the first four-year institution in the country. It is located in the north-western part of the capital, Amman. Starting with one faculty for Arts, this university now has a total of 13 faculties and the number of students in the university now amounts to about 24,000. It offers most academic specialities, including Medicine, Dentistry, Nursing, and Pharmacy. Throughout the past two decades, it has been focusing on the creation and development of graduate programmes at the Master's and Ph.D. level (Majdoubeh, 1996: 22).

1.6.1.2. Yarmouk University

In 1976, Yarmouk University, the second in the country, was established in Irbid in the north of Jordan. In addition to the various academic faculties of Arts, Sciences, Humanities, and Social Sciences, it had established the first faculties of Journalism and Fine Arts in the country. The English language is the medium of instruction for most subjects of sciences, computer and technology sciences, engineering and medical sciences. The number of students is about 12,000.

1.6.1.3. Mu'ta University

It is located in the town of Mu'ta near the city of Karak in the southern part of Jordan, some 120 kms. from Amman. It was founded originally in 1981 as a military college to provide the Jordanian Armed Forces with qualified crew in the various military and police disciplines. A few years later, it initiated a parallel civil branch that teaches various academic disciplines. It has about 11,000 students in both branches.

1.6.1.4. Jordan University of Sciences and Technology

This was established in 1986 and located in Ramtha the north of Jordan, which is 85 kms. from Amman. Originally part of Yarmouk University. It has been developed

to train students in the various fields of science and technology to speed up the development of the country. The university has progressed tremendously to meet the needs of its students. Its population is about 5000 students (www.just.edu.jo).

1.6.1.4. The Hashemite University

The Hashemite University opened its doors to the first group of students in 1994. The university, whose number of students totals 1, 200, is still in the foundation phase. It offers many programmes in the humanities, sciences and Engineering. It is located near the city of Zarqa, some 20 km to the north-east of Amman.

1.6.1.5. AI -AI Bayt University

AL El Beit University was inaugurated in 1993 in AI-Mafraq, about 65 km to the north-east of Amman. It is established as an international university, one of its goals being to encourage a modern perspective and an unpoliticized view of Islam. Students study a variety of subjects, but most of them concentrate on disciplines within the realm of Islamic studies. Many students are from Jordan, but many also come from Islamic countries the world over. Its population is about 2,600 students.

1.6.1.6. Al Balqa' Applied University

A new university, Al Balqa' Applied University was established in 1997 to supervise the large network of community colleges to fulfil their mandate of providing quality and relevant human resources skills development. This university is a composed of its campus in Salt. Besides eleven community colleges that were previously supervised by the Ministry of Higher Education, a further nine public colleges currently operated by other ministries are transferred to Al-Balqa'. Its responsibility is not only to control general academic standards, but also to provide national standards and learning programmes at the applied university and college levels in vocational, technical and

applied academic fields. It also aims to support research and application of technology as a service to the community (www.bau.edu.jo).

1.6.1.7. King Hussein's University

This university has been established in 1999 as an extension of Mu'tah University in the south of the country to cope with the increasing number of the high education seekers in this region. It comprises the faculty of Arts and Sciences with the aim of expanding according to the number of students joining it in future.

1.6.2. Private Universities

Since the late 1980s, Higher Education, like many other spheres, has been affected by the shift of the government toward privatisation. At the early 1990s, several private universities have been established to cope with the number of higher education seekers who are unable to get into the specialisations they want at the public universities.

There are about ten private universities now in the country whose most undergraduate programmes are similar to those of the public universities. The Ministry of Higher Education controls the academic standards in the private universities.

1.7. Summary

This chapter briefly describes recent education developments in Jordan. It is noticed that the education system is governed by the MOE through the senior board of education and other central national committees. The MOE plays the dominant roles in planning, implementing, supervising, monitoring, evaluating and developing all the educational programmes. Few minor responsibilities are delegated to the GDE and down to the LED. National central committees implement the development of curricula, teaching materials and training programmes. Private educational institutions share with

the MOE some responsibilities in running kindergartens and few community colleges and ten universities. Teachers have got good opportunities in the programmes of training and upgrading their qualifications.

CHAPTER TWO

BACKGROUND OF THE PROBLEM

2.1. Introduction

This chapter previews the background of the problem investigated in this study. The preview aims to show how succeeding versions of the national curriculum moved from a general view of the social context of ELT to a more functional view of the specialist discourse needs of different subjects and to a more sensitive grasp of the needs of learners. This preview covers various aspects of the English language teaching situation in Jordan and the development of teaching English in relation to the development of the school curricula of English. It describes the national curricula and school textbooks of both the Basic Stage and the Secondary Stage. The assumptions, the aims and objectives of teaching English at the Secondary Stage are presented besides the description of the course of this stage.

The chapter sets the scene of this study in terms of the context of the problem, purpose of the study and the borders that limit this research.

2.2. The English Language Situation in Jordan

Students start learning English as a general basic educational subject at the age of 10 years (Grade 5) and continue up to the age of 18 (Grade 12) when they finish their secondary school. Although English is the medium of instruction of the scientific courses at the faculties of sciences in the Jordanian universities, it is regarded as a foreign language in Jordan. Science university graduates develop specialism in English medium during their study at the university, then join schools where they teach science in Arabic. When the school graduates join the university or any career requiring scientific English, they will find themselves unfamiliar with any scientific expression or

concept. The English Language National Team (1991: 4) stated that the ultimate goal of teaching this language is:

> "to produce a cultured, informed, useful and enlightened citizen. Through his ability to understand, speak, read and write English, this citizen will contribute to the development of his country."

And they added that its curriculum is based on the following foundations:

> "1. English is a subject required of the Basic Education Stage pupils from the fifth grade aged 10 years up to the tenth grade aged 16 years.
> 2. Teaching English as a general subject continues in the Secondary Stage for the two grades.
> 3. English is allotted between five and six 45-minute periods a week", (1991: 4).

2.3. The development of teaching English in Jordan

When Jordan obtained its independence from the British Mandate in 1946, the schools were using books published by British publishers with no reference to a national curriculum for the English language. Then, in the early nineteen-sixties, the MOE applied the first explicitly described English language curriculum for public schools in Jordan. It prescribed the series of English language textbooks for the compulsory stage. It outlined the rationale for teaching English as a foreign language, the general and specific aims for teaching it, and described the pedagogical theory, practices and ways of assessment. This series was called 'Living English for Jordan' with two components: a Teachers' Guide and a Pupils' Book. This series was mainly based on the structural approach to ELT, as it tackled teaching the basic grammar structures, memorisation of vocabulary items and controlled writing. It focused on the pronunciation of the new words and recognition of their meanings while it neglected listening and speaking skills.

Since the middle of the 1960's, the Ministry of Education has been revising the education system. The set objectives of the 1960's and 1970's had been achieved in making education free and compulsory in the first nine years of schooling. In the late 1970s, the MOE modified the series of English textbooks for the basic stage and published it under a new title 'New Living English for Jordan'. This modified series

tackled listening, speaking and writing. It introduced some situational dialogues, guided and semi-free writing activities.

English Language curricula were evaluated by a team of Campbell, El-Ezaby and Harrison (1972: Mimeographed). Their preliminary study of English Language teaching in Jordan proposed a developmental project of English curricula for the Secondary Stage. They recommended conducting a 'Survey of the English Language Policy in Jordan'. Harrison, Prator and Tucker (1975) conducted this proposed survey. The result of this survey revealed that school English curricula were inappropriate for ELT in Jordan in terms of the recent tends and approaches to ELT in that period. Then, the survey led to the development of the English curricula for the Secondary Stage. Accordingly, new courses were developed and applied in 1977.

The Government of Jordan commissioned in 1986 a committee of specialised educators and senior government officials to conduct a comprehensive analysis of education. One of the Committee's strong recommendations was that "the MOE should develop the school curricula in accordance with recent approaches to teaching English". The findings of this study (Ministry of Education, 1987:60) revealed some drawbacks in the English curricula of the Secondary Stage and concluded as follows:

> "1. The specific objectives are not realistic; that is, difficult to be attained.
> 2. The curricula are not in line with the current approaches to linguistics and language learning and teaching.
> 3. The exercises and activities are inappropriate and concentrated on rote learning which were found to be ineffective for language practice and communication."

Furthermore, the official report of the General Directorate of Curricula (Ministry of Education, 1986:2) emphasised the previous findings of the Committee's study. This report shows that:

> "1. Language exercises concentrate on the complex and informal structure.
> 2. The language skills are not well integrated.
> 3. The Method and techniques of teaching are out of date and boring, given the fact that mechanical and rote learning is given priority.

> 4. The curricula of the Secondary Stage lack variety in activities and do not stimulate the learners' motivation and interest in using English.
> 5. Free communicative writing is not emphasised.
> 6. The contents neither stimulate the learners' thinking nor motivate them towards classroom interaction."

Accordingly, the Ministry of Education (MOE) revised the currently used textbooks of the secondary stage. The MOE took into consideration the recent approaches to teaching English as a foreign language in general and the communicative approach in particular. Revising school curricula was one of the major focuses of the First National Conference for Educational Reform in Jordan (NCER) held in 1987.

Consequently, the NCER recommended (Ministry of Education, 1988) that the new English curricula for the Secondary Stage should be developed in line with the curricula of the basic stage and the policy of teaching English in the Secondary Stage in Jordan as well. It was also recommended that these curricula should be based on current approaches to ELT and to curriculum design.

Before 1984, English language curriculum adopted the traditional methods of teaching English; such as the structural approach, the direct method, the grammar-translation and the audio-lingual methods. These methods concentrated basically more on the role of the teacher rather than that of the learner. The role of the student was only to learn from the teacher what the teacher wanted him to learn. The Ministry of Education (1987:60) found that:

> "1. The curricula are not in line with the current approaches to linguistics and language learning and teaching.
> 2. The exercises and activities are inappropriate and concentrated on rote learning which is found to be ineffective for language practice and communication."

2.4. The English Language Curriculum in Jordan

The curricula and textbooks of each stage of education are described in the following sections.

2.4.1. Curriculum and Textbooks of the Basic Stage

The general goal of the English Course for the Basic Education Stage is to equip the pupils with basic competence in language usage and to prepare them for advanced competence in language usage at the Secondary Stage. The course must nevertheless be self-contained, so that a pupil who does not proceed beyond the Basic Education Stage will have a useful command of the language.

After six years of learning English at the public basic schools, it is expected that the pupil should be able to (Ministry of Education, 1991:4):

> "1. Make use of the English sound system. The pupil should understand simple English spoken at normal speed by native speakers, communicate intelligibly in simple English, pronounce the English words correctly and use basic stress and intonation patterns.
> 2. Understand and communicate intelligibly using a variety of notions and linguistic functions based on everyday situations; such as greetings, leave-taking, polite formulas and expressions. The pupil is presumed to ask and answer questions about, age, price, weight, measurement, time, place, quantity, frequency and distance. He is also encouraged to make introductions of himself/others, to accept and decline offers and invitations; to identify requests and to ask for permission. The pupil should be able to negotiate and to express his likes, dislikes, preferences, suggestions, wishes, apologies, complaints, threats, promises and to express hope, doubt, anger, anxiety, pleasure, surprise and disappointment.
> 3. Read and understand English general texts with vocabulary of about 4000 word like stories, description and expository prose, etc. The pupil is likely to read and obtain the main ideas from newspapers, magazine articles, brochures, catalogues, and instruction manuals. It is also expected the pupil will be able to read silently at a reasonable speed without sub-vocalisation or translation, get specific information from a reading passage and acquire the habit of reading for pleasure.
> 4. Master the graphemes (letters) of English and shape them correctly, legibly and neatly. The pupil should be able to use the English punctuation system correctly; spell correctly the vocabulary. Besides, he is likely to write properly structured sentences; and to write a logical and well-structured paragraph by making use of the previously mentioned elements. Moreover, the pupil will be able to retell a story, write or complete a dialogue and write a short letter for some practical purpose. He is expected to describe how a machine works, fill in forms and extract information from a simple map, graph or diagram and use it in a written form. The pupil will be able to write a short report based on observation, experience or a read text, to transform information from a text into a tabular or diagrammatic form. He is likely to carry out other simple writing functions; such as expressing their own likes, dislikes, daily experiences, wishes and hopes in a simple way."

So far, it is noticeable that there was a significant move towards the specialist discourses required, and to meeting the needs of the learners including some literary, expressive and some transactional genres. Although this was emphasised theoretically in the objectives, it was not implied in practice.

Therefore, a new English curriculum for the Basic Education Stage was designed in 1989 comprising Grades Five through Ten. Then, a series of textbooks based on this curriculum was introduced nation-wide. PETRA (Progress of English Through Relevant Activities) textbooks are the school textbooks used by all students all over the country.

The series comprises three books that should be covered within 16 working school weeks for five days a week and during 45 minutes each class period. Grades Five and Six are allotted 6 classes a week, whereas Grades 7-10 are allotted five classes. The first book is a 'Student's book' which consists of twenty-four units. Every unit contains an audiotaped dialogue between two or three persons. The students listen to it in the classroom. This unit also contains a short passage followed by some activities that are performed through discussion. The second is the "Workbook" that includes different exercises done by the students themselves. The third book is the "Reader" containing many short stories easy to understand and appreciate under the guidance of the teacher.

PETRA textbooks are a translation of the national curriculum that aspires to emphasise the educational value of English in addition to its general present day instrumental value. The English Language National Team (1991: 2) points out that:

> "Based on these two types of value, viz., the educational and the instrumental...Section two gives the content in which the stated objectives can be realised. The content includes themes, topics, functions, notions, vocabulary load and structures."

AL-Jarrah's study (1987) analysed and evaluated PETRA textbooks (i.e., Pupils' Books, Work Books. and Teachers' Books) for grades five and six. Al-Jarrah (1987: 94) found that:

> "PETRA textbooks were good/strong concerning rationale, objectives, language skills, vocabulary, grammar, content, method of teaching, technical factors, hand-writing book(s), teachers' book(s), and general aspects of PETRA Series".

2.4.2. Curriculum and Textbooks of the Secondary Stage

The English Curriculum for the Secondary Education covers all streams and types of education. Table 2.1 summarises the current English courses used in this stage (Ministry of Education, 1991):

Table 2.1: The English Language Courses for Secondary Schools in Jordan

Course Title	Education Stream	Type of Requirement	Grade
General English	**All Streams**	**Basic Obligatory**	**1,2**
Anthology	Literary, Sharia'h	Obligatory	1
Advanced English	Literary	Optional	2
Functional English: Business English	Commercial	Obligatory	1,2
Functional English: English for Nursing	Nursing	Obligatory	1,2

There are four courses addressed to the secondary students as follows (the English Language National Team, 1993):

1) General English is an obligatory two-year course for all streams of the Secondary Comprehensive Education and Applied Secondary Education.
2) Anthology for First Secondary Comprehensive Education (obligatory for Literary and Sharia'h students): this is an obligatory course of three periods a week with an aim to develop the students' reading skills of various topics and types. The content includes a number of selections of modern literature.
3) Advanced English for Second Secondary Comprehensive Education: this is a two-part course as one of the optional specialised courses for the literary students. The English Language National Team (1993:45, 55) prescribes the two parts:

> "The language course aims at upgrading and extending the learners' proficiency level with particular emphasis on reading, writing and translation...Literature is part of the elective course for the Second Secondary Literary Stream.... It is allotted two class periods a week. The focus of this part is on increasing students' understanding and appreciation of literature through a study of a selected number of literary works."

4) Functional English for First and Second Secondary Comprehensive Education (Obligatory for the Commercial and Nursing streams): this consists of two courses: English for Business and English for Nursing Streams. Both of these courses are prescribed and developed by the specialists in these two specialities. Two periods a week are allotted to each course. The first concentrates on the business writing and reading skills dealing with business topics and transactions and writing letters. The second focuses on health topics and patient care including note taking, shorthand writing of surgery requests or instructions, and reading of nursing topics.

This review shows that the MOE has responded to the needs of the students in the Business and Nursing streams and has neglected those of the science students. Actually, The latter need specific English more than any other speciality in the secondary education in Jordan, since it is nationally well known that science students have better chances in either joining the university or the labour sector than others have. Scientific English will help science students in their future careers or higher education more than other students.

2.4.3. Assumptions of Teaching English at the Secondary Stage in Jordan

The assumptions for teaching English in the Secondary Education Stage underline those of the Basic Education Stage, in which English is regarded as a means of communication between Jordan and other countries of the world. Moreover, English is not only a necessary tool for the country's economic, educational and technological development, but it is also a means of gaining insight into other people's cultures and patterns of thinking. The English Language National Team (1993:5) assumed the following principles of ELT:

> "1. The needs of the Jordanian learners as well as those of the Jordanian society should be carefully addressed in the content of the new curriculum.

2. The skills of aural-oral (listening-speaking) communication, reading and writing are to be particularly emphasised for their relevance and value in both the academic and vocational fields.
3. A balance should be maintained between language use (communication and language usage or grammar).
4. As self-learning, critical thinking and problem-solving teaching methods are major concerns of the new Educational Reform plan, they should be incorporated into the new Secondary Stage General English Curriculum.
5. Enabling the students to make use of the various sources of knowledge efficiently and independently should be fostered through life-long and continuous education.
6. Individual differences should be given due consideration in both content and methodology."

These principles assume that English in Jordan is taught for educational purposes including the knowledge of a foreign language and the culture of its native speakers, for future purposes at the university or the occupation. It is also a means of access to sources of modern knowledge in sciences and technology which are available in English. These assumptions theoretically consider the students' needs, yet they have not been translated into action, as is evident in the existing curricula.

2.4.4. Aims and Objectives of Teaching English for the Secondary Stage

The General English Course aims at developing the learner's competence in the four language skills with particular emphasis on the skills of reading and writing. After completing this two-year course, the student should be able to:

"1. Understand English spoken by native and non-native speakers on topics of a general nature.
2. Communicate orally with native and non-native speakers on a variety of topics in an effective and appropriate manner.
3. Read and understand authentic written English texts having to do with general and technical topics.
4. Develop the habit of reading both simplified and original English books (for pleasure and information) on topics of a general nature.
5. Express in writing one's own ideas, feelings, and points of view on a variety of topics using correct and appropriate English.
6. Develop his study skills to a level that would enable him to use English independently, and to enrich his general knowledge in various fields.
7. Develop the skills of critical thinking, reasoning and problem-solving.
8. Respond to the positive contributions of world civilisation without compromising the culture and heritage of his society."
(The English Language National Team, 1993:6)

2.4.5. Description of the Course of the Secondary Stage

The General English Curriculum is required of all students in the various streams and in the two years of the Secondary Education Stage (Literary, Scientific, Industrial, Agricultural, Nursing, Commercial, Sharia'h, Hotel Training and Home Economics.)

This course is allotted three 45-minute periods a week in each class of the Secondary Comprehensive Education Stage: one period for grammar, one for reading and one for writing. It aims to reinforce the English language skills learnt in the Basic Education Stage and to provide learners with new language experiences that can be used in a variety of relevant situations.

As for the Secondary Applied Education, English is allotted two 45-minute periods a week in each year. Its content should be extracted from the content detailed for the General English Curriculum for the Secondary Comprehensive Education Stage taking into account the number of periods allotted and the level of the students.

2.5. Context of the Problem

English is an international language and is mainly used in science and technology. It is the native or first language of about 600 million people, and it is used as a second language in many countries. It is also used as a foreign language all over the world. There are historical, political and economic reasons for this. If we look at English in the context of various economic, industrial and political developments, it is the language of the North American/British world, which has been at the forefront of industrial development.

White (1983: 227) considered the reasons for the growth of English as a world language:

> "Some linguistic factors have led to the predominance of the English language and added much to its importance. English seems to enable its speakers to coin new words. It is a "hybrid" language. It has two major sources of vocabulary. Throughout the history of the English

> language, one sees that "English makes no bones about borrowing new words from other languages, while other languages, for various reasons, do not seem to borrow terminology so readily from other languages, and sometimes, for political or cultural reasons, do not attempt borrow. Thus, the "English speaking people, unlike the French, for example, seem to be not in the least concerned about' maintaining linguistic purity in that sense".

In addition, the English language enables its speakers to master new terminology. As new technical and industrial inventions have been achieved, terminology has very quickly been invented to name them. And similarly, when a term needs to be borrowed, it is very quickly borrowed into English and becomes part of the lexicon. This very characteristic has made English the most appropriate language in the field of science and technology. For instance, computer terms are incorporated into many languages as they are, such as log, internet, web, surf, etc. Similarly, scientific terms such as biology, carbon, silicon, plant, bacteria, chromosome, etc are adopted as they are in Arabic and other languages.

In recent years, there has been a great demand for English for Science and Technology (EScP). For example, in the UNESCO report of 1957 it was stated that English is now established as the principal international language of science. It was also mentioned in the 1968-1969 report of the British Council that English is the language most used for communicating facts and it is a main factor in scientific, technological and economic progress. Half of the world's scientific literature is written in it (Lee, 1971). According to a survey undertaken by Ewer (1981), more foreign experts now lecture in English than before. He also points out that the number of scientists and technologists lecturing in English is increasing by 20% per year. Strevens (1971: 7) states that:

> "... Among millions of people who have learned English, an ever-increasing portion wish or need to use it in connection with science and technology...Yet, they complain that their English is largely inadequate for their needs".

Despite this expansion, little research has been done in the field of teaching ESP in the field of Industry. Trimble (1985: 76) mentions:

> "Our experience has shown us quite clearly that, especially in developing countries, more students will go from school to industry than will go to university. Up to the present, a fair amount of work has been done in English for specific purposes materials aimed at preparing the foreign student for university studies in English or helping him with his special needs in English while he is at the university. However, far less has been done in preparing students-even those who are in technically oriented secondary schools-to handle the kind of English they will need on the job. I am not speaking here of non-native, speakers of English coming into an English speaking environment to work; I am speaking of the student going into industry in his native country."

In the respect of human resources development in Jordan, the Jordanian government has recently paid the attention to equipping the students with the knowledge of English and computer from the first grade at the basic stage of education. Therefore, there is a high demand for teaching English to a large number of students in schools, community colleges and/or universities. An enormous portion of Jordanian manpower goes to other Arab countries. This includes many of the graduates of schools, colleges and universities. This situation increased the need to develop effective programmes to educate and train students. These programmes should help them keep up with the rapid advance in the field of science and technology and with the rapid technological development in Jordan in particular and in the Middle East in general. Accordingly, the number of international companies working in Jordan has increased recently. The number of international experts or consultants in education, industry and business has grown in the last ten years.

The expansion of technical and scientific knowledge has increased the importance of teaching/learning English and of developing school programmes to keep students up with this expansion of knowledge.

A great portion of the graduates of the scientific secondary stream in Jordan go to university where English is the medium of instruction in most of the faculties, and

particularly in those of medicine, engineering and sciences. In such faculties, most of the textbooks are available only in English, many lectures are given in English and students are often required to answer their exams in English. Mostly, these faculty members graduated from either USA and/or Britain. So, to succeed in their specialised subjects, the students should be able to communicate in English orally and in writing.

English in secondary schools is presented to the Scientific Stream students as a general subject containing very few scientific themes. The existing textbooks do not deal with topics that are related to students' interests, experience, and background. In the conversations that took place in the meetings of the English Language National Team, it became evident that the university professors were generally dissatisfied at the first year university students' performance in English at the university level. These professors argued that the poor standard of secondary school graduates affects the teaching of English at the university level, where English is often the medium of instruction. They also argued that the MOE should seriously tackle this problem by offering various courses meeting the students' backgrounds and future plans. Furthermore, they referred to the problem of the science students in particular as most of university science instruction is in English.

Many colleagues reported during training workshops that the Scientific Stream students were complaining of their performance of English language skills and their inability to communicate their scientific knowledge in English, so they disliked attending its school classes. Therefore, they resorted to private tutors who offered a course tailored for them.

The researcher's classroom observations of the teaching/learning situations indicated that the students' low level of motivation towards learning English might be due to the lack or insufficiency of the scientific themes included in the present curriculum which has not been built on the students' needs. These observations revealed

that Arabic was very much used as a medium of interaction between the teachers and the students in the English classes. The students were often passive and not able to express their ideas. They could not answer the questions raised by their teachers neither could they pose a question.

Moreover, informal interviews led by the researcher with some teachers, supervisors and headmasters revealed that there was a general complaint that the performance standard of students was very low. Other interviews with some students including questions about their needs and the problems that hindered their performance in English and a few simple questions in English showed that the many students were unable to express clearly their ideas in simple scientific English.

The curriculum of English in Jordan was built on the audio-lingual approach to ELT, whereas the current approaches to ELT and to syllabus design emphasise the teaching and learning of English for communication in different functional situations similar to those of daily life (Johnson, 1982; Widdowson, 1984; Crombie, 1985; Dubin & Olshtain, 1987).

The English curricula in Jordan were planned by a national Committee on a completely central level. Students, teachers and education supervisors were not consulted on a large scale to assess the students'' needs and practitioners' perspectives of learning and teaching English. There was no survey, questionnaire or any other assessment tool to collect their views and suggestions or to listen to them. Along with the Jordanian Government efforts to promote and enhance the democratic practices in many aspects of life, the MOE should take the initiative to bring up the future generations to these practices. That is, the MOE should involve the education stakeholders in planning and evaluating the education programmes. In other words, it is a matter of demand and supply. If the MOE supplied the people with the product the people need, there will be a demand on this product.

Hence, there was an urgent need for the development of English language curricula for the Scientific Stream students in Jordan based on the communicative approach to ELT in order to meet the students' needs and take into account the perspectives of the major stakeholders concerned in teaching English for these students. To meet this need, the researcher developed an EScP communicative programme which was responsive to the needs of its users and their educational community.

2.6. Rationale for the Study

There has been a movement away from the traditional curriculum of school subjects towards programmes that take into account the needs and interests of students. Identifying the language needs of learners is an important step in designing any language course. Needs assessment surveys provide objective information about the learners' interests, current knowledge and communicative language needs.

Meeting the specific needs of students has become closely related to the teaching of ESP. Clark and Clark (1977) suggest that the first step in any teaching project must be to design a syllabus that will reflect the language needs of the learners concerned. Elliott (1976) suggests that such a syllabus should comply with two criteria: the student must feel that the materials satisfy his needs, and he must enjoy his language course. One of the important attempts to provide a model for need assessment is Munby's communication needs processor. He (1976: 2) states that ESP materials are determined by prior analysis of the "communication needs of the learners". Munby's needs' processor is based on a socio-linguistic view of communication. It specifies the ways in which the learner will need the language as a means to an end. The following categories in this processor are concerned with the end product of learning:

1) Purposive domain: the occupational/academic framework.
2) Setting: the time and place in which the job or study is carried out.
3) Interaction: the roles the learner has to take or play to interact with others.

4) Instrumentality: the type of language (written or spoken) and the type of communication (direct or indirect).

5) Dialect: the varieties of English used in the target situations.

6) Target level: the level of linguistic proficiency that will be required.

7) Communicative event: what the learner will have to do in English.

8) Communicative key: the manner in which communication needs to be carried out.

The procedure followed by Munby is thorough, yet it represents a pure and idealised point of view. It presupposes that the investigator has both time and access to the target situation, and as such is more appropriate to a consultant than to a busy teacher-administrator (Macdonough, 1984).

The model is too detailed for use in situations when time and resources for needs assessment are limited. Still, this needs processor is very helpful in designing instruments to assess students' needs in different contexts. Other attempts to construct tools to identify students' needs have been made by Mackay and Mountford (1978).

Most ESP courses are based on the sponsors' needs: in other words, on what the parents, university, the company, or the agency think the needs of students are. Whilst this perspective is undeniably important, it is incomplete, as it leaves out the views of other interested parties, such as the learner, the teaching institution and the teacher (Allright, 1979). Thus, these courses exclude some important parties in the learning process. Needs as interpreted by the sponsor may conflict with the learner needs as felt by.

However, Munby's model considers many aspects of teaching and learning English. Programmes based on such a model determines the academic/occupational or instrumental purposes of the learners, their roles, the environment and communicative events to be considered. If this model is translated into practical situations, it is probably comprehensive and effective.

2.7. Purpose of the Study

The goal of this study is to suggest a model for designing EScP programmes that might be of value and use to English curricula planners and specialists in developing English teaching in Jordan as well as researchers in this realm.

Specifically, the study addresses the following objectives:

1) Identifying the needs of the Jordanian first year scientific secondary students for learning English for scientific purposes.
2) Assessing the perspectives of the community concerned in teaching English for the scientific secondary students.
3) Specifying the characteristics of a communicative programme of English for the Scientific Stream of the Secondary Stage
4) Measuring the effect of the suggested programme.

2.8. Summary

Previous attempts made great efforts to develop ELT in Jordan. Although the succeeding versions of the national curriculum of English moved from a general view of social context of ELT to a more functional view of the specialist discourse needs of different subjects and to a more sensitive grasp of the needs of learners, it was noticed that the Scientific Stream students' needs for learning EScP or the stakeholders concerned with teaching EScP were not addressed. Business and Nursing students' needs for specific English were considered by providing functional English courses for each stream. But the science stream students' needs for EScP were not assessed or incorporated in any from in the recent developments of the educational programmes. Just very few lessons including merely basic scientific concepts (see chapter eight 8.3 and appendix 6).

This study was an attempt to involve all these parties in designing a suggested EScP programme. This programme also considered the national policy of ELT.

The following chapter reviews the studies related to the present study, since such a review provided the researcher with a clear view of the other researchers' trends, approaches, conclusions and recommendations that were helpful guidelines to direct his focus on the methods, instruments and advice to manage the present research more effectively.

CHAPTER THREE

REVIEW OF PERTINENT LITERATURE

3.1. Introduction

Development of English school curricula in Jordan is based on the national policy and goals of ELT and the MOE sets the specifications of the teaching materials. But the involvement of teachers and learners is not active and direct in the development of these curricula. Attitudes and needs of these learners are almost neglected and no reference was found concerning the development of special programmes for the science students of the secondary schools. Furthermore, there was no record of research in the field of designing ESP courses to these students. The major concern of Jordanian researchers was geared towards such courses for higher education institutions.

This chapter overviews the development of ESP/ EScP in general and ESP in the Arab World and in Jordan specifically. The review will be organised chronologically starting from the earliest to the latest studies. These studies are organised geographically starting with the worldwide research related to ELT, the ESP/ EScP studies carried out in the Arab World, and ending with those conducted in Jordan. The studies represent the development of English language teaching through the dates referred to in the different countries where English is considered as a foreign and/or second language.

3.2. Definition and Development of ESP / EScP

Until very recently, the greatest effort in teaching English as a foreign language concentrated on English as a general educational subject. This type of English teaching is still very important and commonly used. In addition, there has been a growing demand for English language courses to be provided specially for these needs of a particular subject, profession or occupation, that is, English for Specific Purposes

(ESP). ESP is clearly associated with the communicative approach and learner-centerdness. Munby (1978: 2) points out that "ESP courses are those courses where the materials are determined by the prior analysis of the communicative needs of the learners."

ESP normally refers to programmes designed for homogeneous groups of learners whose specific learning objectives have been quantified and stated in communicative terms. Because the programmes are specific and appropriate for particular target users, it could be impossible to design a programme whose content specifications would be usable anywhere and any time.

ESP meets the needs of students in the language field that are directly related to their work. Skills and knowledge can be specified and selected in relation to the learners' purposes, goals and needs. ESP emerged as a response to three issues:

1) recent universal developments in the English language teaching as a foreign or second language in non-native English speaking countries as a means for achieving national goals in science, technology and economics,
2) huge expansion of research in learning and teaching language,
3) learners' demands for English programmes tailored to their specific needs,

(Hutchinson and Waters, 1987).

ESP should not be taught as an end in itself, but as a means to attain clearly definable goals. The element that gives ESP its identity is the learner's purpose. Such a purpose is not only restricted to linguistic competence but it also involves the mastery of the language skills where language forms are an integral part.

Robinson (1991: 7) argued that: "Needs analysis is generally regarded as criterial to ESP, although ESP is by no means the only educational enterprise which makes use of it." He distinguishes between two versions of ESP depending on the learners' purposes for learning English:

> "A major distinction is often drawn between EOP (English for Occupational Purposes), involving work-related needs and training, and EAP (English for Academic Purposes), involving academic study needs. Cutting across these is EST (English for Science and Technology), mainly used for ESP work in the USA....which can refer to both work-and study-related needs (1991:2)."

3.2.1. Definition of English for Scientific Purposes (EScP)

Strevens (1971) argued that both general and scientific English share the whole of English syntax constructing sentences in that both follow the same rules, both share the whole of English phonology and both share part of English lexis. He pointed out that general and scientific English vary greatly for scientific English has a large number of concepts; some general to science as a whole and some specialised to particular parts of science. They do not share similarity of contexts. They do not share the same symbols, sets of values, legends or situations. Scientific English has some linguistic properties in which it is somewhat different from general English.

Mackay and Mountford, (1978: 6) argued that English for science and technology (EST) is the major sub-division of ESP as:

> " It refers to an educational or occupational use of English. For example, the needs of surgeries and engineers are considered occupational, and educational when considering the students' needs for studying different branches of science and technology (Robinson, 1980)."

EScP is the teaching of English for a utilitarian purpose. It is concerned with the teaching of English in the field of science. It is that area of English language teaching which focuses on preparing learners for chosen communicative environments (Mohan, 1980). It differs from general English in that it is based on the analysis of learners' communicative needs for a specific occupation or activity, and the analysis of the language of that occupation or activity (Strevens, 1980).

The following sections review the development of ESP/ EScP worldwide, the Arab World and in Jordan.

3.3. World-wide Studies Related to ESP and EScP

The following worldwide studies are related to two main areas of ESP and EScP. Researchers in the field of ESP have investigated a variety of aspects and arrived at various results. The needs of students for EScP seem to vary with their nationalities, environments and specialisations. The learners' needs are probably driven by their attitudes towards learning English as foreign language for either instrumental or integrative purposes.

Bruton (1961) conducted a study to identify material that could meet the needs of the Hindi-speaking students at the secondary level, as the textbook used was irrelevant. The researcher analysed the structures that occurred frequently in the pre university courses which the students were expected to read. The results pointed out that students need to know about neutral present and simple future to be able to read. The passive forms are very important because they occur frequently in scientific texts. The use of 'may' indicating probability or possibility and the "-er" form in comparative adjectives occur frequently in the science texts of the analysed material. Based on these results, the author designed a course to meet the needs of students at local schools in India. The aim of the six-week course was to enable the students to follow a lecture delivered in English in that subject, and to read a textbook written in English in their field of specialization. The course included exercises directing students' attention to word formation and meaning and made use of dictation to correct vocabulary.

Some researchers attempted to analyse scientific English so as to arrive at appropriate EScP courses that reflected the characteristics of the scientific language.

Barber (1962) conducted an analytical study of the sentence structure and verb forms in scientific and technical English; and the vocabulary in scientific and technical contexts. For the purpose of the study, three texts were chosen from Biochemistry, Engineering and Astronomy. The lengths of the texts were nearly 7,500 words, 6,300

words and 9,600 words respectively. The author examined sentence length, clause types, verb tenses, and the use of non-finite verbs. The results were as follows:

1) Sentence length: The average sentence length in the texts analysed was 27.6 words.
2) Clause types:
    a) 71% out of the sentences examined had only one main clause.
    b) 3.4% had more than two clauses.
    c) 5.4% had no subordinate clauses at all.
    d) 6.9% had more than two subordinate clauses.
    e) 5.2% had a total number of clauses exceeding 4.

In this respect, the researcher found out that adjectival clauses were the largest simple type; adverbial clauses of time and condition were also frequent. Noun clauses and adverbial clauses of manner and degree were also frequent. As for verb tenses, the researcher pointed out that the simple present was predominant at 89%. Verbs with modal auxiliaries accounted for 39% of all verb forms, and '–ing' forms were the largest group of the non-finite verbs. The researcher classified vocabulary into four classes. The first class included words not occurring in the General Service List and occurring in all the three texts (for example: 'phenomenon', 'alter'). The second group contained words occurring in two texts, at least four times in all (for example: 'parallel', 'apparatus'). The third list consisted of words occurring in two texts, at least words occurring twice in each text (for example: 'variation, 'proportional'). The fourth list consisted of words occurring in only one text, at least ten times (for example: battery, transformer). In terms of the order of tenses, the analysis results pointed out the following:

1) Present simple active tense accounted for (64%) of the verbs found.
2) Verbs in the present simple passive accounted for (25%).
3) Verbs in the future simple active accounted for (3.7%).

4) Future simple passive tense accounted for (0.7%).

5) Present perfect passive tense accounted for (1.7%).

6) Verbs in the present perfect active accounted for (1.7%).

7) Past simple active tense accounted for (1.2%).

8) Past simple passive tense accounted for (1.2%).

9) Verbs in the present progressive active accounted for (0.6%).

Ewer and Latorre (1967) conducted a comprehensive study to draw out principles that might be useful in preparing an introductory course for science students. The study covered many fields of study: physics, chemistry, biology, engineering, medicine, agriculture, sociology, geology, economics and psychology. The authors concluded that six main considerations were needed to govern the presentation of the selected material. Properly organised and graded courses were necessary. A good deal of repetition and representation would be needed. Emphasis should be placed on oral work. The textbook should be interesting to students. The textbook should stimulate the interests of the students both in their own discipline and in science and technology.

Hudleston, et al. (1968) carried out a study to give an account of selected areas of grammar of scientific English. The researcher analysed 135,000 words taken from three different areas. The texts were taken from chemistry, physics and biology. High level texts were taken from specialist journals. Mid level texts were taken from undergraduate textbooks and low-level texts from popular works addressed to the intelligent and well-informed layman. The findings of the study showed that texts varied considerably in the number of clauses they contained. Subordinate clauses, clauses acting as qualifiers, clauses acting as complements and prepositions gave the evidence of function. Passive was more common in the high level, whereas active was more common in the low one. The present tense predominated in each level accounting for three quarters of all clauses. Adjuncts did not vary in their overall frequency. The high

level was characterised both by an abundance of 'and' and a scarcity of 'but'. There was a high significant predominance of negative clauses in the low stratum. Hudleston found out that there are linguistic variations in the text of individual sciences, for example Biology texts contained description of organisms where there was an increase in strong anaphora and a higher proportion of intransitives in them. They had more time adjuncts. Chemistry texts conformed more to the passive voice and past tense avoiding the use of 'may'. Physics texts had more minor clauses due to the large number of clauses consisting of algebraic equations. 'If' clauses were more commonly used in Physics.

Farrokophy (1970) examined physics texts and language textbooks taught in high schools in Iran to see how many of the technical terms found in American texts were taught to Iranian students. He found out that students were familiar with 18% only of the vocabulary found in the American texts. The results of the study indicated that a more specialised approach was needed to the teaching of English to science students. It was suggested that the English language courses for science students should deal with the most important aspects of technical vocabulary and structures conveying scientific facts. The text should be short but give the basic terminology of the special subjects and the reading materials should deal with the special topics students study. On the teacher's part, he should encourage the students to read scientific literature. It is necessary to provide supplementary readings in English from scientific literature. The grammar syllabus for EScP should deal with the structures most common in scientific writing.

Manson (1971) assessed the effectiveness of an intensive ESP programme of up to 15 hours per week for foreign students at the University of Hawaii. A comparison was made between two groups of students. The control group went through English as a foreign language (EFL) classes, whereas the experimental one did not go through such classes. An English proficiency test and an academic performance test were

administered before and after the experiment. The results or this study showed that there was no significant difference between the two groups in either English proficiency or general academic performance. The researcher concluded that the reason for the failure of those courses was that they did not provide the learners with the language skills they needed for academic studies.

The above-mentioned studies highlighted the importance of providing science students with ESP courses that should meet their specialism, because of their effect on the students' academic studies. These studies also emphasised the content of these courses should use scientific English focusing on reading scientific texts and writing about scientific topics.

White (1974) studied the relationship between the concept of register and TESL. He analysed laboratory reports, scientific English texts and general English texts. He found out that the distribution of verb groups in science writings reflects the communicative role or purpose of user. He found, for example, that laboratory reports were markedly different from science texts and from general English texts, with the verbs in the reports occurring predominantly in the passive form.

Cohen et.al (1978) conducted four studies to investigate the reading of English texts in the subject disciplines from the view points of the native-English-speaker in the particular field, the teacher of English as a foreign language and the advanced learner of English who was a student in the particular field. The studies investigated a biochemist's experience reading a survey article on genetics, two biology students' experience reading textbooks on genetics, an international relations student's experience reading an analysis of the voting processes and three South East Asian history students' experience reading the introduction to a basic history text. For comparison purposes, the fourth study also elicited responses from native speakers of English. The ultimate purpose of the four studies was to answer the question: What is problematic for non-

native readers when reading material in English in a specialised field?

There was one informant in the first study, a second-year chemistry and biochemistry student. The second study had two informants, a male and a female, both first year biology students. The third study had one subject, a first year international relations and economics major. The fourth study had eight subjects: four (three males and a female) first year history students and four (males) English speaking American students. In the first three studies (genetics, biology and political science), the subjects were instructed to underline all vocabulary and structures that they found difficult to understand. In the political science study, the subject also made a note of the words he looked up in the dictionary in addition to underlining the difficult vocabulary.

Although the reading passages utilised in the studies reflected different disciplines and different rhetorical approaches, students across the disciplines were found to have similar problems. Some of those problems were: 'Heavy noun phrases subjects and objects', the word 'heavy' suggests that although the constructions may not appear very lengthy or complex, they are difficult to understand. These noun phrases not only caused difficulties for informants across all four studies but they were also among the few structures that were problematic for students. As for syntactic markers of cohesion, the studies revealed that students were not picking up on the conjunctive words signalling cohesion, not even the more basic ones (however, thus, despite, nevertheless, relatively, similarly . . .). Concerning the role of non-technical vocabulary in technical texts, subjects were unable to translate or give target language paraphrases of a surprisingly large number of non-technical words; such as essential, giant, diversity, enhance, efficient (genetics); pattern, distinctive, contributing (biology); decades, ambiguity, devices (political. science); discrepancy, perceive (history).

Fredric and Pierson's study (1980) assessed the writing needs of university science students. For this purpose, they examined examination papers in science. Over

500 distinct question patterns were accumulated and analysed and classified into 27 categories as follows:

- List	- Enumerate	- Outline
- Summarise	- State purpose-	- Discuss
- Conclude	- Distinguish	- Explain
- Describe	- Compare	- Contrast
- Give an account	- Suggest	- Define
- Show significance	- Justify	- Prove
- Relate	- Write an essay	- Show cause
- Effect	- Evaluate	- Determine
- Speculate	- Comment	- Illustrate
- Show	- Give reasons	- Design
- Show by what manner	- Miscellaneous	

They found out that the questions dealing with discussion, explanation, and listing accounted for almost 50% of the question pattern data. This indicated that students were required to write answers to questions of this nature most often.

Gage and Prince (1982) conducted a study to investigate three main issues: What are the language and performance skills necessary for entry-level jobs? How can these skills be incorporated into a vocational ESL curriculum for beginning level students? How can the ESL material reflect on-the-job training techniques? The researchers developed two data collection instruments: an oral survey of employers and supervisors; and an observation form to collect data on specific work tasks on functional language requirements of entry positions. Further analysis at five work sites was conducted to examine language demands of entry-level jobs in general and of on-the-job training in particular. The researchers suggest that it is possible to offer vocational ESL immediately to students at the beginning level. There are several language functions necessary for vocational students at the beginning level. These functions can be classified into eight categories.

The first category includes giving directions; one-to-one demonstrations and group demonstrations; sample piece of finished work; reading an illustrated shop and/or blueprint (understanding non-verbal language). The second category includes sequences and codes; understanding alphabetical order; numerical sequences and colour codes. The third one contains feedback; identifying good and bad work and understanding simple oral feedback about the quality of work. The fourth is meta-linguistics: acknowledging that directions have been understood, using eye contact, head nodding or short verbal responses, asking for repetition or clarification when directions have not been understood and understanding when an instructor or supervisor is interrupting work to clarify or change directions. The fifth is reference: understanding gestures used to indicate tools locations or processes in the students' views. The sixth is safety: identifying safe and unsafe practices in relation to restricted areas, special protective wear, smoking, fire, and lifting. The seventh category is concerned with the world of work and social English: reading work schedules for the day, reading company rules, asking a fellow to do something together, and understanding company policy about when and where to take breaks. The last category emphasises simple social language including: a variety of situations (e.g. practice in greeting fellow workers, identifying oneself and describing or asking about routine behaviour patterns such as leisure activities).

These studies revealed that scientific English is different from general English. For example, writing a scientific report about a laboratory experiment needs special vocabulary, structure and function words, because it is addressed to special audience who have their own scientific jargon. Besides, EScP deals with specific scientific situations, such as description, illustration, listing and various demonstrative situations.

Batty and Chan (1984) investigated the English language needs of Chinese science and technology students. In their assessment, they tried to discover the

difference between the perceived needs of students who were preparing to go to the U.S.A. (group A) and the needs of those who had been in the U.S.A. for six months or more (group B). This would allow the researchers to anticipate the problems students might have in accepting a curriculum, which is more closely tied to the perceived needs of the latter group. The sample was divided into two groups: group 'A' consisted of 24 participants who were attending an English language course in China and group 'B' consisted of 22 participants who had been in the U.S.A. for at least 6 months. A questionnaire was designed and administered to the two groups. The results revealed that the most important skill for both groups was 'understanding spoken English'. Reading and writing skills and oral communication skills (e.g. participation in class discussion, asking and answering questions) were high in importance for both groups. There were significant differences between the two groups in some specific needs such as 'participation in seminars' and 'reading charts and graphs'. The researchers suggested that any EScP programme should include the following: opportunities for understanding spoken English; writing for scientific purposes (letters, outlines, answering exams); taking notes from lectures and readings; and participating in discussions of various sorts. He pointed out the importance of assessing the needs of students before designing any language course. Assessment of future needs of those who have experienced the target environment (e.g. work, university) is of equal importance.

Graham and Breadsley (1986) conducted an experimental study in which a course in communication was offered to non-native English speaking Pharmacy students at the University of Maryland. The course was a combination of content area of ESL and ESP. Speech acts that seemed necessary for effective oral communication by pharmacists in their professional setting were used as an organising principle for the syllabus. The course was designed according to the analytical approach. It was based on

meaning rather than on formal structure. The sample consisted of ten non-native students, nine from the School of Pharmacy and one from the School of Nursing. Before the course began, A Test of Spoken English was administered to the sample. Students were also given the listening section of Harris and Palmer's (1970) *Comprehensive English Language Test.*

On the first day, subjects were asked to fill out a questionnaire about their work needs. Students needed to increase their fluency, writing skill and vocabulary. The course was structured around a number of speech functions considered necessary for pharmacists in their professional settings. Role playing technique was used. This technique was fundamental to the course because pharmacy students, like other ESP students, were studying primarily in order to perform a role. At the end of the course another form of the test was administered. The results showed statistically significant improvements in all categories.

Tudor (1987) conducted a study to assess the possible contribution of translation to English for specific purposes (ESP). He used translation activities with one group of ESP learners in Germany. The sample was drawn from small group ESP professional learners, whose first language is German, mainly businessmen and academics in West Germany. The learners required English from time to time in their professional lives, for example, in dealing with customers of their firms or in participating in conferences. The amount of time he spent with the group was two sessions per week. The learners belonged to the same socio-professional group and they were educated and highly motivated. They also had the same objectives for learning English.

Two types of activities were employed using the first language input material: oral presentation and text-study discussion. The aim of the first activity was to improve the ability to communicate in the field of specialization. Each subject was required to

prepare an oral presentation for 25 to 50 minutes on one specific aspect of the professional activity on the basis of relevant first language material. Discussion and questions in English followed this activity. The second activity was based on journalistic material and was designed to develop discussion skills in a more general sense. In this activity, learners received a text in German on current affairs topic. They had to perform three tasks on the basis of the German text: to make a rough oral translation of a text as they read it over; to make a written summary translation of the text; and to prepare for a class discussion of the text topic in the class. The class discussed the difficulties each learner encountered and suggested and discussed possible solutions.

The research results revealed that the first language input in the activities introduced the learners with very precise communicative goals for their second language production. These goals required the learners to explore new areas of the expressive use of second language. The translation works in activity two provided students with confidence in their ability to express themselves accurately. These works increased their communicative competence in this way. The presence of the first language input created the subjects' explicit recognition of their need for second language, and therefore a receptive attitude for the acquisition of new elements.

Lan (1989) conducted a study with a view to extending vocabulary in English for specific purposes to Chinese University students in the UK. On the basis of the author's personal experience in this field, and the results of a survey distributed to Chinese students of science and technology, he made a detailed analysis of the needs and characteristics of these students studying English for Specific Purposes. Particular problems included the lack of language exposure, limited learning time and motivation. The importance of vocabulary teaching and learning was highlighted. Needs analysis of Chinese ESP students and lexical analysis of scientific texts proved that a certain core

vocabulary should have been taught or learned in tertiary education. The common-core vocabulary widely discussed in the standard ELT literature contained only about 2000 words not relevant for university students. The extension of vocabulary should concentrate on words which have a high frequency in every branch of science rather than on any single subject. ESP in China is currently not well informed by advances in applied linguistics made in the English-speaking world. This emerges specifically in the issue of vocabulary learning, where several sociolinguistic and psycholinguistic aspects are involved. A word is learned sufficiently only when it is both needed and used. A lexical syllabus is better suited to a task-based teaching methodology than a grammar-based syllabus. Contextual learning is more effective than word-list reciting. It is possible to devise techniques based on componential analysis, word-formation, and dictionary skills, which enable the student to analyse for him/herself important aspects of the language to which he/she is being exposed.

Clapham (1994) studied the effect of background knowledge on EAP reading test performance. This research aimed to:

> "Firstly investigate the ESP claim that tertiary level ESL students should be given reading proficiency tests in their own academic subject areas, and secondly to study the effect of background on reading comprehension (www.theses.com, 1999).

Two versions of International English Language Testing (IELTS) test including reading modules in three different academic subject areas were administered to the students. Analyses of variance showed that the reading subtests varied in subject specificity: some were suitable for students in the relevant field, others were either too general or too specific. There was a variation in the appropriacy of the reading passages. This variation was:

> "..due to differences in rhetorical function; uncertainty among EAP teachers about concepts relating to academic and topic specificity; the extent of students' familiarity with the subject areas and students differences in their background reading."

This study suggested that the specificity of the reading passages determined the relative importance of language proficiency and background knowledge in reading comprehension.

These studies emphasised that prior to designing EScP programmes, students' needs, familiarity with their subject areas and knowledge backgrounds should be assessed and incorporated in these programmes. These studies revealed that teaching EScP needed specific methods and techniques, such as role-play technique and methods of building up vocabulary as well as translation into the native language of the non-native speakers of English.

To recap, there are two main features in these studies. Some studies focused on the ESP domain with reference to the learners' needs, motivation and attitudes towards English language teaching, the objectives of teaching English, and course design, (Manson, 1971; Rae, 1986; Tudor, 1897 and Clapham, 1994). Other studies were concerned with EScP domain relevant to the objectives of teaching EScP, evaluating EScP programmes and analysing EScP texts and discourse.

3.4. ESP in the Arab World

ESP has received much consideration by practitioners and those who are concerned with language teaching for general and specific purposes. In terms of growth of ESP in the Arab World, Crocker (1984:24-25) stated that:

> "…this is reflected in a shift in emphasis from the design and setting up stages…to the stages of evaluation, review and modification…the lack of published test material for ESP, combined with the priority need to get a course off the ground, requiring research and at the least the adaptation of published material.."

Swales' (1984) review of the ESP situation in the Arab world from 1977-1983 suggested that better co-ordination and contact between the ESP practitioners and ESP regionally based journals should be obtained by mutual visits of practitioners and occasional ESP regional conferences held under the auspices of a relevant authority, i.e.

a language centre, college or private establishment, which means financial undertakings. Very few countries in the region budget or fund any such activities. Any other government or establishment undertaking such activities is more likely to exploit them for their own interest; e.g., advertising an ESP or an EFL programme and some times rendering some sort of cultural transference. Swales concluded that the educational programmes in most of the Arab countries have been unstable in that period (1977). There were three particularly positive features of the ESP situation in the Arab world; its international reputation as a source of innovative ESP textbooks, its recent regional ESP conferences and the quality of research in the field of ESP. The two negative features given emphasis in 1977, lack of staff continuity and frailty of regional contacts, continue to give cause for concern.

The importance of ESP in the Arab world might have been overestimated by Swales at that time. English in the Arab world is a major school subject rather than a medium of learning in most of the educational institutions, except for some faculties at the universities, and not the main medium of carrying out occupational tasks.

Hemissi (1981), Tawfiq (1984), Abo Mosallem (1984), Zughoul and Hussein (1985), Momani (1987) and Momani (1989) have conducted ESP studies for the purpose of designing ESP courses for university students, community colleges, language centres and some university departments. Emphasis has been laid on ESP research in the higher education level whereas the school level has not yet been approached.

Hemissi (1981) conducted a study on ESP, which aimed at finding out ways of improving the English syllabus of higher education institutions in Tunisia. He used two questionnaires; one was answered by the students and the other was answered by the teachers. He also interviewed administrators and professors. Hemissi concluded that students hardly used English outside the classroom and rarely prepared their English

lessons at home. The teachers also did not refer their students to reading English reference books. The students preferred to use English instead of French for various reasons: 1) English is the language of most of the scientific subjects, 2) a number of postgraduate students seek higher education in countries like the U.S.A, U.K and Canada and 3) a pilot secondary school had been established where English was used in teaching scientific subjects.

Abu Mosallem (1984) conducted a study on English for police officers in Egypt. He investigated 150 officers from various police departments. The study showed that police officers' need for using English was increasing as the English speaking community in Egypt was increasing. It also showed that officers in various departments expressed different needs. Whereas, state security officers emphasised reading comprehension and Interpole officers needed more writing, the other department officers preferred speaking and listening skills as these skills have more relevance to their work.

Some of the following studies were concerned mainly with investigating the learners' needs for ESP/ EScP, types of English discourse the learners need to communicate in generic and/or specialist contexts, and the students' and teachers' attitudes towards learning/teaching ESP/ EScP. Other studies focused on evaluating the existing programmes of ESP/ EScP at school and university levels.

Learners may need some generic vocabulary for scholarship (e.g. 'evaluate', 'consider', 'explore' etc…) as well as particular vocabulary to use in their specialism (e.g. factor, element, reaction, molecules, etc…).

Cromic and Swales (1965) conducted a study at the Faculty of Engineering, University of Libya. The purpose of the study was to find out verb frequencies in scientific English. They found out that a fair proportion of verbs describe actions, events and relationships that are commonly encountered in everyday life, (such as 'rotate',

'penetrate', 'absorb', etc.) in a more formal elevated style. They also found out that there was another group of verbs of general academic discourse such as 'appear', 'consider', 'indicate'.

El- Kassabgy (1976) conducted a study to find out the intensity of motivation of ESP learners, the type of orientation towards foreign language learning, and the attitudes towards foreign language learning in general and the methods and materials used in particular. Three questionnaires were administered to the sample of the research which included 100 adult learners studying English as a foreign language at the division of Public Service in the American University in Cairo (AUC). This study concluded that students were highly motivated to learn English. Students' responses to the orientation index revealed an instrumental orientation towards English. The relationship between the language learning objectives on the one hand and the syllabus and evaluation on the other is of prime importance.

El-Faras (1977) investigated the influence of attitudes of students, administrators and teachers on the teaching of ESP at the tertiary level. Four questionnaires were administered to four samples: students, language teachers, subject teachers and administrators at the University of Alexandria. The results of the study indicated that secondary school graduates had not acquired a sufficient command of English and what they had acquired was not sufficient for their needs. The researcher found out that the students needed both general and special English. The students believed that subject teachers were more qualified to teach ESP at the tertiary level than English language teachers. They also believed that the most important objectives of teaching English at the tertiary level were: to help students read specialised books in English with understanding and also to help them express themselves in writing in their field of specialization. The language teachers expressed that they felt very little need for special training.

El-Mancabrdy (1979) conducted a study on students of secretarial studies at the American University in Cairo (AUC) to investigate their interests in and needs for English. Another purpose of the study was to find out if their English met the pre-determined standards. Two questionnaires were administered to 28 students to measure the intensity of motivation and type of motivation towards learning English and to find out if the language programmes had met their expectations in language learning. Another questionnaire was given to a sample of employers at foreign organisations to determine what level of proficiency was necessary for employment as a secretary. The study revealed that the English course which students studied was not appropriate to their needs. They needed more practice in English with special emphasis on oral communication. Students were highly motivated to learn English. The strong factor behind their desire to study English was to get a job at a foreign company. Fluency in English was important for a secretary to get a high salary. Fluency in English also required proficiency in both oral and written skills.

Abu Haggar (1980) assessed the effectiveness of teaching scientific English in general secondary schools in Egypt. For the purpose of the study, two questionnaires were administered; one to science and mathematics students at the general Secondary Stage and the other to English language teachers and inspectors. In the study, the researcher tried to answer three questions: how far the prescribed textbook catered for Egyptian students' needs; how far the book reflected appropriate objectives for learning EScP at the general secondary stage; and how far the book coped with the characteristics of scientific English discourse. The study concluded that the target textbook did not cater for students' specific needs. The relationship between the students and the textbook was not strong because there was no strong correlation between the course and students' background and experience. English language teachers

at the Secondary Stage were badly in need of in service training. Students preferred to use supplementary books, as the textbook was not satisfactory.

Tawfiq (1984) assessed the needs of Iraqi undergraduate medical students in Kufa Faculty of Medicine for designing an EScP reading skills course for them. His sample consisted of 114 students: 86 males and 28 females. The participants were randomly divided into three groups. The experimental group contained 39 subjects: 25 males and 14 females. The first control group consisted of 34 students: 30 males and 4 females; and the second control group included 41 students: 30 males and 11 females. The researcher presumed that students' motivation seemed to be very strong as 97.4% of the subjects showed their willingness to pursue their studies in medically related subjects in English. The researcher designed three questionnaires: one for subject teachers and two for students. The results showed that both teachers and students ranked the four skills as important to medical students. The reading skill was the most important skill. The next skill in order was the listening comprehension. Study skills were also important. Accordingly, the researcher designed a reading skill course for the students. The results showed that there was a significant difference between the experimental group and each of the control groups in their reading skills, reading speed and self-confidence. There were also differences in students' motivation towards EScP reading materials in favour of the experimental group.

These studies point out that English is the most common Language used in higher education institutions. They also reveal that Arab learners of ESP have various academic and occupational needs related to their study areas, careers and future prospects. The attitudes, motivation and orientation towards EScP are effective on the Arab learners' performance of English. Therefore, it is necessary to assess these variables in addition to their needs when applying EScP courses.

Barmada (1993) developed an institutional self-evaluation scheme in an ESP in the Arab world. This work presented:

> "an ethnographic case study of the development, implementation and evaluation of a participatory institutional-self-evaluation scheme in an ESP centre at a university in a developing Arab country. Innovative ELT projects in developing countries are thought to have failed to introduce innovation that takes root in the host system", (www.theses.com, 1999).

This researcher attempted to investigate the reasons for this failure and to describe an experiment for creating successful innovation. The experiment assessed the implications for institutional-self-evaluation as a strategy in creating successful ELT projects. The researcher attributed the ELT project failure to the fact that the teachers were not involved in the early stages of innovation and that the use of the appropriate strategies for innovation was inadequate. The characteristics of the optimal educational system were described. This study demonstrated the "need for involving the teachers in innovation in order for it to take root and prosper". It also suggested that the ELT project design should "take the organizational structure of the host system into consideration".

Al-Otaibi (1994) carried out a study with the objective of identifying the English communication needs of Kuwaiti soldiers at the Military Language Institute (MLI) in Kuwait. The researcher assumed that language teaching should consider the communicative needs of students. He also said that such a teaching should encounter the language functions, tasks, and skills rather than formal linguistic features. The sample of this study involved 325 non-commissioned Officers (NCO) selected from three different military ranks and four military branch installations. They answered six main questions in one questionnaire about two different situations (peacetime and wartime). The study concluded that the MLI programme should meet the future needs of its students. Twenty four relevant key activities were identified and recommended to be included as the basis for course changes and design. Furthermore. the findings

demonstrated "the need for a purposeful integration of the four language skills which are seen to be almost equal in importance (www.theses.com, 1999).

Osman's research (1996) investigated the ESP students' underachievement at the Public Authority for Applied Education and Training (PAAET) in Kuwait. It aimed to identify the possible reasons of students' underachievement in English. The researcher suggested some possible reasons behind students' underachievement such as

> "previous schooling; poor motivation; more important priorities in their studies; too many pressures on time outside college; lack of interest in learning English and lack of self-confidence" (www.theses.com, 1999).

The researcher analysed the needs to identify possible solutions for these reasons. This study recommended that the stakeholders' needs, namely the teachers, the institution and the students should be regarded. Then, questionnaires were designed and administered to 563 (203 males and 360 females) out of 569 final year ESP students (6 dropped out) and to all 25 ESP teachers (14 females and 11 males). Interviews were also conducted on a sample of 12 drawn from the questionnaires' sample. The results indicated that

> "teachers needed specific courses of training on ESP; they needed to use English more frequently in class; they needed to use syllabuses/methodologies that cater for students' spoken and written skills (indirect need); course materials and educational aids needed to be improved" (ibid. 1999).

The study recommended that smaller teaching load and smaller classes were needed as well as the students needed syllabuses/materials that cater for self-confidence, spoken and written skills.

Studies in the Arab world revealed that most Arab students were motivated instrumentally to learn English for their academic studies or careers. ESP courses proved success when the teachers and learners were involved and consulted in developing these courses. Teachers were in need of specific training on ESP. Mainly, theses studies clarified that ESP differs from general English in that it is based on a

close analysis of the learners' communicative needs. Its focus is on preparing learners for specific environments where they are to play the major roles in communication. Thus they should be consulted in the contexts and functions they would require to perform in these communicative environments.

3.5. ESP and EFL in Jordan

ESP for science students of the secondary schools in Jordan may be considered both occupational and educational. It is occupational since these students might be motivated and interested in learning ESP for future careers where job owners require the applicants to have a good command of English. And it is educational because these students are expected to join university science faculties where they should have been equipped with scientific English.

The subsequent sections go through studies conducted in Jordan that may have relevance to the topic of the present research. The studies are sequenced historically starting from 1979. These studies focused on pedagogical aspects and evaluation of programmes or teaching methods, such as programmed instruction, using the TV as well as setting criteria for the analysis and evaluation of the school textbooks and the factors affecting the Jordanian learners' achievement in English. In addition, some studies approached the ESP at the university level.

Rihani (1979) conducted a study to test the effectiveness of programmed instruction that depends on both overt (written) response and on covert response (oral) in the teaching of both grammar and reading comprehension in English to the third grade female students of the preparatory stage. Effectiveness was measured by both the immediate and delayed retention of students belonging to three different attainment levels (high-mid-low). Four linear programmes were chosen from "*American Language Course*" used by Defence Language Institute, Auckland Air Force Base in U.S.A. The four programmes were administered to 120 female students in third preparatory class in

one of the public schools in Amman. The students were arranged into achievement groups depending on their grades in both the immediately preceding term, and the immediately preceding year. A two-way analysis of variance of the data showed that the mean achievement of students who used programmed instruction adopting overt response mode was significantly higher than that of those who used programmed instruction adopting the covert response mode in both grammar and reading comprehension.

The purpose of Alawneh's study (1984) was to investigate the effect of the Focused Efficient method on the achievement of first secondary students in Irbid public secondary schools. Randomly, the students were selected from eight schools and divided into two groups; 75 boys, 88 girls in the experimental group; and 73 boys, 78 girls in the control group. The teachers of these classes were almost similar in their qualifications, training and experience. A pre-test was given to both groups. The t-test was used to analyse the data obtained on the pre-test. The results of the analysis displayed no significant differences in achievement in English between the experimental and control groups. A two-way analysis of variance (ANOVA) on the 2x.2 factorial design was used to analyse the data obtained on the post-test. This analysis showed that there were significant differences in achievement in English between the experimental and control groups due to the method of instruction. Those differences were in favour of the experimental group.

The present researcher (Abd-Alrazaq, 1985) in his study investigated the relationship of teachers' knowledge of linguistics and pedagogy of teaching English with the achievement of the first year secondary students in English in Irbid District. The differences between the achievement scores of the students whose teachers scored high and those whose teachers scored low on the linguistics and pedagogy tests were also investigated in this study. The sample of the study consisted of 25 teachers and

their 751 students from the first secondary grade in 17 schools of Irbid General Department of Education (IGDE) in 1982. The Pearson Correlation Coefficient was used to test for the correlations between teachers' knowledge of linguistics and pedagogy and their students' achievement in English. The 't' test was applied to test for the differences between the achievement of the students whose teachers scored high and those whose teachers scored low on both the linguistics and pedagogy tests. The one-way analysis of variance was performed to test for the relationship of teachers' experience in teaching English and qualifications with their students' achievement in English. The results revealed no significant differences between the achievement of the students whose teachers scored high and those whose teachers scored low on the linguistics test. Similarly, there were no significant differences between the achievement of the students whose teachers scored high and those whose teachers scored low on the pedagogy test. Besides, there was no significant positive correlation between teachers' knowledge of linguistics and pedagogy, teaching experience and qualifications and their students' achievement in English. The study concluded that there might be other teachers' variables or characteristics that affect their students' achievement in English. It recommended conducting other studies investigating the teachers' practical competencies inside the classroom and their abilities to apply their knowledge into the classroom situations.

Muhaidat's (1985) study aimed to find out the effectiveness of programmed instruction when compared with the traditional method of instruction on the Second Preparatory Class Students' achievement in English in Irbid. The subjects of this study were 261 students selected randomly from Irbid Public Preparatory Schools. The subjects were also randomly assigned into an experimental group containing 133 students and a control group containing 128 students. The researcher constructed programmed material on the basis of the original content of lesson sixteen from the

prescribed textbook for the second Preparatory Class students. The Programmed material consisted of nine linear programmes containing 150 frames whose content validity and language were confirmed by a jury of judges. This study showed that there were significant differences in the achievement of second preparatory class students. This study concluded that programmed instruction had a significant effect on the achievement in English of the second preparatory class students.

The major purpose of Jayousi's (1986) study was to compare the effect of the Instructional Television group (ITV) with the Conventional classroom Instruction (CI) on the achievement of the Jordanian third secondary literary students in Conditional sentences and phrasal verbs. The population of the study consisted of all the third Secondary literary students in the public schools in Irbid and Idoun represented by sample of 406 third secondary literary students selected randomly from boys' and girls' secondary schools. The subjects were then divided into an experimental group and control. A pre-and post-test was constructed consisting of 45 multiple choice items on conditional sentences and phrasal verbs. The 't' test for two independent samples was used to test for the differences between the means of control and experimental groups on the pre-post-test. It was found that there was no statistically significant difference in the mean scores of the two groups' achievement and there was a statistically significant difference in the achievement mean scores of the ITV group and the CI group. These differences were due to the ITV method and the differences were in favour of the ITV group. The study concluded that using ITV was more effective than the CI in learning conditional sentences and phrasal verbs. This study suggested that more studies ought to be addressed towards the attitudes and needs of students and teachers towards school television.

AL-Jarrah (1987) analysed and evaluated the basic stage textbooks (Pupils' Book, Workbook and Teachers' Book) for grades five and six of the elementary stage.

He aimed at developing an evaluation scale on the basis of language learning/teaching criteria and specifications of good quality textbooks which promote foreign language learning. The scale included eleven elements: 1) Rationale, 2) Objectives, 3) Language skills, 4) Vocabulary, 5) Grammar, 6) Content, 7) Method of teaching, 8) Technical factors, 9) Handwriting book, 10) Teacher's book, and 11) General aspects of PETRA series. The population consisted of the teachers at basic schools of Irbid Education District and ELT professors at Yarmouk University. The sample of the study comprised 120 subjects including 40 ELT professors and 80 elementary class teachers. The weighted mean was used in analysing the obtained data of this study; i.e., the means and standard deviations were calculated for each item. This study found out that the target textbooks were good/strong in terms of rationale, objectives, language skills, vocabulary, grammar, content, method of teaching, technical factors, handwriting book(s), teachers' book(s), and general aspects of PETRA Series. It also found out that the Jordanian elementary class teachers participating in this study were not contacted by the Ministry of Education regarding the selection of PETRA materials. Al-Jarrah recommended that the Jordanian Ministry of Education should involve teachers in selecting EFL materials because teachers take over where the textbook leaves off. The researcher also recommended that other studies should be conducted to address the pupils' and parents' satisfaction with such given courses.

However, the need for ESP course design and materials production has been felt more with the expansion of the university programmes and number of universities in Jordan. The use of English as a medium of communication with some foreign staff and in scientific seminars also increased the need for ESP materials production.

This situation brought about three ESP studies at the Yarmouk University and one study at the University of Jordan. These studies are summarised below.

Zughoul & Hussein (1985) conducted a case study on Arab students at Yarmouk University (in Irbid, the north of Jordan) through investigating their needs for learning English. The researchers used questionnaires for both the students and the University staff. The study showed that the students' need for mastering the listening skill was more important than their needs for mastering other language skills. The staff responses supported this result. The results showed that the science students needed to learn English more than other students in non-science departments did. This is due to the fact the medium of instruction at science departments is normally in English.

Momani (1987) also conducted a study, in which he analysed community college and technical college students' English language needs. He distributed two questionnaires, one for the undergraduates and the other for their teachers. Momani found out that the students perceived speaking as the most difficult skill and reading as the easiest one. Meanwhile, the teachers perceived the receptive skills as more important than the productive ones.

Momani (1989) conducted a study on ESP at the Yarmouk University Language Centre (YULC). He distributed three questionnaires: one for the students, another for the subject teachers and the third for the English teachers. He found out that the textbooks in use did not match the students' needs and that the English syllabus at YULC was not based on previous scientific studies. In the light of the research findings, he recommended that an evaluation of the syllabus and textbooks should be done at the end of each semester; studies investigating the examinations of' the YULC and Art students' needs should also be implemented.

Ja'far (1992) conducted a study to investigate whether there is an interaction between students' background knowledge and their performance on ESP reading comprehension proficiency tests. Data was collected from 388 Arab fourth year students from the faculties of Chemistry, Physics, Maths, Technology and English at the

University of Jordan. The sample was homogeneous in that they shared nearly the same school educational background and the same university major subjects. The four reading comprehension modules from the old IELTS exam were used as the testing instrument. The General Academic module was used to measure the general reading comprehension ability; Physical Science module to test the reading comprehension of the Physics, Chemistry and Maths; Life Science module was used to test the Biology students' reading comprehension performance; similarly, the Technology module was to test the Technology students. The study was designed in such a way that half of the major groups sat the test in their own field and the other half sat one of the other two modules. ANOVA analysis gave significant evidence that students perform better on tests whose subject matters are related to their subject field. The findings showed that the students' general ability, which was measured by the general academic test scores and their university accumulative average, had an effect on students' performance on reading comprehension proficiency tests.

It is clear that some of the Jordanian studies indicated that classroom interaction between the teachers and learners might be effective when the roles of both teachers and learners are considered in designing English programmes. Such interaction could be gained in communicative programmes that involve these parties in constructing these programmes.

Other studies developed English programmes without involving the learners and the teachers, such as developing the programmed material that was based on a ready developed material. These studies suggested that more studies ought to be addressed towards the attitudes and needs of students and teachers towards school courses such as television programmes.

One study (Al-Jarrah, 1987) recommended that the Jordanian Ministry of Education should involve teachers in selecting EFL materials. It also recommended that

other studies should be conducted to address the pupils' and parents' satisfaction with such given courses.

These days there is an increasing call for ESP research and ESP material production in Jordan with the educational reform launched since 1987. The newly developed curricula for English Language at schools include functional English programmes as well as a general English programme. The new curriculum has catered for the needs of some specialities of the Secondary Stage students in commercial and nursing streams. Therefore, more ESP studies are expected in the coming few years geared towards developing and/or designing ESP materials for secondary schools.

The following sections sum up the previous studies in some points concerning the teaching of EFL and ESP/ EScP Worldwide, in the Arab World and in Jordan.

3.6. Summary of the Worldwide Studies

These studies are summarised in the following points with reference to the objective of the present study:

1) The EScP studies conducted during the sixties concentrated on the syntax of scientific English. Thus, the sixties were the period of the structural approach, where syllabuses were designed in terms of grammatical structures especially verb forms (Bruton, 1961 and Barber, 1962).
2) The seventies were the decade for pioneering work on rhetorical functions of scientific and technical English. Some studies dealt with the relationship between rhetorical functions and grammatical choice. Attempts were made to match form and function and to interpret the former in terms of the latter. Unlike what happened during the sixties, the scope of research was reduced from all scientific writing in the sixties to some types of scientific writing (for example, journal articles, scientific reports).
3) During the eighties the focus narrowed further. Attempts were made to get inside

the composing process. The composing process is of equal importance to all teachers of scientific English. Tarone, et al, (1981) analysed the use of passive in two Astrophysics journal papers. She pointed out that switching from active to passive happens when the authors are simply following established or standard procedures as in using accepted equations or describing what logically follows from their earlier procedural choice.

4) English for science has some characteristics which differentiate it from general English. Yet the two versions have many characteristics in common.
5) The rhetorics of scientific and technical English are universal regardless of languages. This may suggest that "the scientific processes of thinking are independent of any given linguistic system; and that English, as a dominant language of technology, has influenced the expression of scientific thought in other languages. Widdowson (1974: 40) points out that world's scientific and technical languages have rhetorical and perhaps grammatical processes in common. He argues that "one is dealing with the realisation of universal modes of thought and practice in EST and in the way that other languages are used in scientific and technical communication". Selinker et al (1972: 320), view this phenomenon differently in that "since most of the world's scientific and technical information is coded in English, it is possible that a type of translation and some kind of rhetorical influence have taken place".

3.7. Summary of the Arab World Studies

These studies came to various findings and conclusions. Regarding the learners' attitudes towards learning English and the relevance of the taught courses to their needs, it was concluded that students were highly motivated to learn English with instrumental orientation towards it (Kassabgy, 1976; El-Faras, 1977 El-Mancabady, 1979; and Abu Haggar, 1980). The language teachers expressed their need for special

training and for in-service training as well, (El-Faras, 1977; Abu Haggar, 1980 and Osman, 1996).

The researchers also concluded that both teachers and students ranked the four language skills as important to the students. The reading skill was the most important skill then the listening comprehension and the study skills (El-Mancabady, 1979; Tawfiq, 1984; Al-Otaibi, 1994 and Osman, 1996).

The findings demonstrated the need for involving the teachers in innovation in order for it to take root and prosper. They also indicated that the ELT project design should take the organizational structure of the host system into consideration and suggest that innovation should be adapted to fit into the culture of that system, (Barmada, 1993).

3.8. Summary of the Studies in Jordan

The Jordanian researchers concentrated mainly on exploring the effectiveness of some recent teaching/learning approaches/methods such as programmed instruction, using the TV at schools. Some researchers tried to set criteria for the analysis and evaluation of the present textbooks, whereas other studies tackled the factors affecting the Jordanian learners' achievement in English. There were no studies that dealt with ESP in General or on school level in particular. Ja'far's study (1992) seems to be the most relevant one to ESP. It was conducted on the students of University of Jordan to assess the effects of the science students' background knowledge on ESP reading comprehension proficiency IELTS test. He came to a finding strongly related to the present study that the target science students perform better on tests whose subject matter are related to their subject field. Al-Jarrah (1987) posed a recommendation relative to the present study that the Jordanian Ministry of Education should involve teachers in the process of setting EFL objectives.

Generally, it is suggested that on developing or selecting TEFL textbooks. there are criteria to evaluate and analyse such books in terms of objectives, student needs, content, design, organisation, and general and technical aspects that relate to length of units and lessons, supplementary materials, teacher's book and its directions, student's workbook and exercises.

3.9. Implications of these Studies for the Present Study

These studies highlighted the characteristics and the linguistic properties of general English on the structural and the discourse levels as well as the properties of scientific English which shares some aspects with general English. Widdowson (1974: 383) pointed out that the general and scientific English are different varieties of the same language. He states that:

> "it is preferable to think of scientific and literary English not as different forms of language but as different ways of the same language. It is in terms of their communicative functions that one can best understand how they differ and how they are alike."

On designing or developing EScP programmes, the characteristics of such programmes can be summarised as follows:

1) The passive form of verbs is used in scientific English situations more than their use in the non-scientific ones. This is due to the fact that the emphasis in scientific writings is on the action rather than on the person who performs this action.
2) The present simple tense predominates in scientific writings (Swales 1971).
3) Special plurals occur frequently in scientific and technical writings. They are derived from Latin or Greek, e.g.: 'criterion-criteria, basis-bases, crisis-crises, datum-data, etc…" (ibid., p: 31). A lot of words in scientific English are formed by adding a prefix or a suffix, e.g.:

prefixes: co-, dis-, inter-, micro-, multi-, mis-

Suffixes: -able, -age, -al, -ance, ant-, en-.

4) Structure words are frequent in EScP. They are difficult for science students to understand. They connect different parts of a statement and can, at the same time, modify the meaning of a sentence, (e.g. however, thus, although, if).

5) Words that have different meanings appear frequently in Scientific English, e.g.: 'as' has different meanings in the following statements (Ewer and Latorre, 1969):

As I was late, I hurried up (Because).

As a child, I lived on a farm (When I was).

As we grow older, we gain experience (While).

6) There are many abbreviations in EScP, e.g.:

- Hz. = hurtz	lab. = laboratory
- Mb. = mega bite	SD. = standard deviation
- C. = Celsius	nt. wt. = net weight

7) Basic technical scientific terms are a major component of scientific English.

In Jordan where scientific English is not different from anywhere else, the science students have the same needs and interests as other students worldwide have. Science is universal and not restricted to certain circumstances. However, English for science should be taught to help learners use language functions in scientific contexts where they need to express themselves and their experiences as easily and clearly as possible. These characteristics of the ESP/ EScP were considered when the framework was designed for the suggested programme for science students in the present study.

CHAPTER FOUR

LANGUAGE ACQUISITION AND LEARNING

4.1. Introduction

Any language programme designer should be aware of the linguistic background in terms of the language to be included in this programme, language components, varieties, and factors affecting learners' or acquirers' attainment of this language. S/he should also be familiar with the target learners' characteristics, attitudes, interests, needs, background and social environment. Thus, the language programme designer will be able to select the language contexts and functions to be targeted and the approach to teaching this language and to determine the learning styles of the learners and their perceptions for learning the language.

In Jordan, the nature of English is a foreign language, although it is commonly used at the university faculties of sciences. This could be due to several reasons such as:

1) Most of the science reference books are available in English.
2) Most of the university science lecturers have graduated from the USA and UK and they use English in their teaching classes.
3) Most of the businesses of chemical, biochemical and pharmaceutical industries, for example, use English in their daily transactions and thus when they advertise for job vacancies they require the applicants to have a good command of English. Usually, most of such job applicants are graduates of science stream of the secondary schools who were the target of this study.

This chapter reviews the main theories of language acquisition and learning discussing general language principles, terms, components and varieties and their relevance to the teaching of language. Theories can be classified into three categories of Behaviourists' theory, Nativists' theory and Interactionists' theory.

This chapter considers three major aspects of language acquisition:

1) The generic aspect related to the developing observational and discriminational powers.
2) The individual personal aspect due to the native ability of the learner, his/her language aptitude and his/her attitudes and motivation towards the language itself and learning this language.
3) The pedagogic aspect related to teaching methods and the instructional environment, such as social environment, feedback and reinforcement, and learning styles, the relevance of teaching materials to the learners' levels, their priority of language skills.

The sections 4.2, 4.3, 4.4, 4.5 deal basically with nature of the native language, whereas the rest sections of this chapter deal with the issues related to learning English as a native and foreign or second language. Theories of native language acquisition are the sources for drawing approaches and methods to learning this language as second or foreign one.

4.2. Language Components and Varieties

The term "language" has different definitions in the field of linguistics. Language is part of the culture of its community or society since they use it in their daily life interaction; i.e. it is a means of social communication. Since there is a variety of definitions relying on different viewpoints and theories, this study will adopt the definition of Bussmann (1996:253) who considers language as:

> "...a vehicle for the expression or exchanging of thoughts, concepts, knowledge and information as well as the fixing and transmission of experience and knowledge."

The components of a language system can be classified into the following (Mackay, 1965):

1) Phonetics: the sound system of a language.

2) Morphology: the structure of words.

3) Syntax: the structure of phrases, clauses and sentences.

4) Semantics: the meanings of the words and sentences.

The weighting of the importance of these components has implications for the language curriculum and teaching/learning methods. Many linguists have studied the relations between language and the subject matter of related academic disciplines, such as sociolinguistics and psycholinguistics.

Regarding language varieties, four forms can be identified: **standard, dialect, colloquial and slang**.

Standard language is the socially produced form of language reflecting the usage of a particular geographical or social group. Linguists consider this form to be one dialect of a language which has become dominant. For example, the dialect of French spoken in Paris became the standard language of France not because of any linguistic features of this dialect but because Paris is the political and cultural centre as the capital city of the country (Comrie, 1996).

A dialect is a form of a language peculiar to a district or class of people. Linguists have applied the term 'dialect' to geographically distinct language varieties (Comrie, 1996) and (Larousse Plc, Microsoft Bookshelf Basics 2000).

Colloquial language: belongs to or is proper to ordinary or familiar conversation, not formal or literary (Concise Oxford Dictionary, 1996).

Slang usually refers to words, phrases, and uses that are regarded as very informal and are often restricted to special contexts or are peculiar to a specified profession, class, etc. (Concise Oxford Dictionary, 1996).

At the initial and intermediate levels of learning a language, the learner is taught the standard form of this language. After mastering this form s/he may acquire

familiarity with other forms, which can be learnt through cultural immersion of that language community or country.

Learners of foreign or second language are usually taught the standard form. In Jordan students were never exposed to other forms of English. For example, they have never used colloquial expressions such as 'Hi' 'How do you doing', 'What is up' etc.

4.3. First and Second or Foreign Language

In the field of language acquisition/learning, much argument appears in the different definitions of the terms, 'first' or 'native' language or 'mother tongue' on the one hand, 'second' language, and 'foreign' or target language on the other.

Lightbown and Spada (1996: 121, 125) have generalised the definitions, grouping them as follows:

> "First language, mother tongue, and native language: The language first learned. Many children learn more than one language from birth and may be said to have more than one mother tongue. The abbreviation L1 is often used. Second language: Any language other than the first language learned. The abbreviation L2 if often used. Target language: The language that is being learned, whether it is the first language or a second or third or fourth language."

The terms 'mother tongue' and 'first language' are generally used in the same sense. The term 'mother tongue' is used in the field of native language instruction among language minority groups, especially in Britain and the United States. The usage of the 'mother tongue' is often restricted to communicating within a person's family, with no further or professional skills in this language being developed. This term was used by many researchers; such as Tansley and Craft (1984) in their report *"Mother Tongue Teaching and Support: A Schools Council Enquiry"*; Houlton and King work (1984) *"Mother Tongue Teaching in Britain and the United States: Some Current Developments"*, and their report (1984) *"Implications of Britain's Mother Tongue Project"* and Adams (1997) in *"Teaching the Mother Tongue in a Multilingual Europe"*. For example, it is possible for some one to have as his/her mother tongue

Welsh or Bangladeshi and also English as a first language.

The term 'foreign language' is particularly used to refer to any language that is not a native language in a country, and 'second language' is commonly used in this sense. According to Crystal (1997) a foreign language (FL) is a language taught that has no status as a routine medium of communication in that country. For example, in Japan or the Arab countries like Jordan, English is regarded as a foreign language. A second language (SL) is a non-native language that is widely used for purposes of communication, usually as a medium of education or business, for instance, English in Nigeria or India. SL is also used with reference to immigrants and indigenous groups whose L1 is a minority language. In the USA, for example, English is a second language for millions of immigrants from a wide range of language backgrounds.

Bussmann (1996: 168) has a slightly different view. He explains:

> "A foreign language is any language that is not officially recognised in a given country or state. In this view, for example, the Spanish language in the United States would be considered a 'foreign language' even though approximately 19 million people speak it. In contrast, a second language is an officially sanctioned language spoken by an identifiable population in a given country or state, such as French in Canada.

English in Jordan is widely used in the academic situations in particular at the universities as a major medium of instruction in the faculties of sciences, medicine and related disciplines, engineering, and computer sciences. In business domains English is used mainly at banks, export and import agencies, industries etc for foreign written and spoken transactions. In other normal walks of social life, English is not used either in written or in spoken forms

4.4. Language Acquisition / Learning

Generally, there are two processes for assimilating a language. Acquisition is natural, unconscious, and informal occurring in different forms of the language, whereas learning is unnatural, conscious, complicated, corrective and geared mainly to the

standard form of the language.

Krashen and Terrell (1983: 18) distinguish between these terms when they mention that simply acquiring a language is 'picking it up', whereas language learning is 'knowing the rules'. They believe that adults are more likely to learn, while children acquire their first language, and most probably, second language as well.

Some other researchers have associated these terms with the target language, suggesting that the first language or mother tongue is 'acquired' while a second or foreign language is 'learned'. Many researchers have used 'acquisition' in speaking of first language like Al Shama (1981) and Ingram (1989). Also, the term 'learning' has been widely used in the literature in the context of both first and second languages. Bussmann (1996) commented that language acquisition is an umbrella term for the natural acquisition of one's first language and the natural acquisition of a second language in an informal learning environment, as a result of living in the target language society or being exposed to certain language contexts. When the term 'acquisition' is used in second language literature, researchers have tended to deal with acquiring language in such natural settings or tried to adopt some approach that follows the way a child naturally acquires language. On the other hand, language learning refers to planned activities with rules and explanation.

Generally, it seems that these two terms influence the 'approach to learning language', regardless of the age of the learner and the language to be learned. This implies that approaches, methods and strategies are commonly used in the second and foreign language literature. Therefore, theories of language acquisition will be reviewed in the next section.

4.5. Theories of First Language Acquisition

The development of English curricula in Jordan has normally responded to the development of language theories. For instance, the adoption of the structural approach

to ELT came into existence after the appearance of the Behaviourist theory.

The ability to learn language is an operation that has attracted the attention of linguists and psychologists for generations. Many theories have been introduced as explanations of how language is learned. Modern theories of language, as Mackay (1965:3) clarifies:

> "... they are more concerned with how language works than with why it exists. They therefore tend to base their principles on the observation of language and languages"

The following section sums up three major theories: the behaviourist, the nativist and the interactionist, which have influenced the views and understanding of the teaching/learning process of language.

4.5.1. The Behaviourists' Theory

The behaviourists believe that language learning is simply a matter of imitation and habit formation. Learning is seen as a kind of link between stimulus (S) and response (R). Children imitate the sounds and patterns, which they hear around them and receive positive reinforcement for doing so. Thus encouraged by their environment, they continue to imitate and practise these sounds and patterns until they form habits of using correct language. According to this view, the quality and quantity of the language that the child hears should have an effect on the child's success in language learning (Lightbown et. al, 1996).

To some extent, the behaviourist view of how language is learned accounts for children's early language learning. Brown (1994) notes there are doubts about how well this view accounts for the development of some more complex aspects of learning language, in the light of many language errors and special forms being made by young children. Imitation and practice alone cannot explain such errors, since adults never produced the forms created by the child.

For example, a child may generalise the plural form of 's' into many other plural forms; such as 'mans' instead of 'men'. Another example from Arabic a child may say 'Rijal' (men) as the plural form of Rijel (table leg) instead of 'Arjul'; where Rijal is the plural form of Rajul (man). Children appear to pick out patterns and then generalise them to new contexts. They try to create new forms or new uses of words until they finally figure out how the forms are used by adults. The behaviourists' model would make a key element in the structural approach to language teaching in audio-lingual methods and to classroom teaching, especially using positive reinforcement such as rewards and incentives for the correct positive response. So, teaching would emphasise vocabulary and grammar.

English curricula in Jordan adopted this theory at that time where audio-lingual and structural materials were applied to ELT situations

4.5.2. The Cognitive Theory

The cognitive approach, or as it is called sometimes the 'nativist theory', is represented by the works of Chomsky and Jean Berk (Brown, 1994), and then by Eric Lenneberg's (1967) work and many other theorists and linguists. They disagree with behaviourists on the basis that perception and thinking cannot be restricted to an increase in individual sensations or associations. They concentrate on the function of the brain and argue that language acquisition relies on internal mental thinking and cognitive structures. Chomsky viewed language acquisition as very similar to the development of walking. The environment and the availability of people who speak to children make a basic contribution to the development of language.

According to Chomsky, children's minds are not blank slates to be filled merely by imitating language they hear in the environment. Instead, he argues that children are born with a special ability to discover for themselves the underlying rules

of a language system. Chomsky (1957) originally referred to this special ability as being based on a Language Acquisition Device (LAD), often described as an imaginary 'black box' in the brain. This 'black box', which is thought to contain the principles which are universal to all human languages, prevents the child from going off on many wrong trails in trying to discover the rules of the language. For the LAD to work, the child needs access only to samples of the natural language. These language samples serve as a trigger to activate the device. Once it is activated, the child is able to discover the structure of the language to be learned by matching the innate knowledge of basic grammatical relationships to the structures of the particular language in the environment. In later writings, Lightbown and Spada (1996) and Chomsky and his followers no longer use the term LAD, but refer to the child's innate endowment of Universal Grammar (UG). UG is considered to consist of a set of principles that are common to all languages. If children are pre-equipped with UG, then what they have to learn is the ways in which their own language makes use of these principles and the variations on those principles that may exist in the particular language they are learning. For instance, all languages have 'subject', 'verb' and 'object' regardless of their order when producing a sentence. In addition, all languages have content words (learn, go, come, etc) and function words (the, in, for, but, etc).

Much evidence can be found to support this view of language acquisition. For example, Lightbown and Spada's argument (1996) that can be summed up as follows:

1) Virtually all children successfully learn their native language at a time in life when they would not be expected to learn anything else so complicated.
2) Children successfully master the basic structure of their native language or dialect in a variety of conditions. They achieve different levels of vocabulary, creativity, social grace, and so on, but virtually all achieve mastery of the 'structure' of the language spoken around them.

3) Children are exposed to the language that does not contain examples of all the information, which they eventually know.

4) Animals - even primates receiving intensive training from humans - cannot learn to manipulate a symbol system as complicated as the natural language of a three- or four-year-old human child.

5) Children seem to accomplish the complex task of language acquisition without having someone consistently point out to them, which of the sentences they hear and produce are 'correct' and which are 'ungrammatical'.

Despite the Cognitivists' argument against the Behaviourists, they both consider acquisition as an external process with observable input and output. Both also recognise the child to be the receiver and the adult as the sender. They deal with language through surface structure, but not deep structure, or as a part of a huge human system.

However, in designing FL programmes, the learner's innate linguistic capacities of his/her L1 could be made use of to teach the target language. For instance, the UG and other components of the language system of universality are cornerstones for building the FL learning/teaching programme where the designer can rely on the universals of both languages, such as the passive and active forms of the language, verb-noun agreement, vowel and consonant sound combinations, etc.

4.5.3. The Interactionists' Theory

This theory focuses on the role of the linguistic environment in interaction with the child's innate capacities to determine the language. Lightbown and Spada (1996: 14) explain that the interactionists view language development as a result of the complex interplay between the uniquely human characteristics of the child and the environment in which this child grows. They continue saying that:

> "Unlike the nativist, the interactionists claim that language which is modified to suit the capability of the learner is a crucial element in the language acquisition process."

According to Brown (1994), Bloom's research, along with that of Jean Piaget, Dan Slobin and others focus on the cognitive prerequisites of linguistic behaviour. Piaget described overall development as the result of children's interaction with their environment, with a complementary interaction between their developing perceptual cognitive capacities and their linguistic experience. What children learn about language is determined by what they already know about the world.

Since language is used for communication, it is only fitting that one studies the communicative functions of language: what children know and learn about talking with others, the interaction between hearer and speaker and conversational cues. This interactional trend is revolutionising research on first language acquisition. The very heart of language -its communicative function- is being tackled in all its variability.

An interactional model of language development would emphasise the significance of language environment. For example, a child in a poor environment that has no modern technology might learn less than what another child learn in a rich environment where s/he has the access to this technology. A learner working in a bank, for instance, will be more competent in the banking language than in the teaching profession language.

The community and adult people usually affect children's language development. In other words, children, whose parents do not consistently provide modified interaction, will still learn language, but these children may have access to the modified speech when they are in the company of other adults

The three different theories have viewed language acquisition from different angles. Each theory offers a particular insight. Lightbown and Spada (1996: 16) view that each theory:

> "...may help to explain a different aspect of children's language development. Behaviourist explanations may explain routine aspects, while nativists' explanations seem most plausible in explaining the acquisition of complex grammar. Interactionist explanations are necessary for understanding how children relate form and meaning in language, how they interact in conversation, and how they use language appropriately."

However, it seems that features of native and foreign language are overlapping and it is difficult to draw a border between them. Theories of native language acquisition are the sources for drawing conclusions about language learning and thus determining approaches and methods to learning this language as second or foreign one.

4.6. Factors Influencing Language Learning

There is some agreement among researchers on the factors that affect the process of language learning. Some researchers, for example, Carroll and Sopan (1955) and Hewson (1982) categorise these factors into general factors related to the learner him/herself, the teaching/learning situations and the instructional materials. These three factors overlap and inter-relate with each other. It is difficult to allocate one single factor to one single situation. This situation might be influenced by more than one factor simultaneously. For example, the efficiency of the instructional materials is tied to the learning situation and indeed to the abilities of the learner.

The factors that affect language learning/teaching are considered below and grouped into three major areas related to the learner, the learning environment/situations and the teaching methods and materials.

4.6.1. Developing Observational and Discriminational Powers

The language learner or acquirer through teaching and/or his/her own observations of his/her community may be able to develop his language. S/he also may be able to discriminate between different varieties of the language taught.

Lambert and Tucker (1978) state that the learner becomes aware of the way in which languages differ, and if he is by nature perceptive, he looks for the distinctive data of the language that he is using. Thus, it may be said that any learner who has undergone any instruction or basic linguistic training in phonology, syntax and semantics will have another kind of experience to which s/he can associate the new learning. For example, a learner who has taken a basic course in phonetics can be taught to discriminate between the distinctive speech sounds of the new language s/he is studying. The learner will, then, be able to discriminate between sounds of: '**th**is' and '**th**in'; 'vis**ion**' and 'selec**tion**' In this way, the learner will hear and appreciate phonological distinctions.

4.6.2. Language Aptitude

People, generally speaking, differ in the extent to which they possess a natural capacity for learning language. This capacity, known as language aptitude, is believed to be in part related to general intelligence, but also to be in part distinct. The work by John Carroll (as in Ellis, 1997) led to the identification of a number of components of language aptitude. These may be summarised as follows:

1) Phonemic coding ability, i.e. the ability to identify the sounds of a foreign language so that they can be remembered later. This ability is also seen as related to the ability to handle sound-symbol relationships.
2) Grammatical sensitivity, i.e. the ability to recognise the grammatical functions of words in sentences (for example, the subject–verb agreement in a sentence).
3) Inductive language learning ability, i.e. the ability to identify patterns of correspondence and relations between form and meaning (for example, to recognise that in English 'on' can denote location and time).

4) Rote learning ability, i.e. the ability to form and remember associations between stimuli. This is believed to be important in vocabulary learning.

Research in language aptitude has focused on whether and to what extent language aptitude is related to success in language learning. According to Ellis (1997) there is strong evidence that learners who score highly on language aptitude tests typically learn more rapidly and achieve higher levels of language proficiency than learners who obtain low scores.

4.6.3. Attitude and Motivation

Attitudes develop early in childhood and are the result of parents' and peers' attitudes and interacting factors in the human experience. These attitudes, afterwards, form the concepts of oneself, of others, and of the culture in which one is living.

Gardner and Lambert's (1972) extensive studies were systematic attempts to examine the effect of attitudes on language learning. After studying the interrelationships of a number of different types of attitudes, they defined motivation as a construct made up of certain attitudes. There has been a great deal of research on the role of attitudes and motivation in second language learning. The overall findings show that positive attitudes and motivation are related to success in second language learning (Gardner 1985).

Motivation is clearly a highly complex phenomenon. Motivation can result from learning as well as cause it. As Lightbown and Spada (1996:19) remarked:

> "Unfortunately, the research can not indicate precisely how motivation affects learning. That is, we do not know whether it is the motivation that produces successful learning or successful learning that enhances motivation. Are learners more highly motivated because they are successful, or are they successful because they are highly motivated?"

Furthermore, motivation is dynamic in nature; it is not something that a learner has or does not have but rather something that varies from one moment to the next depending on the learning context or task.

4.6.4. Learner's Age

The biologist Eric Lenneberg (1967) observed that children's ability to develop normal behaviours and knowledge in a variety of environments does not continue indefinitely. He added that children who have never learned language for any reason could not return to normal if these deprivations go on for too long. He argued that the language acquisition device, like other biological functions, works successfully only when it is stimulated at the right time that is referred to as the 'critical period'.

The Critical Period Hypothesis (CPH) states that there is a period in human development when the brain is predisposed for success in language learning. During this period language acquisition is easy and complete and beyond it is difficult and typically incomplete. Developmental changes in the brain, it is argued change the nature of language acquisition.

Lightbown and Spada (1996) suggest that adult learners of a second language may become very capable of communicating successfully in the language, but there will be always differences of accent, word choice, or grammatical features which set them apart from native speakers or from speakers who began learning the language while they were very young.

This means that there is also a critical age for the foreign language learners. But this factor could not be so problematic for them as they may expect such difficulties to occur. Possibly the influence of their motivation, attitudes and other factors may interfere with their learning of this language.

Furthermore, Ellis (1997: 67,68) argued that:

> "It was claimed that people who lost their linguistic capabilities, for example as a result of an accident, were able to regain them totally when they were about the age of twelve, but were unable to do so afterwards. There is considerable evidence to support the claim that language learners who begin learning as adults are unable to achieve native-speaker competence in either grammar or pronunciation. However, there does not appear to be a sudden cut-off age, beyond which full competence is impossible. Rather, the capacity to achieve full competence seems to decline gradually, becoming complete by about the age of sixteen. In the case of pronunciation, the crucial age appears to be much earlier, possibly as early as six."

Generally, older learners depend on more general learning abilities, the same ones they might use to learn other kinds of skills or information. These general learning abilities are not as successful for language learning as the more specific, innate capacities which are available to the young child.

The critical period hypothesis has been challenged in recent years from several different points of view. Ellis (1997) criticised the CPH from two angles. First, there is some evidence that not all learners are subject to critical periods. There are adults who do extremely well in second language acquisition. Second, the differences of success of most adult learners may lie in differences in social conditions, such as the social gap between one's native culture and the second language culture that s/he is exposed to. It is also possible that acquisition draws on different learning mechanisms because most adult learners have had longer access to their previous other language.

Moreover, some studies of the second language development of older and younger learners who are learning in similar circumstances have shown that older learners, at least in the early stages of second language development, are more efficient than younger learners (Lightbown and Spada, 1996). Krashen and Terrell (1983) suggested that older acquirers might be superior in initial rate of acquisition because they are able to get more comprehensible input. There appear to be at least three ways this happens. First, older acquirers could be better at "managing conversations", or controlling the input directed at them and making it comprehensible. A second factor

contributing to older acquirers' greater speed in the initial stages may be their greater ability to "beat the silent period", to produce in the second language structures that have not yet been acquired. A third reason may be due to the fact that older acquirers have a greater knowledge of the world. This greater extra-linguistic knowledge helps make input comprehensible.

No one has yet determined an optimum age to begin second language instruction in schools. Experiments with immersion programmes in Canada have shown that kindergarten is a satisfactory level for an immersion programme, but a programme begun that early must be maintained in a coherent way through successive years. Hewson (1982: 270) states that advanced age "is considered to affect learning abilities, just as it affects other abilities". However, if age affects language negatively, it affects it in a positive way in that the experience that goes with age may increase the efficiency of certain elements. For example, a learner who knows a language of one particular family will in many ways find it easy to learn another language from that family.

Studies made on Egyptian learners (e. g. Ibrahim, 1983) have found out, that the earlier the student begins learning the language the more perfectly he will master it. They have suggested that teaching a foreign language should begin as early as the kindergarten.

In Jordan, the Ministry of Education decided in 1999 to start teaching English at grade one instead of grade five of the Basic Stage of Education, whereas the private schools are used to starting teaching English at the kindergarten level.

4.6.5. Social Environment

The community is perhaps the most important context for learning a language. The language of the community in which children are born surrounds them, and this soon replaces the home as the most important influence on their speech.

Since language is essentially a social phenomenon, the social influences on its acquisition are numerous and interrelated. It is the role of these influences on the growing mind that results in the learning of the language. Social influences are also responsible for the learning of second language.

There are some theories that draw on the idea of social affectedness. Among them, according to Ellis (1997:38), is Howard Giles's Accommodation Theory. This seeks to explain how a learner's social group influences language acquisition. For Giles the key idea is that of social accommodation. He suggests that when people interact with each other they either try to make their speech similar to that of their addressee in order to emphasise social cohesion or to make it different in order to emphasise their social individuality.

Accommodation theory suggests that the social factors mediated through the interactions that learners take part in, influence both how quickly they learn and the actual route they follow. However, this latter claim is controversial as it suggests that sequences of acquisition are not as fixed as many researchers have claimed.

In terms of learning a language, the social contexts in which it is continually used have some effect on both the manner and skill with which it is performed. Benefiting from the work of Mackay (1965), the groups or communities affect the language learning may be summed up as follows:

1) those with whom we live (home group);
2) those near whom we live (community);
3) those with whom we learn (school group);
4) those with whom we play or entertain (playgroup);
5) those with whom we work (occupational group);
6) those of the same national background (ethnic group);
7) those with whom we perform religious rituals or prayers (religious group);
8) non-personal and passive contacts as radio, television and the cinema; and such contacts with the written language as are provided by reading matter.

The school as one of these eight groups, might be able to influence certain others, but may be unable to affect all these groups. However, the co-ordination and co-operation between the schools, parents and society will greatly increase the chance of developing language learning.

4.7. The Learning Environment, Teaching Methods and Materials

There are other factors that may influence language learning, but they are not related to the nature of the language or the learner. The following sections present some of these factors.

4.7.1. Management of the Language Classes

The teaching/learning process should be managed properly to ensure its effectiveness. It should be restricted to that which an average learner can assimilate at any one time without confusion. In this respect, the learning sessions should be short and have a minimum of new input. Some researchers pointed out that since the most effective intake occurs during the first minutes of the lesson, gradually falling into an even sharper curve, it follows that if the intake is continued after a period of about 20 minutes. Then, time is largely being wasted because the learner has reached his/her intake threshold. The rest of the lesson should be devoted to practice (Carroll and Sopan, 1955 and Hewson, 1982).

Similarly, the learner can assimilate a large quantity of data provided that it presented to him in regular and frequent sessions. Language skills are probably easily learned through regular and frequent practice. For example, a learner may assimilate more from four hours evenly spaced 30 minutes or forty minutes classes than s/he can from a continuous two hours of study. Language learning cannot be effected by force.

Hewson (1982: 271) gives the following example:

> "One can pour millions of gallons of water over a wall in a short space of time without effecting any change, but if one allows the same quantity of water to drip, drop by drop, on a certain point of the wall, the water will succeed in boring a hole through the wall."

4.7.2. Snowballing

Mackay (1965: 206) points out that snowballing is a model of language learning starting with the most frequent and most useful and working out towards what is less frequent and less useful while continually reinforcing what has been learned earlier. This approach may be contrasted with the Jigsaw approach to the language learning whereby all the bits are gradually fitted together in the total picture but without any conception of programming or ordering.

4.7.3. Reinforcement

Reinforcement can be carried out when the learner is listening to his target language, reading a text in it, speaking it or writing it. Reinforcement is not being carried out, if the learner is listening to some one talking about the target language through the medium of his mother tongue. Therefore, students should be encouraged to practise what they have learnt otherwise they will lose it. In this respect, frequent practice, revision and quizzes are of great value (Hewson, 1982).

4.7.4. Learning Styles and Strategies

Basically, learners could implement a task with a different set of skills and preferred strategies. Learning strategies are the particular techniques employed to gain language. They can be behavioural, as for repeating new words, or they can be cognitive, such as using the linguistic or situational context to infer the meaning of a new word.

Some people cannot learn something until they have seen it. Such learners would fall into the group called 'visual' learners. Other people, who may be called 'aural' learners, seem to need only to hear something once or twice before they know it. Some learners feel compelled to memorise and will practise and practise until they have committed new information to memory, before they feel comfortable that they have a grasp of it. For still others, there is a need to add physical action to the learning process. It is not enough to see, hear, or practise for these learners. They need to live the new knowledge in ways that involve them more completely (Lightbown and Spada, 1996).

Different kinds of learning strategies have been identified. Cognitive strategies are those that are involved in the analysis, synthesis, or transformation of learning materials. Metacognitive strategies are those involved in planning, monitoring, and evaluating learning. An example is 'selective attention', where the learner makes a conscious decision to attend to particular aspects of the input. Social/affective strategies concern the ways in which learners choose to interact with other speakers. An example is questioning for clarification (Ellis, 1997).

There have been various attempts to discover which strategies are most important for language acquisition. Dickinson (1992) has concentrated his work on learner autonomy as the most consequential strategy of language learning. He suggested that the best guess we can make at what differentiates 'good' language learners from the rest is their active, independent involvement with the target language. The development of autonomy involves both methodological and psychological preparation. Methodological preparation is a matter of learning techniques for independent learning. Psychological preparation is a matter of changing attitudes and building the learner's motivation and confidence in his/her ability to learn independently. Dickinson also suggested that teachers should discuss with their students what leads to success and what avoids failure in language learning and how they should react to the different

factors known to influence success in learning. The rationale behind this is that the greater the awareness of the factors that affect learning the less discouraging impact will be. It is also possible that some learners will be encouraged to realise that the problems they are facing are common to all language learners.

One way is to investigate how 'good language learners' learn. This involves identifying learners who have been successful in learning language and interviewing them to find out the strategies that worked with them. One of the main findings of such studies is that successful language learners pay attention to both form and meaning. Good language learners also show very active awareness of the learning process and their own personal learning styles and, above all, are flexible and appropriate in their use of learning strategies. Other studies have shown that successful learners use more strategies than unsuccessful learners do. They have also shown that different strategies are related to different aspects of language learning. (Ellis, 1997). However, Ellis could not provide a clear answer to the question: does strategy use result in learning or does learning increase learners' ability to employ more strategies?

However, it can be said that certain strategies or styles are more successful for one person than for another. Language learners should be given the freedom to choose their preferred way of learning, which will help them to perform better than those who are forced to use a learning strategy which might not suit them. This may imply that the stronger the perceived learning style of the student, the more effective the programme is, and the learners are likely to be more explicit about their learning preferences.

4.7.5. Priority of Language Skills

In designing English programmes, designers should consider the organisation of the language skills. Listening, speaking, reading and writing constitute a sequential and integrative order in communicative-based programmes.

Among linguists and teaching methodologists, it has been recognised that all language skills are interrelated and there is no sharp division between them. Language skills, spoken and written, are divided into two major categories: encoding (or passive) and decoding or (productive). Reading and listening are the decoding skills, and writing and speaking are considered the encoding ones. In the decoding skills, learners should not be required to use the elements for which they have not yet acquired encoding skills. A child is not required to cycle to school before he has learned how to ride a bicycle. According to the results of the research done on Egyptian foreign language learners (El-Naggar, 1980 and Ibrahim, 1983), it was found that delaying oral comprehension and giving priority to listening comprehension had a positive effect on foreign language acquisition. Students should not be required to use what they have not learned. Students cannot speak a language that they cannot understand when spoken to them. In this way, listening should come before speaking, and reading before writing.

4.7.6. Suitable Teaching Materials

No effective learning can take place without properly designed teaching materials. These materials should meet the students' needs and accord with their linguistic level. Materials for all skills should be carefully integrated. The materials should be graded in a way that facilitates learning. For example, reading and listening can be integrated by providing teachers with a tape of a native speaker reading the same material. In this way, students can alternate between listening to and reading the same materials (Williams, 1983).

In the field of English language teaching in general and teaching scientific English in particular, theory and practice seem to be marching hand in hand. Theory enriches the possibilities of practice and practice lends strength and support to theory. Most teaching materials produced in the field of teaching ESP can be seen under four

headings: eclectic materials, register-based materials, skills-based materials and communicative competence oriented materials (Tickoo, 1976:98). Each one of these types represents a separate approach. A detailed description of these approaches and materials will be introduced in the following chapters.

4.8. Summary

The language learning data presented to the learner should be relevant to his level and background knowledge. It should not be too easy or too difficult for the learner. It is only if the student is occupied in doing something that he knows how to do and yet remains a challenge that efficient language learning is being carried out. In efficient language learning, students are taught what they need first and subsequently given reinforcement exercises (Hewson, 1982).

It is clear that the language curriculum or programme designers or developers should be aware of the language learning theories when writing, assessing and/or selecting the instructional materials. In addition, they should take these factors affecting the language learning into their consideration when designing programmes for teaching English as a foreign language in general and in designing ESP programmes in particular. The national policy of foreign language teaching and then methods of teaching should be chosen in the light of them.

English curricula in Jordan have kept up with developments in language theories and approaches such as the behavioural theory and the audio-lingual approach and grammar-translation method. These curricula showed some adaptation to the developments in the cognitive theory and the functional approach. Nevertheless, these curricula did not respond properly to the attitudes and needs of the scientific stream students for learning English for scientific purposes whereas they responded to the needs of the nursing and business stream students. These curricula included Business

English for Business Stream and English for Nurses for the other stream. But they did not include Scientific English for Science Stream students who are in need for this kind of English more than other students as clarified in chapter one and two.

CHAPTER FIVE

APPROACHES TO TEACHING ENGLISH AS A FOREIGN LANGUGAE AND ENGLISH FOR SPECIFIC PURPOSES

5.1. Introduction

This chapter reviews the development of methods and the approaches to teaching/learning of English as foreign or second language. This chapter discusses the approaches to designing EFL and ESP programmes and teaching materials with reference to Jordan. The focus of this chapter is on the communicative and the ESP approaches as they are the bases for designing the programme suggested in this study. It also reviews the relationship between ESP and the communicative approach as well as the development of ESP communicative programmes for schools.

These approaches may not be necessarily mutually exclusive but can be used integratively. A linkage of the relevant instances of development of these approaches in Jordan is referred to where necessary. The existing programmes and textbooks in foreign language teaching in Jordan reflect different approaches.

For ESP communicative programme developers, it is suggested that the programme should be based on a certain approach (or a variety of approaches) to language learning and teaching that meets the needs of Jordanian students.

5.2. Approaches to Language Teaching/Learning

Broadly speaking, there are two distinct ways of developing language competence. The first is via language acquisition; that is, by using language for real communication which can be called the natural way. It is a subconscious process and it is not necessary to be aware of acquiring language; people are only aware they are communicating. The second way is to develop competence in a language learning

process. Language learning is a process of knowing about language or it can be formal knowledge of language. Learning, in this context, refers to explicit knowledge of rules, being aware of them, being able to talk about them and being able to practise them.

Both broad approaches will be recommended as the basis for implementing a successful method of teaching/learning.

Mackay (1965) divided theories of language learning into two main categories: cognitive theories and associative theories. Cognitive theories are concerned with knowledge, and claim that we learn by insight, interpretation and by solving our problems. Associative theories (stimulus-response) are concerned with responses and view learning as a chain of responses where we learn by trial and error.

Language learning approaches have proceeded through various stages, beginning with traditional approaches, such as the Grammar Translation Approach, the Series and Direct Methods through later developed approaches like the Audio-lingual Approach and the Silent Method. More recent theories and research have resulted in subsequent approaches such as the Natural Approach and Notional-Functional Syllabuses.

Before summarising the main approaches and methods, these three terms, **approach, method and technique** need to be clarified. Edward Anthony (1963 as quoted in Richards et. al 1986: 15) distinguishes a hierarchy in these three terms. His definition of these terms, which is used in this study, is as follows:

> "**Approach** is a set of correlative assumptions dealing with the nature of language teaching and learning. An approach is axiomatic. It describes the nature of the subject matter to be taught….".
> "**Method** is an overall plan for the orderly presentation of language material, no part of which contradicts, and all of which is based upon, the selected approach. An approach is axiomatic, a method is procedural. Within one approach, there can be many methods….".
> "**Technique** is implementational - that which actually takes place in a classroom….".

The following sections review the major methods used in learning/teaching English in general and in EFL in particular.

5.2.1. Grammar Translation Method

This method, which has been called the Classical Method to language teaching, has been practised in mother tongue or first language learning world-wide for decades. It focuses on knowledge of grammatical rules, memorisation of vocabulary and of various derivations and conjugations, translation of texts, and doing written exercises. As other languages began to be taught in educational institutions in the eighteenth and nineteenth centuries, the Classical Method was adopted as the chief means for teaching foreign languages. Teaching oral use of languages was not emphasised, as languages were not being taught primarily to develop the oral/aural communication abilities but to give students a reading proficiency in a target language.

In the nineteenth century the Classical Method came to be known as the Grammar Translation Approach. There was little to distinguish Grammar Translation from what had been used in foreign language classrooms for centuries, beyond a focus on grammatical rules as the basis for translating from the second to the native language.

The major characteristics of Grammar Translation Method as mentioned by Richards and Rodgers (1986) and Prator and Celce-Murcia (as in Brown, 1994) can be summarised as follows:

1) Reading and writing are the major focus; little or no attention is paid to speaking and listening.
2) Little or no attention is given to pronunciation.
3) There is little active use of the target language in the classes.
4) Many vocabularies are taught based on the reading texts in the form of lists of isolated words.
5) Grammar provides the rules for putting words together, and instruction often focuses on the form and inflection of words.
6) Reading of difficult classical texts is begun early.

7) Little attention is paid to the content of texts, which are treated as exercises in grammatical analysis.

8) Often, the only drills are exercises in disconnected sentences from the target language.

Richards and Rodgers (1986) believe that this approach does virtually nothing to enhance a student's communicative ability in the language. They view it as a tedious experience of memorising endless lists of grammar rules and vocabulary and attempting to produce perfect translations of stilted or literary prose. They (1986: 5) continue:

> "(Although) The Grammar Translation Method is still widely practised, it has no advocates. It is a method for which there is no theory. There is no literature that offers a rationale or justification for it or that attempts to relate it to issues in linguistics, psychology, or educational theory."

However, Brown (1994) suggested various reasons for using this method, more of this to do with teacher convenience. Grammar Translation Method requires few specialised skills on the part of teachers. Tests of grammar rules and of translations are easy to construct and can be objectively scored. It is, also, sometimes successful in giving students knowledge about a language enabling them to interpret some language phenomena.

5.2.2. The Series Method

In the mid-nineteenth century, the Frenchman Gouin attempted to build a methodology based on observation of children's language learning, emphasising oral proficiency. Based on his own experience and attempt to learn German, and his observations of his nephew and other children, Gouin described his insights about language teaching. Only once did he try to "make conversation" as a method, but this caused people to laugh at him and he was too embarrassed to continue that method. Then, Gouin discovered that his 3-year-old nephew had gone through that wonderful

stage of childhood language development. Eventually, Gouin concluded that language learning is primarily a matter of transforming perceptions into conceptions; children use language to represent their conceptions; language is a means of thinking and of representing the world to oneself (Brown, 1994). From these insights, Gouin created the Series Method. Gouin believed that language through a series of sentences was easily understood, stored, recalled, and related to reality. Brown (1994: 43) describes it as:

> "A method that taught learners directly (without translation) and conceptually (without grammatical rules and explanations) a 'series' of connected sentences that are easy to perceive."

According to this method, language would be taught directly through a series of sentences, which have an unconventionally large number of grammatical properties, vocabulary items, word orders, and complexity. For instance, to teach type one of conditional sentences, the teacher should teach: first the simple present tense; second the simple future tense; third the joining word 'if ' and finally how to join the main clause with the 'if ' clause.

The limitation of this method is that it sees language as only a set of series of sentences and ignores interactivity between the learners; in a conversational situation, each learner does not necessarily follow the same series the other partner of conversation uses. The applicability of such a method seems limited to classroom situations.

5.2.3. The Direct Method

A generation later, the applied linguist Charles Berlitz established the Direct Method whose basic concept was that second language learning should be more like first language learning. This method emphasised extensive active oral interaction, spontaneous use of the language, no translation between first and second language, and

little or no analysis of grammatical rules. It continued up to the end of the nineteenth century and the start of the twentieth.

Richards and Rodgers (1986: 9-10) summarise the principles of the Direct Method as follows:

> "1. Classroom instruction was conducted exclusively in the target language;
> 2. Only everyday vocabulary and sentences were taught;
> 3. Oral communication skills were built up in a carefully graded progression organised around question and answer exchanges between teachers and students in small, intensive classes;
> 4. Grammar was taught inductively;
> 5. New teaching points were introduced orally;
> 6. Concrete vocabulary was taught through demonstration, objects, and pictures; abstract vocabulary was taught by association of ideas;
> 7. Both speech and listening comprehension were taught;
> 8. Correct pronunciation and grammar were emphasised."

According to this method, teachers have to use only Standard English in the English teaching/learning process. The usage of dialects or colloquial language must be prohibited inside English language classes. Richards and Rodgers (1986) argue that this method was most widely accepted in private language schools where students were highly motivated and where native-speaking teachers could be employed.

This method was criticised because its success was attributed not to the methodology, rather to the general skill and personality of the teacher. Its applicability in public schools was constrained by a lack of specialised teachers, classroom size and time allotted to the course.

The Direct Method was also criticised for its weak theoretical foundations. It neglects the theoretical factors affecting language learning /teaching related to the learners' motivation, background and aptitude for learning a language. Effective language users, not only learners, may be able to the standard forms in writing and reading, but not in speaking, because real life communicative situations do not depend exclusively on the standard forms of either the native language or the target language.

5.2.4. The Audio-lingual Method

After World War Two, for political and economic reasons, the USA contributed to the development of ELT when its military was provided with special intensive language courses known as the Army Specialised Training Program (ASTP), or the "Army Method". These courses focused on the aural/oral skills where there was a great deal of oral activity, pronunciation and pattern drills and conversation practice with virtually no focus on grammar and translation. Despite the drawbacks of the Direct Method, some techniques were borrowed and injected into this new approach. Soon, the success of the Army Method and the raised interest in foreign languages stimulated educational institutions to adopt the new methodology known in the 1950s as the Audio-lingual Method (Krashen, 1983, and Bouchouk, 1987).

The Audio-lingual Method (ALM) was firmly grounded in behaviourist linguistic and psychological theory, making conditioning and habit-formation models of learning strong features of audio-lingual methodology.

From the work of Richards and Rodgers (1986) and Brown (1994) the characteristics of the ALM can be summed up in the following:

1) There is little or no grammatical explanation: Grammar is taught by inductive analogy rather than deductive explanation;
2) There is dependence on mimicry, memorisation of set phrases;
3) Great importance is attached to pronunciation;
4) New material is presented in dialogue form;
5) Structures are sequenced by means of contrastive analysis and taught one at a time;
6) The classes are small usually around 10 persons, offering opportunity to engage in communication experience;
7) Vocabulary is strictly limited and learned in context;
8) There is much use of tapes, language laboratories, and visual aids;

9) Great attention is paid to speaking the target language;

10) Successful responses are immediately reinforced;

11) There is a great effort to get students to produce error-free utterances.

Ultimately, Teaching of English as a Foreign Language (TEFL) can benefit from this method by reducing the efforts and time given to the learning of theoretical grammar. in favour of practising the standard form of language and getting students to produce error-free language instead of memorising then reciting 'ready-made' sentences. TEFL pedagogy should also learn from the importance given to language laboratories and audio-visual aids as features providing interactivity and motivation.

5.2.5. Community Language Learning Method

In his "Counselling-Learning" model of education, Curran (1972) was inspired by Carl Rogers' view of education in which students and teacher join together to facilitate learning in a context of valuing and prizing each individual in the group. In such a surrounding, each person lowers the defences that prevent open interpersonal communication. The anxiety caused by the educational context is lessened by means of the supportive community. The teacher's presence is not perceived as a threat, nor is it the teacher's purpose to impose limits and boundaries, but it is to be "counsellor," to centre his/her attention on the clients (the students) and respond to their needs.

Curran's model was extended to language learning contexts in the form of Community Language Learning (CLL). The group of clients (learners), having first established in their native language an interpersonal relationship and trust, are seated in a circle with the counsellor (teacher) on the outside of the circle. The clients start the conversation, then repeat sentences which are corrected by the counsellor. The counsellor may take a more directive role and provide some explanation of certain

linguistic rules or items. More and more direct communication can take place with the counsellor providing less and less direct translation and explanation, until the learner achieves fluency in the spoken language. The learner has at that point become independent. The success of CLL depends largely on the expertise of the teacher.

For learning English as a Foreign Language (EFL), CLL offers certain insights to teachers as they are reminded to lower learners' anxiety, and build a friendly atmosphere for the students to make English enjoyable to them. This method also emphasises autonomous learning in which students develop their own language and improve their abilities of speaking and using standard language.

When we look more closely at language teaching atmosphere we should not exhaust the possible relationships between teachers and pupils and take into our account the three aspects of teaching: "knowledge, attitude, and skill" which correspond to that used in Bloom taxonomy, (Bloom, 1956).

5.2.6. The Silent Method

The Silent Method devised by Caleb Gattegon was based more on cognitive than affective argument. It was viewed as a problem-solving method of learning. Richards and Rodgers (1986: 99) summarise the learning hypotheses underlining the Silent Method:

> "1. Learning is facilitated if the learner discovers or creates rather than remembers and repeats what is to be learned;
> 2. Learning is facilitated by accompanying (mediating) physical objects;
> 3. Learning is facilitated by problem solving involving the material to be learned.

This method employs discovery-learning procedures that aim to help learners to develop independence, autonomy and responsibility. Learners in a classroom are encouraged to co-operate with each other in the process of solving language problems. The teacher -a stimulator but not a hand-holder- is silent much of the time. hence the

name of the method. Teachers do not spell everything out in black and white or come to the aid of students at the slightest downfall but "get out of the way" while students work out solutions.

The Silent Method was too a harsh method, and the teacher too distant to encourage a communicative atmosphere. There is a number of aspects of language that can indeed be "told" to students to their benefit; they need not, as in CLL, struggle for hours or days with a concept that could be easily clarified by the teacher's direct guidance (Brown, 1994). Besides, interaction is limited in this method to interaction between the learners rather than between the learners and their teacher.

For learning EFL, this method offers the benefit of adopting discovery learning techniques, reducing teacher talk and letting students discuss with each other and practise language. The method could also lead to the adoption of some useful techniques such as problem solving which can be used in teaching grammar inductively.

5.2.7. Error Analysis and Correction Technique

The errors made by the foreign language learner can be regarded, through correcting them, as actual evidence that learning of the system is taking place. Error Analysis and Correction can give a picture of the type of difficulty learners are experiencing. It emphasises that feedback given to the learners must be positive in order to be effective. Too much negative feedback, a barrage of interruptions, corrections, and overt attention to malformations, often leads learners to feel frustrated and then shuts off their attempts at communication. They perceive that so much is wrong with their language production and that there is little hope of getting anything right. There are other disadvantages in too much positive cognitive feedback. The teacher-listener may be willing to let errors go uncorrected, to indicate understanding and facilitate the flow of their production. The result is the persistence and perhaps the eventual fossilisation

of such errors. So, the task of the teacher is to make balance between positive and negative feedback.

Some methods recommend no direct treatment of error at all (Krashen and Terrell, 1983). In 'natural,' untutored environments, according to Brown (1994), non-native speakers generally get corrected by native speakers on only a small percentage of errors that they make.

This technique has some advantages which can be invested in developing EFL programmes, such as identifying the areas with which students have greater difficulties, and also helping with evaluating the curriculum content and teaching methods. It could be used to evaluate existing programmes and also suggest areas that should be concentrated on in designing a new programme or syllabus. It can also be used to assess how individual students are progressing through the programme given in a certain period through repeating comparable tasks, with a time interval in between.

5.2.8. Total Physical Response Method

Asher (1977) founded the Total Physical Response Method on the co-ordination of speech and action to teach language through physical activity. Asher noted that children, in learning their first language, appear to do a great deal of listening before they speak, and that their listening is accompanied by physical responses (reaching, grabbing, moving, looking, etc.). He argued that motor activity is a right-brain function that should precede left-brain language processing. Asher was also convinced that language classes were often the focus of too much anxiety and wished to devise a method that was as stress-free as possible, where learners would not feel overly self-conscious and defensive. The TPR classroom, then, is one in which students do a great deal of listening and acting and where the teacher is very directive in leading a performance. For instance, commands are an easy way to get learners to move about

and to loosen up; such as 'open the book', 'close the door', 'shut the window'. 'repeat after me', 'stand up', 'sit down', 'pick up the book', 'give it to John', and so on.

The TPR method had its limitations. It was especially effective at the beginning levels of language proficiency, but then lost its distinctiveness as learners advanced in their competence. Today, TPR is used more as a technique, which is a more useful way to view it. Many successful communicative, interactive classrooms utilise TPR activities to provide both auditory input and physical activity.

TPR could help learners to learn, for example, new vocabulary, especially at the beginner level. But in classes where students already know and understand that level of language, they, generally, need advanced vocabulary and language structures. TPR could be proper to teach listening and speaking, but students are also in need to learn reading and writing.

The following sections discuss the major approaches to the design of EFL programmes.

5.2.9. The Natural Approach

The Natural Approach was manifested and developed by Krashen and Terrell (1983). They felt that learners would benefit from delaying production until speech 'emerges', that learners should be as relaxed as possible in the classroom, and that a great deal of communication and 'acquisition' should take place, as opposed to analysis. The Natural Approach advocated the use of TPR activities at the beginning level of language learning, when 'comprehensible input' is essential for triggering the acquisition of language.

The Natural Approach aimed to teach the basic interpersonal communication skills for everyday language situations such as conversations, shopping, listening to the radio, and the like. The initial task of the teacher was to provide comprehensible input

of spoken language understandable to the learner. Learners did not need to say anything during this 'silent period' until they felt ready to do so. The teacher was the source of the learners' input and the creator of an interesting and stimulating variety of classroom activities, commands, games, skits, and small-group work (Krashen and Terrell 1983).

The most controversial aspect of the Natural Approach was its "silent period" and its reliance on the notion of "comprehensible input". Gibbons (1985) argued that the delay of oral production can be pushed too far and that at an early stage it is important for the teacher to step in and encourage students to talk.

This approach separates the listening skill from other skills at the silent zone of teaching/learning, but this separation is for a while when the teacher ensures the learner's 'comprehensibility'.

In EFL natural classroom situations the teacher deals with the language skills as integrative and interrelated. As a teacher of English, the researcher would find such situations difficult to put cuts between the skills; when there is speaking, listening overlaps and reading as well. For instance, in a dialogue the speaker cannot ask a series of questions and wait for the listener to give a series of answers. This breaks the flow of interactivity among the learners and with the teacher.

Nevertheless, the Natural Approach reminds us that in teaching a second foreign language, we sometimes insist that students speak much too soon, thereby raising anxiety and lessening the possibility of further risk-taking as the learner tries to progress. Once again the teacher's responsibility is to choose the best of what others have experimented with, and adapt those insights to his/her own situation.

This method resembles the TPR as both are a little extreme, and appropriate for teaching a completely new language, which is not the case in learning English for non native speakers like the Arab students for example.

Anyhow, some techniques can be derived from this method. For example, the teacher should not push students to speak English if they are not ready to do so and s/he should give students easy topics for composing their ideas, let them engage with language styles and structures rather than constitute the meaning.

5.2.10. The Structural Approach

According to this approach, language is taught through grammar. Grammar and vocabulary are divided into different parts to be taught one by one, gradually going from the simple to the more difficult. The process is one of breaking down language into smaller and smaller bits for teaching, so that the student synthesises all these bits back into a useful competence in the language.

This approach has its roots in psychology. The supporters of the Conditional School believe that the learning situation is complex and it should be broken down into simpler tasks, or steps. The learner tries each step separately and corrects his/her errors in the following trial. The principle underlying this is that the teacher should facilitate learning if s/he presents the learner with pieces of language that have been pre-digested according to the categories found in the description of the language. After selecting the most frequent grammatical and vocabulary items, the course is divided into small lessons each of which concentrates on a grammatical structure. For example, teaching the passive voice form, the learner should be taught first the 'subject-verb-object' active form, then verb tenses (present simple, past simple, etc.) and types (auxiliary, main, etc.). Finally, s/he should learn how to transform the active into passive form by replacing the subject with the object and so on.

Thus, what the structural approach does is to take the language behaviour and the language knowledge, analyse the linguistic component of the desired performance, isolate its units and teach the units piece by piece so as to get to the position from which

it started. As for grammar, the ultimate goal of the course is to teach the whole of the grammatical system. Certain criteria are used to decide which grammatical structures will have to be taught at certain stages. The most important criteria are simplicity, regularity, frequency and contrastive difficulty (Mackay and Mountford, 1978).

According to the first criterion, the simpler is taught before the more complex. Regularity refers to that the more regular forms are taught before the less regular. The criterion of frequency of structures is rarely used. Regarding the contrastive analysis, it is suggested that the early stages of learning should be devoted to the language forms which present the fewest contrastive difficulties (Lee, 1963). Vocabulary and grammatical forms will have higher and lower priority according to their degree of "pedagogic utility, their appropriateness" to classroom context and their "adaptability" in the light of the methods and techniques used in teaching. Pattern practice and drills are used to consolidate learning grammatical structures. For example, we should teach first the active voice form before the passive. And we should teach the articles 'a', 'an', and 'the' before 'some', 'few', 'many', etc.

In the early structural courses much attention was paid to vocabulary. Certain criteria were used to determine the usefulness of words; such as frequency, range (distribution of the item over a number of different texts), availability, familiarity and coverage (items that have many functions). The strategy of teaching would go from the familiar to the unfamiliar and from using the familiar to teach the unfamiliar (Bung, 1973).

In recent years, a number of arguments have been put forward for questioning the adequacy of the structural approach. Wilkins (1976: 7-9) points out that one of the problems facing course designers is that:

> "...the various lexical and grammatical criteria conflict with one another as often as they complement one another, and there is no way weighting can be given to them".

Another problem is that forms are taught because they are there rather than for the value which they will have for the learner. Sometimes irregular verbs are introduced for the sake of completeness even where they are likely to be of little use to the learner. Widdowson (1979: 39) states that the structure approach:

> "atomises discourse into linguistic elements...and teaches the manifestation of the language system quantitatively. What it does not do is show how the language system is realised qualitatively in practical instance as a communicative activity. It accounts for samples of language as instances of linguistic usage but not as instances of communicative use".

One of the major drawbacks of the structural approach is that even when it describes the grammatical or lexical meaning of a sentence, it does not account for the way in which it is used as an utterance. Sentences are not confined in use to the functions suggested by the grammatical labels given to them, nor does one use of the language require the selection of one particular form.

On the whole, the structural approach provides for the acquisition of grammatical competence and embodies the assumption that both grammatical and communicative competencies are the same thing. The learner him/herself can readily acquire knowledge of the communicative aspects of language during or after his acquisition of the grammatical system. The communicative aspects of the language are neglected because the structural approach focuses on teaching separate grammatical items and not on the distribution of those items in particular uses. Naturally, the learner, even one who masters these items, may not be able to communicate properly.

For instance, Arabic speakers learning English as a foreign language learn the usage of the imperative forms and the advice forms. But in practice they might not be able to distinguish between the use of these structural forms. For instance, they learn that 'open the door' is a command not a request, and do not learn that 'can you, will you, please open the door' as alternative forms of request. The same can be said about 'see the doctor' as an advice not a command.

5.2.11. The Situational Approach

The situational approach is grammatical in nature. Language teaching is associated with some physical characteristic of the classroom. Grammatical and lexical items are given meanings and illustrated through objects, pictures and other activities. This approach assumes that learning a language is a matter of associating the formal elements of the language system with their real life situations. It teaches the learner the ability to compose a correct sentence in a proper situation understandable to the audience.

Supporters of this approach argue that language is used in a social context and cannot be understood without reference to that context. In this manner, the social situation restricts the choice of the linguistic item. Course designers predict the situations in which the learners are going to use the language and teach the language forms they will need to perform in these situations. One should also determine the features of the situation including the physical context, in which the language event occurs (for example: bus station, post office, stores, etc.), the manner in which the learner will communicate (spoken or written), the type of language activity (productive, receptive), the participants (number, characteristics) and the field of activity within which the language is taking place.

Here, the situations are judged according to their value as illustrative of the linguistic items to be taught not according to their naturalness. The structural priority is clear. West (1951:140) advises teachers to choose "one thousand words" and make a set of situations that demand those words. The teacher "has to use his ingenuity in inventing his situations". Such situations are not natural to the linguistic items, to the one thousand words that have to be taught, and it is they that have to conform to the language and not the language to them. These situations are devised specifically to

fulfil a structural purpose not tailored to the learner's actual needs. In other words, these situations are remote from real life.

The weakness of the situational approach is that its focus on form is artificial and it does not contain adequate examples of the kinds of realistic discourse which students will need to learn. For Jordanian students, for instance, if a student faces a situation that needs a word or more s/he has not learnt, s/he will not be able to express her/his idea, message or opinion.

Gaies (1977: 211) argues that the grammatical and structural presentations are too often "semantically divorced in every way from the classroom surroundings or the students' experience, past and present". Krashen (1977:7) points out that "the grammatical focus will usually prevent real communication using the second language".

The teaching of language involves the teaching of use and meaning, which are restricted by the practical circumstances in which teaching takes place. In this, the situational approach faces two difficulties. Firstly, the teacher may not be able to devise in the classroom the situations s/he needs for meaningful use of the sentence patterns s/he proposes to teach. Secondly, the teacher faces the question of priority (Which should have priority - situations or language?). The teacher should either select structures and then devise the situations that involve them, or choose the situations first and then think of the structures to be taught.

To recap, both the structural and the situational approaches aim to promote the knowledge of the language system and the ability to compose grammatically correct sentences. The two approaches emphasise the grammatical competence at the expense of the communicative competence. Communication only takes place when we make use of sentences to perform a variety of different social acts of social nature. The ability to compose grammatically correct sentences is not the only ability we need to communicate. Learners do not communicate by forming sentences but by using

sentences to make statements of different kinds. Knowing how to compose sentences correctly is only one part of knowing a language but this is not enough for effective communication. It has to be supplemented by knowledge of what to say, how to say it and in what context the sentence is counted as a means of communication.

Dissatisfaction with the structural approaches led course designers to look for a solution based on the notional and the communicative approaches.

5.2.12. The Notional-Functional Syllabuses

Beginning with the work of the Council of Europe and later followed by numerous interpretations of 'notional' syllabuses' by Wilkins (1976) and some others, Notional-Functional Syllabuses were developed in the United Kingdom in the 1970s. The distinguishing characteristic of the notional-functional syllabus is its attention to functions as the organising elements of a foreign language curriculum. Grammar is attended to only in that it explains the various forms used to accomplish certain functions.

Wilkins analysed the meanings that a language learner needs to understand and express rather than describe the core of language through traditional concepts of grammar and vocabulary. Wilkins attempted to demonstrate the systems of meanings that lay behind the functional uses of language. He described two types of meanings:

1) Notional categories: concepts such as time, sequence, quantity, location, frequency;
2) Functional categories: requests, denials, requests, offers, complaints, etc.

Notional-functional Syllabuses have become common grounds for the development of communicative textbooks and materials in EFL courses in particular. With regard to its suitability for teaching EFL, we should take into our account Brown's (1994: 248) further statement that,

> "What notional syllabuses do give us is, first of all, an organisation of language content by functional categories. Second, they provide a means of developing structural categories within a general consideration of the functions of language."

This method might be utilised for selecting the content of the curriculum as it provides teachers with the most useable functional language. It is crucial for teaching EFL to transform into teaching students a sort of language which may have utility and relevance outside the classroom and instead, to link the language taught with the actual future life of the student either at education aspect or work sector. According to this method, the language provided to learners should be closely linked to their local community and social environment, which increases the functionality of the syllabus.

The supporters of the notional approach assume that they take the desired communicative ability as their starting point. So, instead of asking how the speakers of the language express themselves or when and where they use the language, they ask what it is they communicate through language. Wilkins (1976:19) maintains:

> "The advantage of the notional syllabus is that it takes the communicative facts of language into account from the beginning without losing sight of grammatical and situational factors. It is potentially superior to the grammatical syllabus because it will produce a communicative competence and because its evident concern with the use of the language will sustain the motivation of the learner. It is superior to the structural (situational) syllabus because it can insure that the most important grammatical forms are included and because it can cover all kinds of language functions, not only those that typically occur in certain situations."

The first step in designing a course according to the notional approach is to decide what to teach according to what the learners should most usefully be able to communicate in the foreign language. The most appropriate forms for each type of communication are determined. The units of the syllabus are given semantic labels. Thus, the linguistic content is planned according to the semantic demands of the learner. The semantic content of the syllabus does not coincide with what is grammatically the most simple, the most regular or the easiest to learn. For example, the notion of

'affirmation' is presented to the learners before the notion of 'advice'. This is related to what the student should be able to use first then to move to the next notion and so on.

Wilkins suggests that there are certain notional categories or semantic groups into which language acts may be classified and grouped as follows:

1) Semantic grammatical meaning, where the form of the grammatical structure carries the meaning. This category includes some notions such as time, quantity, space, etc.
2) Modal meaning where the attitude of the speaker is expressed in the utterances. Certain notions fit in this category such as certainty, affirmation and probability, intention and obligation.
3) Communicative function meaning, where the social purpose is expressed. This category includes certain notions such as prediction, argument, and emotional relations.

Supporters of the notional approach fall into two categories in their discussion of the idea of notions and functions. The first group sees function as a speech act. Searle (1969: 16) states that speaking a language is performing speech acts such as making statements and giving instructions. These acts are in general made by and are performed in accordance with certain rules for the use of the linguistic elements. Thus, Searle concentrates on the communicative act/ language form axis.

Unlike Searle, Van Ek (1977) concentrates more on the act of communication and less on the conventions of use. He analysed the basic communicative needs of travellers within Europe. He identified the communicative functions such travellers might need to fulfil and the notions they might need to communicate, such as seeking factual information.

Another group of researchers investigated language functions used in particular discourses. Candlin and Burton (1977:269-271) investigated the English used by doctors. He grouped the communicative functions used by doctors into: "task-oriented

functions" and "meta-communicative functions". The task-oriented functions included eliciting information and apologising for hurting the patient. Meta-communicative functions were employed as meaning clarifiers. For example, checking that the patient had understood the doctor's instructions to use a medicine. He pointed out that the utterance could have more than one meaning. Ewer (1981) worked on the typical micro acts in scientific texts. He divided the functions (Microacts) into two categories: informational and attitudinal. He gave grammatical, lexical and formal medium devices, which provided the exponents of each function under each category, but he did not indicate when or in what order these functions could be most appropriately used.

Widdowson (1979:247) argues that the notional and structural approaches differ only in the manner in which language content is defined. Both the structural and notional approaches recognise that the learner's aim should be the ability to communicate.

The two approaches differ in the assumption of what needs to be actually taught for this ability to be acquired. The structural approach assumes that teaching knowledge of the language system is the basis for communicative behaviour; its exploitation for communicative purposes is left to the learner. The notional approach teaches separate functions and notions of the language and relates each function to its language form. In both cases there is a gap between what is taught and what is learnt, both leave something for the learner to find out for himself.

The notional approach has been criticised for not achieving its objectives. It is difficult to apply it because there is no one-to-one relation between grammatical forms and either grammatical or language functions. An individual sentence can be used to perform many functions in the language. In the same way, it may take a variety of forms. For instance, for an EFL learner, the sentence 'Sami, see the doctor' may indicate advice, obligation or probability.

The notional approach does not differ from the structural approach. Both focus on items not strategies, on components of discourse not the process of its creation. The focus of the notional approach is still on the accumulation of the language items rather than on the development of strategies for dealing with language in use. For example, teaching the modal verbs in 'permission' notion includes teaching the form of these modals (shall, will, may, can, could, etc), but does not teach how to use these forms in real situations.

5.3. The Communicative Approach to EFL/ESL Course Design

Wilkins' book called '*Notional syllabuses'* (1976) had a significant influence on the development of Communicative Language Teaching (CLT).

The CLT has stemmed from the changes in the British language teaching tradition starting from the late 1960s. This was partly a response to the sorts of criticisms the American linguist Noam Chomsky had levelled at structural linguistic theory in his now classic book, *'Syntactic Structures' (*1957). Chomsky had demonstrated that the current standard structural theories of language were incapable of accounting for the fundamental characteristic of language, the creativity and uniqueness of individual sentences. British applied linguists emphasised another fundamental dimension of language that was inadequately addressed in current approaches to language teaching at that time, the functional and communicative potential of language.

This method may be the most beneficial method for teaching the EFL for specific purposes as a whole and for scientific purposes as a part. Therefore, it is adopted in developing the suggested EScP programme in this study.

The resort to the communicative approach in course design appeared in response to the linguistic theory that language learning occurs on two levels as Rivers (1972:12) points out that:

> "the level of manipulation of language elements that occur in fixed relationships in clearly defined closed systems and the level of expression of personal meaning at which possible variations are infinite".

Tylor (1983) maintains that the structural and the notional approaches emphasise the first level and give little opportunity for the development of the second one. He gives two reasons to account for the importance of the communicative approach in language teaching. The first reason is that, given the inadequacies of both the grammatical and the functional if we expect students to learn how to use a given language, they must be exposed to a real language used to fulfil a real communication. The second reason is the importance of the language input in language learning (Krashen, 1979).

Supporters of the communicative approach claim that learners acquire a foreign language only to the extent that they are exposed to and actively involved in real meaningful communication in that language. The research conducted by Warshawsky (1978) supports the hypothesis that when the transmission of essential information is a compelling communicative need, learners will be motivated to continue trying to communicate. These attempts to communicate, in turn, indicate that grammatical structure appears to develop in the learner's speech in response to communicative need.

The primary principle of the communicative approach is to make students learn the language through use. It assumes that there are two pairs of meaning: usage and use or significance and value. Communication takes place only when we make use of sentences to perform a variety of different acts of an essentially social nature. Widdowson (1972: 16-17) comments:

> " We need to draw a careful distinction between two different levels of meaning. One kind of meaning is that which language items have as elements of the language system, and the other one is that which they have when they are actually put to use in acts of communication. Let us call the first kind significance and the second value."

For example, teaching the present continuous according to the traditional approaches is accomplished by inventing some kind of situation to demonstrate its meaning. Such a situation might consist of the teacher writing on the chalkboard and saying "I'm writing on the chalkboard". In this situation, we show what the present continuous signifies or how its meaning relates to that of other tenses, but we do not demonstrate the kind of communicative functions these sentences have in these situations. This can be achieved through communicative activities in real situations in the classroom situations in which students perform real roles. Communicative competence does not mean the ability just to utter words or sentences. It involves the ability to react mentally as well as verbally in communication situations. The mental reaction is the root of these verbal reactions. Lixiaoju, (1984: 4) says:

> "Keeping the student out of real situations and requiring them merely to produce a verbal reaction is keeping the plant away from soil while trying to get it to grow and blossom. False situations do not produce mental reaction - even if they sometimes produce verbal reaction that sounds appropriate".

In order for communication to be achieved, there should be a need, a purpose and a context for it. These three things are what give rise to communication in real life. You ask a question because you do not know the answer. People speak or write when they want to express something. The course should provide students with this need, this purpose and this context if we want them to speak, read and write.

The communicative approach gives the students the chance to learn in realistic situations. It is flexible so that students can manage when they are thrown into a real and unpredictable communication situation afterwards. Thus, effective communication requires that students should be provided with sufficient exposure to the target language (sufficient input).

Propositions are essential elements in communication. Wells (1981:73-115) points out that:

> "...language is comprehensible to the degree that hearers are able to reconstruct proposition from the spoken utterances. In this way, learning how to create a proposition is the first task in learning how to communicate in a given language."

When a child says 'thirsty' we understand 'I am thirsty' and from 'no thirsty' we understand this utterance as being 'I do not want to drink'. These examples show that the propositional meaning can be understood even if the sentences are not complete or grammatically correct. Sentences may refer to the same proposition but differ in what they say about it. The following refer to the same proposition, 'Tom married Sara,' but differ in what they say about it:

- When did Tom and Sarah marry?
- Why did Tom and Sara get married?
- Tom and Sara have been married for years.

Reality is an important aspect of the communicative approach. Real communication is the goal in the programme that should be based on real issues and that encourages students to accomplish 'specific tasks or goals', not just practice. This programme should enable teachers to serve not only as teachers but also as facilitators, and to provide instruction in order to meet the genuine functional needs that arise in the classroom during the course of these attempts at 'real communications'. Krashen (1976:5) states that:

> "...proper acquisition will occur only when the target language is used realistically. Yet, authenticity does not imply that the language in the classroom should be the native speaker's language, but, it should be the language used in real communicative situations that are relevant to the students."

Appropriacy is another element in the communicative approach to ELT; i.e. it is not only the language that should be appropriate for the students, but also the roles and situations as well. What is appropriate for the students is what is appropriate in the situations and roles that are relevant to them. If appropriacy is to be taught, this should be done through real communication. For instance, 'May 1 know who is speaking?' is considered more appropriate in asking about the identity of a phone caller than 'What is

your name?' Socially, the first question indicates more politeness than in asking the second one.

The communicatively based syllabus concentrates on the tasks rather than on grammatical or vocabulary items. The task includes grammar, vocabulary, function, and context to serve certain themes graded integratively and sequentially. One way of grading the communicative syllabus is to control and organise the tasks and activities. Some factors such as the performance requirements, the difficulty level and the level of the material, language and culture should be considered. For example, a simple task of introducing one-self may be given to students in early stages and advanced tasks in later ones. Learners may also be involved initially in dialogues then in-group conversation at a later stage. That is to say, theme and context govern the choice of vocabulary and grammatical forms.

In conclusion, not all the grammatically correct sentences are used in communication. In communication, language is used in a conventional way as it is used in real life situations. If you are asking someone to bring you a book, you cannot say 'I ask you to bring me that book'. Although this sentence is grammatically correct, it is not the conventional way of using English. You may say this in different polite request forms, such as 'Please, bring me that book', 'Can you bring me that book, please', or 'could you bring me that book', etc. Similarly, we cannot say 'It is five minus ten minutes'. Yorio (1982: 437) suggests that the conventional uses of language should be apparent in many aspects of the discourse. Ceremonial formulas, for example, are conventional phrases used in ritualised interaction such as "after you", "nice to see you..." etc.

When designing an EFL course, teaching is no longer limited to the teaching of the four skills of reading, writing, listening and speaking. The communicative approach is concerned with the various types and kinds of behaviour that happens when people

speak or understand language for specific purposes in particular situations. In language teaching, the communicative approach has become more concerned with sub-skills or micro-skills. Munby (1978) classifies language into 260 micro-skills in 54 groups for the purpose of selecting appropriate skills to be included in his syllabus. He maintains that the selected skills together with a selection of micro-functions are enabling factors for activities. The learner should be taught communication skills in order to be able to solve the problem arising from this correlation. Prediction is one of the communication skills that needs to be taught to foreign language learners.

For instance, in a dialogue about a certain theme the two persons should be attentively listening to each other so that they can predict what the other might say, which in turn facilitates the flow of communication.

Negotiation is another communication skill. Brumfit (1981: 25) points out that the speakers and writers perform an unconscious guessing game because they have to establish what the agreed goals are and how much knowledge or understanding is shared. Brown (1977:162) argues that training in making "intelligent guesses" plays an important part in learning to understand the spoken form of a foreign language. The lesson may be designed as a series of tasks performed by students. For example, a student may be required to read or listen to a passage read for general impression of the author's attitude or specific information. Tasks like note-taking, summarising, evaluation and carrying out conversations, arguments or a debate may also be included. These tasks include different skills. In this way the four skills are not taught separately but they are integrated and combined in use. The communicative approach does not teach four separate skills but rather composite ones.

The communicative syllabus is student centred. Instead of being highly structured, teacher-centred and grammar based, the communicative syllabus is task-oriented, communicatively based and learner-centred. It gears its objectives to what

students actually need. Students take the central role in learning. The role of the teacher is to give guidance to students and observe, organise, analyse and evaluate their performance. They may also provide the students with samples of the target language, rules, cues and feedback. In the learner-centred communicative classroom, Stevick (1980: 19-20) differentiates between "teacher control" and "student's initiative". For him, the control consists of two elements: structuring the classroom activities and providing the feedback. If teachers are to take control they must be careful not to "monopolise" initiative. In exercising control, the teacher is giving some kind of order, or structure to the learning space of the students in encouraging them to take initiative, The teacher is allowing the student to work and to grow within that space. If there is too little space, the learner will be stifled. If there is too much, the student will feel that the teacher has abandoned him. In this kind of classroom the teacher does not function as a drill leader or an authority figure, but rather as a facilitator who responds to students' emerging needs.

Curran (1976) suggests that students should exercise what he calls "learning initiative". Students may play a role in directing the learning process and in determining the content and the manner of instruction. The role of the teacher is to respond to the students' needs, encourage them and provide structures and directions without placing many demands on the students. Several activities can be undertaken in which students can be actively engaged in real communication and learn communicative skills. One of these activities is to involve task -or goal-oriented group projects which interest or affect them (Johnson, 1981), (White, 1981) and (Hutckin, 1981).

Providing an information gap is a basic principle in the communicative approach. When one student talks to another, it is important that new information should be transmitted across the gap between them. Two techniques are suggested to create an information gap in classroom. The first technique is the 'Jigsaw in

task-oriented and problem-solving activities' (Geddes, 1981) In such activities, the correct information required to complete a task is given only to some learners and withheld from others. This information gap creates a real need for students to communicate. The second technique is task dependency, and is usually used in conjunction with the jigsaw technique. In activities structured according to this technique, students are assigned to complete a major task which requires certain sub-tasks (Johnson, 1981).

The interactional process is another aspect of the communicative approach. Conversation is a way of communicating meaning as well as a form of social encounter. Students should be given the chance to acquire interactional skills that are an important component of the communicative competence.

Communication can be organised in two ways: macro or task organisation, and micro or process organisation. The macro perspective reveals different discourse tasks (narration, description, and debates). These different tasks require the speaker to choose an appropriate way to organise his utterance to be relevant to the task. The micro perspective, process organisation refers to the words and phrases which indicate how and what we are going to say is related to what has already been said (e.g. well, maybe, I agree with you, actually and in my case).

The question of grammar teaching in the communicatively based syllabus has been discussed. Krashen (1980) recommends that the language used in presenting, explaining and discussing grammar should be real communicative language. In this way, students can profit from this additional exposure to language even if they cannot benefit directly from the grammatical information being discussed. Kressler, et al (1979) argues that the order of acquisition of grammatical rules is determined more by the need to communicate than by the teaching order. He also recommends that the

teaching of explicit grammar should be an optional supplement for those who can benefit from it.

Despite these advantages of this approach, there might be some drawbacks that should be considered. The findings of research conducted by Brumfit (1981), Johnson (1981) and Scott (1981) indicate that although some learners are successful at learning grammar rules which they have been taught, and then at using those rules productively, most of them cannot utilise their intellectual understanding of the grammar of the language in real communication.

This is a warning to communicative programme designers that if they can not put these principles into practice in actual classroom situations, this may be a threat to the effectiveness of the programme.

Foreign language learning appears to depend on the extent to which learners are exposed to and involved in genuine communication in the target language. Hence, there should be opportunities for students to engage in using real communicative activities which are meaningful and which motivate students to become involved in the situation and accomplish the specific goals.

On teaching English to scientific secondary school students in Jordan, it should be emphasised that the effective way to learn this language as a means of communication is to get the students involved in communicative situations. Thus, tasks and activities should create real opportunities for the students to use English in a full range of real situations and social settings. Students should be exposed to and engaged in performing communicative acts related to their future purposes to enrol in a career or pursue higher education where English is the major medium of communication.

The advantages of the other approaches should not be neglected. For example, we should not neglect the teaching of the grammatical points. But this should be done naturally and in communicative contexts.

However, the main features of the communicative approach were reflected in the design of the framework of the suggested programme developed in the present study. Accordingly, this design enhanced the features of this approach as shown in the two trial units (see chapter 9 and appendix 9).

5.3.1. The Communicative Approach and ESP

The communicative approach and ESP are closely related. Both are learning-centred starting from the needs and expectations of all parties involved in the learning process when designing courses and selecting methodology. If ESP is to be taught, the teacher has to be clear about what the communicative purposes are and to consider the ways in which they hope to achieve these purposes.

The justification of an ESP course lies in its contribution to the communication needs of its students. For Mackay and Mountford (1978: 6), teachers cannot decide what to teach until they know "to whom and why teaching is required". Munby (1978:2) points out that the first step in designing an ESP course is "to focus on learners' needs". Elliot (1976: 30) emphasised that on EScP courses "the student must feel that the materials cater for his needs as a scientist and secondly, he must genuinely enjoy his language course".

Saylor (1981:11) summarises the characteristics of the ESP course as follows:

> "It is based on a knowledge of the learner's needs and interests in general and it involves a diagnosis of the specific needs and interests of the population served by the plan. The curriculum plan is flexible to conform to specific needs and interests of particular learners".

Maley (1983:3) comments that in teaching ESP, no one is able to learn a language totally. Even the native speaker uses only a small part of the total sources of his language. Instead, we should concentrate on what the learner will need to use the language for when he or she finishes the course.

Teaching English as a means of learning science and technology implies not only teaching the linguistic elements that are most commonly used in this context, but also how scientists and technologists use the system of language to communicate. In this respect, learners should be taught how to use the right language in the right context.

Widdowson (1979) argues that the rules of use are rhetorical ones and that the communicative competence is the language user's knowledge of rhetoric. Whereas grammar is concerned with correctness, rhetoric is concerned with appropriacy. He also suggests that the language teaching process should be a selection of rhetoric acts (for example: promises, orders and apologies) rather than of linguistic elements and vocabulary items. This involves teaching different linguistic elements and vocabulary items meaningfully by giving them a definite communicative value.

Linguistic competence is different from communicative competence. Learners who are able to produce sequences of correct linguistic responses may fail to find adequate language to cope with actual situations. ESP syllabus tends to be centred more on sequences of communicative situations than on sequences of graded linguistic items. For, example, a learner may correctly complete sentences, but he may not be able to respond smoothly to questions in a dialogue or conversation.

To sum up, an effective management of EScP requires a proper understanding of students' language needs for communication. This means that an ESP/EScP material designer/ developer needs to identify what students want to communicate, how they communicate, at what level and whether in speech or in writing. S/he also needs to assess students' educational background and history of learning English, their aspirations and the place English occupies in their long-term plans. Assessment of students' attitudes toward English language learning and their expectation of an English class and syllabus should also necessarily be considered.

Further, the ESP/EScP programme designer needs to consider the local circumstances that have a distinct bearing on the success or failure of language teaching. The designer/developer should also consider factors like the timetable, size of the class, conventions of teaching and learning, availability and use of audio visual aids, the relationship between English and other subjects and the community's attitudes towards English language teaching and learning as well as the language national policy of ELT.

For example, if a science student is expected to understand an academic topic, it is necessary for the ESP programme designer to examine his ability to receive and transmit information effectively, that is, his understanding competence. A language course for science students needs not to be too ambitious. Its objective should be realistic to enable students to use normal English, which is understandable, appropriate in expression and with clear and meaningful language context.

Selinker and Trimble (1974) pointed out that students' difficulties in EScP are not merely a result of technical vocabulary. In fact, they found that non-technical words in technical writing would sometimes give students more difficulty than technical ones; e.g., adverbial phrases and conjunctions. They attributed much of the difficulty in reading to the structure or the writing. They also noticed that the use of passive voice caused some problems to technical English students. The "-ing" forms were other source of problems because students considered them as present continuous. Certain idiomatic expressions were also difficult. For example, 'to make somebody do something', 'to be supposed to do something', 'to have something done'. Some words like 'hardly', 'nearly', and 'matter' presented also special difficulties.

5.3.2. Developing ESP Communicative Programmes for Schools

The stages of programme development are divided by Mackay and Bosquet (1981:3-4) into three stages: pre-programme development stage, programme

development stage, and programme maintenance and quality control stage. The first stage is typically a stage of educational decision making. In this stage, a policy of educational goals is determined and an interest in and commitment to remedying or changing a situation is expressed in the form of a rationale. The second stage can be broken up into five phases:

1) Basic information gathering phase in which the students' needs and the specific purposes of teaching are identified through questionnaires and interviews.
2) Goal specification phase in which the students' needs are translated into attainable objectives.
3) Production phase in which teaching materials are prepared and appropriate methods are devised.
4) Teacher training phase.
5) Trial phase in which the materials and methods are revised and their effectiveness is determined.

The third stage is concerned with monitoring the quality of instruction and the appropriateness of the defined goal, the teacher training and the testing procedures. It is an important stage if the value of time, effort and money is to be realised effectively.

Strevens (in Macdonough, 1984) categorises the variables involved in course construction and development as follows:

1) Community-controlled variables; such as cultural restrictions on materials and styles, organizational and physical limits, class size, time factor and equipment.
2) Administrative variables such as the control of the education authority over finance and syllabuses, teacher training standards, psycholinguistic attitudes towards English, and the educational framework of teaching English as a foreign language.
3) Teacher-controlled variables related to syllabus design such as approaches (selection and organisation of content, relevance to the needs of the learner, views of language

and learning), methodology (teaching techniques, organisation of class) and material evaluation and production.

4) Learner variables such as reasons for learning, attitudes, expectations, age and proficiency level.

In this respect, curriculum design should be an inter-weaving of responses to three dimensions of considerations: knowledge considerations, instructional considerations and learner considerations. Knowledge considerations include skills, capacities and changed behaviours. Instructional considerations are the ideas of the staff, teaching strategies and techniques, materials and equipment availability. Learner considerations set out the age, grades and development stages of the target group of learners.

Fredrickson (1979: 295) states that the ESP curriculum development process aims to enable each student to achieve his maximum potential by incorporating the following features:

> "1. Structural integration among components.
> 2. Consistent flow of active vocabulary.
> 3. Documented continuity and systematic reinforcement.
> 4. Controlled initial review in an entry phase.
> 5. Sub-technical oriented and job- related materials.
> 6. Co-ordination of cognitive, affective and behavioural factors with student centre focus.
> 7. Highly motivating interesting approaches, format and presentation.
> 8. Audio-visual and supplementary training aids to reinforce the basic materials.
> 9. Field testing, feedback and subsequent revision of the entire package.
> 10. A coding scheme to clarify which learning approach in a given segment of lesson.
> 11. Weekly quizzes and phase exams to assess students progress on an on-going basis.
> 12. Continuous progress achievement cards to indicate individual mastery learning."

This model may be a useful guide for curriculum planning requiring a certain amount of flexibility and eclecticism in approach and methodology, and control to be provided to assure that goals are met.

A language skill priority is an important aspect in developing ESP curricula. Priorities should be validated through surveys. Technical programme staff and training specialists should be asked to determine the relative ordering of the four skills, allotting a percentage of importance to each, and corresponding to the needs reflected during the on-job-training (Fredrickson, 1979).

The content of the teaching materials should focus on the elements of language acquisition which are essential to students' success. According to Fredrickson (1979), the content should be relevant to students' needs and sub-technical in nature. It should include a certain amount of job-specific information that is purely technical, besides a limited amount of affective and/or social language, such as greetings, expressing of mode and identification of the members of the family. In this manner, the ESP programme should include general English as well.

ESP programmes should contain elements for visual input and for decoding and encoding output. Bloom (1972) believes that those new methods of teaching and superbly produced materials can profoundly affect the instructional process and markedly change the intellectual and emotional climate of teaching and learning. Therefore, charts, flash cards, tapes, slides and transparencies should supplement the ESP curriculum.

Many ESP course designers have considered the use of translation. Widdowson (1979) suggests that we use the mother tongue with a non-verbal device. For example, in teaching the vocabulary of 'prayer', it is best explained through the learner's native language, as it has different interpretations according to religious beliefs. According to Stern (1983), one cannot ignore the student's mother tongue, for it constitutes his linguistic competence or network or frame of reference. It supplies him with a set of associations and a chaining of sounds and patterns that are different in many aspects from English. Yet, translation is only one of the several ways of approaching the

materials. Fredrickson (1979) warns that it should not be relied upon more than any other device present in the material.

Re-exposure and reinforcement are essential parts of the components of any ESP programme. In order to ensure that students are constructing or reconstructing, rather than simply reciting memorised materials, it is important that practice and reinforcement materials contain numerous examples of sentences which are not long enough, or which are sufficiently varied, to abort memorisation. It cannot be assumed that one-time exposure to a given item will ensure mastery. In addition to built-in reinforcement, items once taught should recur in future lessons as vehicles for introducing new items. Yet, mere quantity of repetition should not be considered as important as the number of times meanings are associated with their linguistic manifestations in words and phrases.

Accordingly, the programme designer should realise that the content of the language items should include those taught for passive acquisition and those taught for active acquisition. In active acquisition, students should be able to use items productively in most contexts in productive modes (speaking and writing). In passive acquisition students should only be expected to use language in receptive modes (listening and reading). The designer should also consider that communication vs. correctness controversy where stress should be on communication rather than on correctness. Mistakes that do not interfere with communication should not receive an intensive degree of practice. The learner should be encouraged to express him/herself fluently rather than accurately, so that the flow of speech goes spontaneously.

Ordering or sequencing language items is an important controversy in developing curricula. Fredrickson (1979) suggests that language items should follow some sort of ordering scheme (in terms of difficulty and/or frequency) but not in the strictest definition of ordering as in the classic audio-lingual approach. Thus, it is

assumed that a given item cannot be taught before another, nor that a given item must be fully mastered before moving on to the next. Stress should be on semantic clarity, communicative usefulness and relevance to students' projected use of the language. Tasks should be ordered in a manner that facilitates their acquisition and retention.

Evaluation plays a significant role in general curriculum development. Curricula in different subjects are commonly developed, tried out, evaluated, revised, re-taught until they have demonstrated their adequacy in meeting programme objectives or their superiority over competing curricula (Portwood, 1976). The features of programme evaluation may include:

1) Assessment of students' needs which will lead to a clear statement of programme activities in operational terms.
2) Consideration of the decision alternatives available to the programme designer.
3) Administration of the programme,
4) Systematic monitoring of this try out through the collection of information to relate observed outcomes to programme process,
5) Making decisions regarding the improvement of the programme.

Batchman and Strick (1981:46) developed a model for the pre- developmental phase of language programme design. With this model, the language programme designer can relate learning objectives directly to resource needs in a way that will enable the designer to determine "what objectives are reasonable, given certain resources, or what resources are required by a given objective". The model has three components: needs assessment and evaluation of objectives; resources assessment; and mapping objectives into resources, or the determination of achievable objectives within the limits of given resources.

The needs assessment is aimed at determining to what extent there is a genuine need for the programme being considered and determining the objectives set for the

programme. This assessment needs to identify the clients who will be affected by the programme and the framework for need assessment according to the set objectives. Objectives are determined according to the rationale behind each objective, the possible outcomes of achieving a given objective and the objective's relation to the broader goals of the programme. The end product of the needs assessment and the evaluation of objectives is a list of performance objectives ranked and weighted in terms of importance and priority.

In the resource assessment stage, Strick (1.981: 50) believes that the main factors to be considered are "physical factors, human factors and cost factors". The physical factor includes materials, equipment and methods. Materials for example, may include students' textbooks and supplementary materials. The human factor includes students, teachers or administrators, in terms of students' number, competence, motivation or attitudes. The relevance of these factors to the programme can be determined, ranked and weighted in order of priority. Then, the objectives are mapped out onto resources according to their achievability within the limits of given resources.

Methodology is an important aspect in developing programmes for specific purposes. Phillips (1981) states that the structure of language for specific purposes must be determined by the structure of the behavioural objectives of the learner's special purpose, and that this structure must be at the highest practical level of focus.

Methodology can be chosen in terms of reality control, relevance, authenticity and tolerance of error. That is, the difficulty of the task demanded should be controlled to ensure its meaningfulness. Relevance of the programme to the students' needs makes them feel that they are involved in the learning process. Hence, materials and tasks should be relevant to students' concerns and expectations. Authenticity indicates that the language presented to the students is naturally generated by their special purposes so that the student has an opportunity to encounter authentic examples of language use.

Therefore, it is necessary to tolerate a higher level of certain types of error in students' language use. Phillips (1981:103) states three types of error:

> "Errors of content and formal adequacy should be judged as unacceptable only to the extent that they entail errors of communicative adequacy".

5.3.2. Communicative Materials

The communicative materials stress the communicative and not the structural aspect of the language. Robinson (1980: 23) points out that the communicative materials are "more dynamic, more obviously activity based". Candlin, et al, (1981) state that the communicative approach has enabled the material writers to escape the narrow framework of structural linguists, to be concerned with how the total system operates to convey the meanings and messages.

On the whole, communicative programme designers should consider three issues: what to communicate, why people communicate and how they communicate. According to Yalden (1983), the following components should be considered:

1) The purpose for which learners are studying the language.
2) The setting in which they will be using it.
3) The role the learner will assume.
4) The communicative events or situations in which they will participate.
5) The language functions and acts involved in these events.
6) The notions involved.
7) The varieties of the language the learner will need.
8) The grammatical content needed.

These components were considered in the design of the framework of the programme developed in the present study. For instance, the learners' purposes were assessed by the interviews and questionnaires (see chapters 7 & 8). The target learners

of this study were assumed to learn the standard variety of the language using communicative functions in scientific settings related to their speciality.

5.3.2. Evaluating Communicative Teaching Materials

The textbook is an instructional tool, and teachers should know not only how to use it, but also how useful it can be. The teacher takes over where the textbook leaves off. Therefore, the teacher must be able to assess the strengths and weaknesses of the textbook.

Tucker (1974: 8) suggests that the evaluation system of such materials should include three components as follows:

> "1) A comprehensive set of criteria consistent with basic linguistic, psychological and pedagogical principles underlying currently accepted methods of teaching.
> 2) A flexible rating scheme that provides a method for the comparative weighting of the criteria and a simple system for recording the evaluators' judgements.
> 3) A rating chart that facilitates a quick, easy and display of the evaluator's judgement on each criterion.

Tucker divides the evaluation criteria into four categories: pronunciation criteria, grammar criteria, content criteria, and general criteria. Various aspects of pronunciation should be presented for practise drills - not merely described. Grammar criteria are concerned with how much of the structure of the language is presented, how well it is presented and how really the student may be able to use them. Grammar drill model and pattern displays should be adequately provided and practised. Content criteria deal with the functional load. Other issues such as the rate and manner of entry and the appropriateness of contexts and situations should be taken into consideration.

There are general criteria requiring a broader view of the book and involving assessment factors that are external to the material itself. They are related to the authenticity of language, availability of supplementary materials, adequate guidance for

non-native teachers, competence of the author, appropriate level for integration, durability, quality of editing, design and production, and price and value.

Williams (1983) suggests that teachers should be acquainted with the principles of textbook evaluation. His evaluation scheme relates assumptions about teaching a foreign language to a set of linguistic, pedagogical, general and technical criteria. He gives four assumptions. The first assumption, up-to-date methodology, is that the textbook should be consistent with the psychological and linguistic principles underlying current accepted method of foreign language teaching. The second assumption is that the textbook should provide guidance for non-native teachers of English. Accordingly, the textbook should:

1) give introductory guidance on the presentation of language items and skills.
2) suggest aids for the teaching of pronunciation.
3) distinguish the different purposes and skills involved in the teaching of vocabulary.
4) offer meaningful situations and a variety of techniques for teaching structural units.
5) provide guidance for the initial presentation of passages for reading comprehension.
6) demonstrate the various devices for controlling and guiding content and expression in composition exercises (writing).
7) contain appropriate pictures, diagrams, and tables.

The third assumption is that the textbook should cater for the needs of the students. The last assumption is that the book should be relevant to the socio-cultural environment of the learners.

For Lee (1974), a good textbook will repeat in subsequent lessons the structures already taught. He recommends the use of pictures that show clearly the action in each dialogue.

In Egypt, Daoud (1970) divides his criteria into six parts divided into a number of questions; the subject matter, vocabulary and structure, drills and exercises, illustrations, physical make up, and teachers' handbook.

For science students, these materials should include a lot of drawings, photos, graphs, etc. because they enhance the students' understanding of concepts and terms. Showing objects might be more effective than describing them. For example, because English textbooks of the secondary stage in Jordan lack many of these criteria, it was noticed that teachers were trying to make simple illustrations of scientific objects to consolidate their students' comprehension of the topic. It was also noticed that because the textbooks of the basic stage in Jordan were well designed, rich with colourful photos and drawings, students were interested in studying these textbooks.

Therefore, the suggested programme developed in the present study, produced a teachers' booklet to introduce the trial material and explain the language items, functions and suggest guidelines to help the teachers teach the lessons as effective as possible. The teachers were provided with audio-taped listening passages in order that the target students would listen to them. Illustrations were also presented in the students' booklet (see appendix 9).

5.4. Summary

The review of these methods and approaches indicates various implications that may be of value to programme designers, teachers and researchers in EFL and ESP as follows:

1) In some cases, it would not be possible to adopt completely two or three methods at the same time. But it is possible, on the other hand, to use many 'techniques' from different methods in one language lesson, or to adopt a method and enrich it with many techniques from other methods.

2) For the EFL situation, the Communicative Approach should be adopted, but it can benefit from other techniques from other methods, such as TPR, Notional-functional and the Natural approaches. The sole base of selecting the teaching method is the extent to which it is beneficial for learning the English language in a given context. In short, this is what is called the 'eclectic' method.

3) Some teaching approaches and methods lack detailed description of how to be implemented. They are presented as general suggestions without giving practical guidelines to help teachers apply them in the actual classroom situations. In practice, this suggests a need for further analysis and investigation of the teaching methods for developing teaching and learning of EFL in the Jordanian context.

4) Despite the great importance of the teaching methods being adopted for developing TEFL, teaching method represents only one component of the curriculum, which interacts with the other components and should be developed within a systematic process. Practically, curriculum components affect each other and are very much interrelated; therefore, developing one of them may have little, or even no, contribution in developing ELT and improving the students' performance.

5) Much more attention should be paid to the student-centred learning taking into our account the needs of the learners and their interests to ensure their high motivation and positive attitude towards learning EFL.

In the respect of EFL course design, generally speaking, there are four basic steps to develop English language teaching programme:

1) Identifying and assessing the learners' needs for English (Munby, 1978, Robinson, 1980).

2) Specifying the objectives of the course according to the learners' needs.

3) Choosing suitable materials and methods of teaching to achieve the objectives and meet the desired needs.

4) Devising suitable techniques for evaluation to check if the objectives are met.

On developing ESP communicative programmes, the designers, the users and/or the evaluators should take into their consideration the logic or the rationale behind the objectives, i.e. the philosophy of the programme. On the other hand, the programme should be very well planned in terms of the programme users' needs for using the language for their own personal and/or community purposes. Therefore, the language content should be balanced between the cultural aspect of the target language to be taught and the authenticity and suitability of this language to apply in real situations with which the learners are familiar.

Teachers of such a programme play the roles of organiser of the teaching/learning activities and facilitator to the success of both the learners and the programme. Therefore, s/he should be involved in developing such a programme and be trained well enough to perform the new roles effectively. Teachers should be trained in applying the new methods that centre on the students. Student-centredness should be emphasised in training programmes to introduce pair work and group work, project-work and self-learning as they are the major features of the ESP communicative programmes.

In designing the framework of the programme suggested in the present study, Munby's advice and the conclusions drawn from these studies were of great help. The needs of the target learners were assessed using two questionnaires (see chapter 8). This assessment led to specifying the objectives, components and contents and recommended techniques for the assessment of the learners' performance (see chapter 9 and appendix 9). The teachers who participated in this study were involved in the planning of the suggested programme and trained to teach the trial units in their classrooms.

CHAPTER SIX

DOCUMENTARY ANALYSIS AND INTERVIEWS

6.1. Introduction

This chapter describes the research methods used to collect the required data for this study and the rationale for using these methods. In the following sections, the literature related to this research methodology is reviewed to define and support the two specific methods applied for data collection.

Investigating the situation of ELT and ESP in Jordan entailed the application of various qualitative research methods and techniques. The problem of teaching English for science students at the secondary schools was raised in informal meetings and conversations with educators interested in the development of English education in Jordan. This was supported by a scrutiny of the available educational documents and analysis of the content of the national curriculum and English textbooks. Exploratory interviews were used to probe the target population's ideas and views. Anderson and Arsenault (1998:119) exemplified qualitative research as:

> " ...an inductive form of inquiry whose results are a blend of research skill, luck and a particular perspective. Like the fisherman on uncharted waters, you may have an idea of what lies beneath the surface, but you cannot always be sure. As the fisherman knows, where you happen to anchor your boat, the particular lure you choose and the skill you demonstrate in fishing has a great deal to do with what you catch. Similarly, the qualitative researcher soon learns that being in the right place at the right time is all important."

6.2. Specific Objectives of the Study

The present study was an attempt to specify the characteristics of the suggested EScP programme based on assessing the needs of target students at the public schools in Irbid General Directorate (IGD) and the perceptions of their community. Semi-structured interviews were conducted to survey the situation of teaching and learning English from the various different viewpoints of the stakeholders.

The following specific objectives were identified:

1) Specifying the characteristics of the framework for the suggested programme.
2) Specifying the objectives of this programme.
3) Describing the content of the programme.
4) Providing the suggested strategies and techniques for teaching this programme.
5) Proposing the appropriate techniques for assessing the outcomes of this programme.
6) Establishing the reliability and validity of this suggested programme by developing two units to be piloted on the target sample of students.
7) Suggesting a model that could be made use of by other researchers, curriculum planners, course designers, programme developers and writers and/or assessors of instructional materials.

6.3. Statement of the Problem

The problem of this study is stated in the following questions:

A. How can we design a communicative programme of scientific English for the first scientific secondary grade students in Jordan?

This question subsumes the following questions:

1) What are the needs of students for learning English for Scientific Purposes?
2) What are the community perspectives for teaching English for Scientific Purposes for the scientific secondary stream?
3) What are the characteristics of a theoretical framework for an EScP programme, based on the communicative approach to TEFL, for the first scientific secondary grade?
4) How can these characteristics be used in designing a communicative EScP programme for the first scientific secondary grade?

B. What is the effect of this programme on the communicative performance of the first scientific secondary students in scientific contexts?

6.4. Limits of the study

The following limits were imposed on the study:

1) The subjects of the study were selected from the first year Scientific Stream in the secondary stage of education at the public schools in IGD in 1998/99.
2) Two units of the designed programme were piloted in the public secondary schools with a Scientific Stream in six Local Education Directorates belonging to Irbid Governorate. These directorates were Irbid First, Irbid Second, Ramtha, Beni Kenaneh, Korah, and North Shoneh.

6.5. Definition of Terms

The following terms are used in this study:

Communicative Approach

It is an approach to teaching English use and developing students' skills to satisfy their communicative needs for effective interaction with other speakers of English, ensuring the utility and relevance of this language to the student's future life in either an education aspect or work sector. This approach concentrates on a student-centred learning methodology that provides the learners with the language functions, themes, structures and vocabulary to enhance their motivation towards learning EFL.

Programme

It is an instructional plan based on the general goals of ELT in Jordan and in the secondary stage in particular, as well as the community's perspectives and the students' needs for English for scientific purposes. This programme consists of the specific objectives of ELT for the scientific secondary stream students, and the

content that includes structures, vocabulary items, functions, themes, and situations. It also consists of integrated language skills learnt through single complete units. The learner-centred methodology gives more opportunities for the learners where the teacher is an organiser and facilitator for learning.

Scientific Secondary Stream

It is a stream of the academic secondary stage of education in Jordan joined by the students who finish the basic stage successfully. The curricula of this stream are different from those of other streams; that is students learn physics, chemistry and biology. The curricula of all streams include Islamic education, Arabic and English.

Community

In this study, the community refers to the educators who are concerned in teaching and learning English for scientific purposes for the target students in Irbid General Directorate of Education. It includes school teachers, education supervisors, curriculum specialists and university lecturers.

Communicative English Programme for Scientific Purposes (EScP)

It is a programme this study suggests to teach the science students of the secondary stage of education in Jordan to use the English language functions communicatively. This programme is based on the communicative approach to teaching English and the students' needs to communicate in scientific contexts related to their specialism and scientific knowledge background with reference to the basic scientific subjects of scientific applications, general science, biology, chemistry and physics. It focuses on teaching the use of English rather than on teaching sciences, i.e. teaching the language through sciences.

6.6. The Population of the Study

The following categories were involved:

1) First scientific secondary students at public schools in Irbid Governorate;
2) First year university students of the faculties of sciences at Jordan University of Science and Technology and Yarmouk University in Irbid Governorate.
3) Teachers of English for the secondary stage students in this target region.
4) Teachers of science for the secondary stage students in this target region.
5) Supervisors of English language teachers in Irbid Governorate.
6) Specialists in English curriculum development at the General Directorate of Curricula of the Ministry of Education located in Amman.
7) University professors of English language and English curriculum and methodology at the two above-mentioned universities.
8) University professors of sciences at the faculties of sciences in these two universities.

6.6.1. Characteristics of the Population

The Educational Statistical Report (Ministry of Education, 1997:211.) stated that in 1997 at the Secondary Stage of Education, there were 782 schools, 7485 teachers and 126469 students under the authority of the MOE distributed in 12 Governorates around the country. Table 6.1 shows the total number of secondary and the academic schools in Jordan and in IGD as well as the number of teachers, students and classes. The ratios of students to classes are 29.2 in IGD and 28.2 in Jordan, while the ratios of students to teachers are 19.8 in IGD and 20.2 in Jordan, (Jaradat et. al., 1997).

Table 6.1: Numbers of MOE Secondary and Academic Schools, Teachers, Students and Classes in Irbid and the Total in Jordan in 1997

Schools		Schools		Teachers		Students		Classes	
		Male	F	Male	F	Male	F	Male	F
Secondary	Irbid	66	77	738	867	12958	13929	430	522
	Jordan	246	343	3459	4026	57259	69210	2079	2497
Academic	Irbid	63	74	517	627	10962	11945	353	422
	Jordan	320	330	2107	2845	42754	57423	1548	1995

Because the present study included the Scientific Stream students, the information focused on the numerical characteristics relevant to this target population. The total number in the two scientific grades in IGD was 9046 male and female students distributed in six local directorates, whereas the total number of the first grade was only 4503 students in public schools. Table 6.2 shows the numbers of the students of the first and second scientific grades of this stream in Irbid and the total number in Jordan.

Table 6.2: Numbers of MOE Scientific Secondary Stream Students in Irbid and the Total Number in Jordan in 1997

Grade	First Scientific			Second Scientific			Grand Total
Gender	Male	Female	Total	Male	Female	Total	
Irbid	2474	2029	**4503**	2559	1984	**4543**	**9046**
Jordan	10896	10219	**21115**	10246	9210	**19456**	**40571**

Table 6.3 shows the number of the teachers according to their qualifications in IGD and the total number in Jordan. It is clear from this table that most of the teachers at the academic secondary school in Irbid hold BA, BSc, MA, or MSc degree.

Table 6.3: Numbers of Teachers according to their Qualifications in Irbid and the Total Number in Jordan

	Diploma		BA or BSc		Higher Diploma		MA or MSc		PhD	
	M	F	M	F	M	F	M	F	M	F
Irbid	15	38	363	527	105	39	31	22	3	1
Jordan	90	141	1518	2470	359	146	135	82	4	2

In Irbid Governorate there are only two government universities (YU and JUST). They were involved in the present study. Both of them have Physics, Chemistry and Biology departments (see table 6.4).

Table 6.4: Numbers of Science Lecturers for First Year and First Year Students at Yarmouk University and JUST in 1997

University		YU			JUST		
Department		Physics	Chemistry	Biology	Physics	Chemistry	Biology
Lecturers of FYUS		10	10	12	8	10	9
First Year Univ. Sts. (FYUS)	Male	35	41	46	40	42	49
	Female	30	44	49	38	47	51

6.7. Research Sample Selection

The sample is selected according to the nature of the study, its design and objectives and/or the size of the population itself. The sampling literature does not fully determine how big a sample should be (Oppenheim, 1992). However, there are some determinants of sample sizes, such as the relative homogeneity of the population. So, if the population was homogeneous, a small sample would suffice. The other important determinant is the accuracy of the sample's representation. A properly drawn sample of a small number of cases can give more reliable estimates of a population of many millions than a poorly drawn sample of hundreds of thousands. Other factors identifying sample selection are the precision of the sampling process, the required accuracy of the population estimate and the costs and personal availability for the study.

In this study, the clustering technique was applied as it is appropriate for allowing a larger sample to be manipulated with less cost and reduced sample error. Oppenheim (1992:40) mentioned:

> "We may therefore resort to a modified sampling method which is called the *cluster sampling method.* This takes the advantage of the fact that most populations are structured in some way, or could be divided into sub-sections according to certain characteristics; that is they can be clustered. Cluster sampling is designed to make use of these structured hierarchies."

However, one of the disadvantages of clustering is that it reduces the precision of the sample. That can occur when people in the same area tend to be similar in respect of the survey variables. One of the most common forms of clustering is clustering by area. This was the approach followed in this study.

6.7.1. Characteristics of the Sample

In chapter one it was stated that the system of education in Jordan is centralised. All the schools apply one national curriculum and its textbooks, which are approved by the Board of Education (Ministry of Education, 1997). The schools also use the same radio and TV materials and programmes that are transmitted by one central educational TV station in co-operation with the central National Radio and TV Corporation. Moreover, all these schools apply the same central rules and regulations under the supervision of the Local Directorates.

The researcher intended to generalise the results of the study to all public secondary schools belonging to IGD. Since the sample was scattered over this Directorate and because it was hard to deal with the whole population of these schools, a random cluster sampling technique was applied to select each sample. The sample was homogeneous in that the subjects shared the same cultural and school educational background.

Hence, for the main study, 839 students were randomly chosen with a percentage of 19% from the population of 4503 students in the first scientific grade. A cluster of 12 schools with a percentage of 11% was chosen from 113 secondary schools, which had Scientific Stream and were homogeneous in educational facilities and demographical features. IGD was chosen for several reasons. It has urban and rural areas scattered over mountainous and hilly regions. Its people work in agriculture, business, small industry projects, and in the government sector as civil and military officials.

Irrespective of Amman the capital city, IGD has a relatively larger population than other governorates in terms of the number of teachers, students, schools and higher education institutions. There are two government universities (YU and JUST), one private university, one government community college and two private colleges.

Furthermore, Irbid is close to the researcher's residence. Therefore it was chosen for the research. The size of the sample will be described in detail in presenting the administration of each instrument of data collection.

6.8. The Research Methods Used for Data Collection

Various methods were utilised in this study, since it is widely recognised that using more than one approach in collecting data helps the researcher to identify the strengths of each of these data sources and overcome the weaknesses which could result from using only one single method. It is suggested that a single method of obtaining data, such as a questionnaire, might not address every problem that arises in the research; several instruments and approaches might need to be applied to solve the complexity of human problems (Patton, 1990). In educational research, the first issue to be decided is which approach should be adopted for data collection: qualitative or quantitative, taking into account that each has its own advantages and disadvantages.

Both qualitative and quantitative methodologies were used to address the research questions. Questionnaire surveys constituted the quantitative approach, and semi-structured interviews the qualitative one. The latter approach requires the researcher to observe, record and interpret the world as seen through the eyes of the study subjects, (Easterby-Smith, Mark et. al). Denzin and Lincoln (1994: 2) argue that:

> "Qualitative research is multi-method in focus, involving an interpretative, naturalistic approach to its subject matter. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or interpret phenomena in terms of the meanings people bring to them."

Qualitative research accepts that the research subjects know themselves best and describe, interpret and talk about their own environment from their perspective through their eyes. This type of research is an inductive form of inquiry where the researcher is the main data collection instrument. Through this inquiry, the researcher

forms his/her opinions, attitudes, and ways of looking at phenomena and interpreting findings. Denzin and Lincoln (1994) state that the interview involves the gathering of data through direct verbal interaction between individuals. The kinds of interview range between the structured, unstructured, non-directive and the focused interview.

In this study, several procedures were applied; semi-structured interviews, two questionnaires, an achievement test, and content analysis of the national documents related to ELT and of the English language curriculum of the textbooks of the first scientific grade. Similarly, the literature pertinent to the topic of the study was reviewed.

In short, the study proceeded through two major phases. The first phase tackled the documentary work related to ELT, and the second one was concerned with the empirical part of this study. The following sections explain each phase.

6.8.1. Phase one: The Documentary Analysis

Content analysis is necessary to understand how different sources of data can be used to clarify understanding and make the description more meaningful to the researcher. Content analysis presents classified or tabulated information (Gall and Borg, 1989).

Moreover, content analysis helps the language material writers, publishers and/or evaluators to produce word lists, for instance, to assess the readability of a book or any other reading materials and for developing more readable ones. Recently, not only do content-analysis studies consider content frequencies but also the interactivity among the content-analysed variables, or the association between these variables and the variables under investigation (Gall and Borg, 1989). Anderson and Arsenault (1998: 101-102) suggest that "Content analysis is applied to the analysis of data in documents and refers to the systematic description of the contents of documents"

Accordingly, at this phase the researcher undertook the subsequent actions:

1) Analysing the Jordanian system of education by examining the official documents of the Ministry of Education (MOE) such as the educational developmental plans and the reports. Therefore, the researcher identified the management of education (organisational structure and educational ladder) and the national goals of ELT for the basic and secondary stages.
2) Analysing the proceedings of the first National Conference for Education Reform (NCER) held in 1987, so the conclusions of the national panels and their recommendations for the improvement of English curricula and the textbooks were identified.
3) Analysing the Jordanian English curricula of the basic and secondary stages of education to identify the goals, objectives, contents and teaching methods.
4) Reviewing the theoretical background of the study pertaining to the language acquisition and learning theories and the curriculum development models.
5) Reviewing the studies related to the approaches to TEFL and ESP in the world generally and the Arab countries and Jordan particularly.

Thus, the researcher constructed a clear view of other researchers' methods, techniques and instruments. This helped in selecting the appropriate methods and procedures to collect, manage and analyse the data, apply the proper statistical measures and to present the findings. Figure 6.1 illustrates management of the research process.

6.8.2. Phase two: The Empirical Phase

This phase was divided into the exploration stage and the implementation stage as shown in figure 6.2. The former employed the interviews to explore the research environment as described in the following sections. The latter involved implementing

the research instruments (the English language questionnaire, the science questionnaire and the achievement test) in the main study (see chapter 7).

Figure 6.1: Management of the Qualitative Research Process/ Phase One

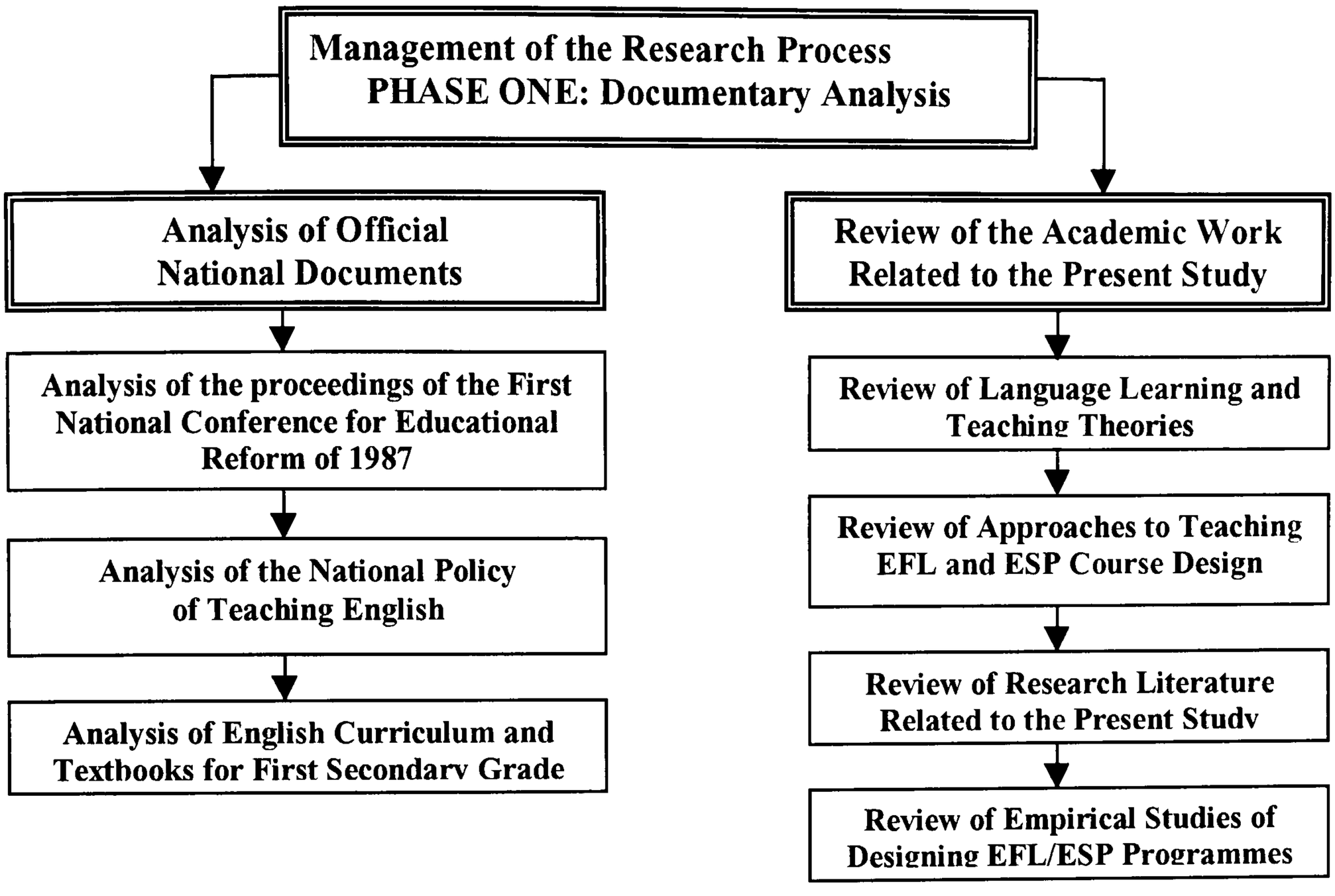
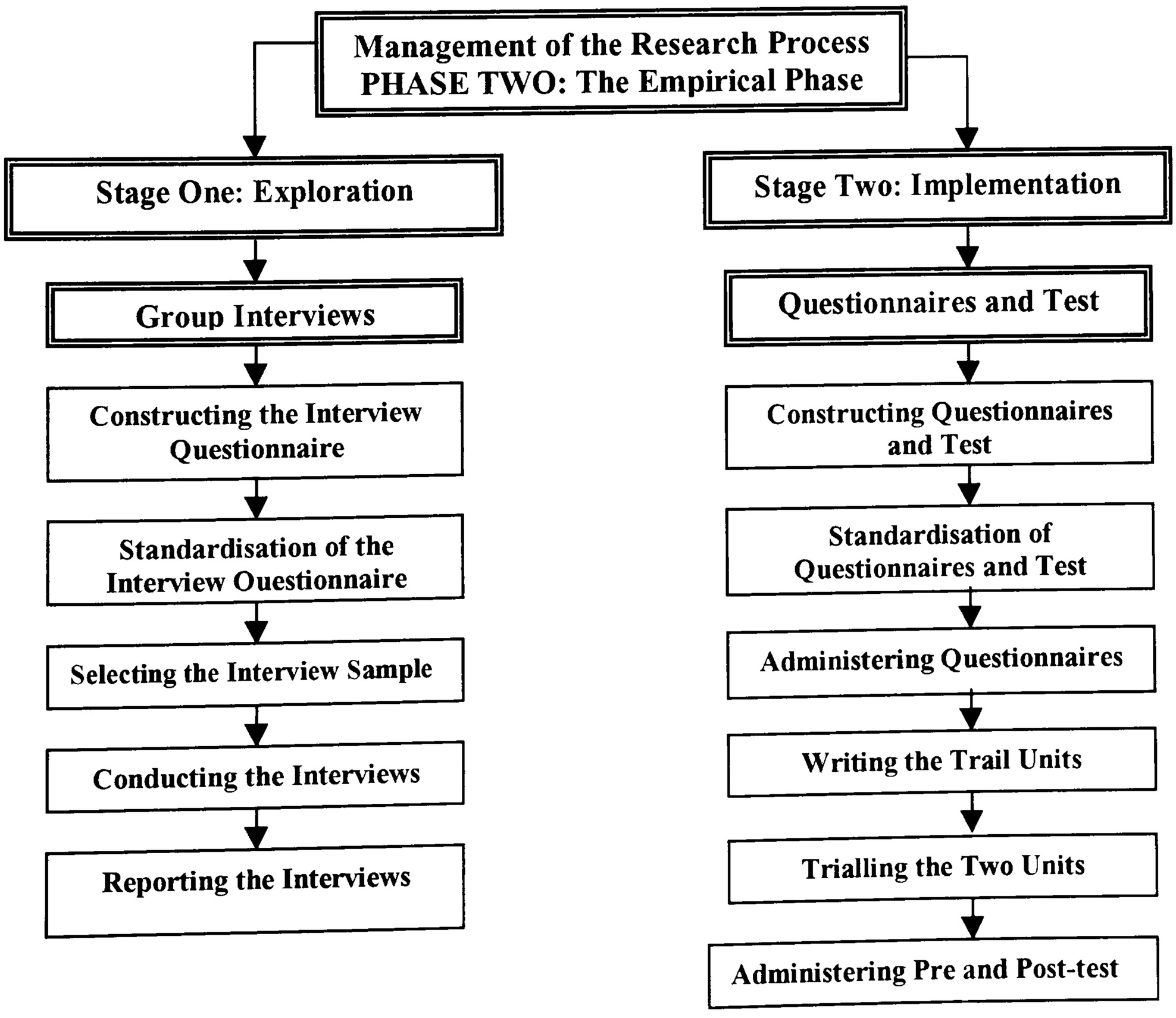


Figure 6.2: Management of the Research Process/ Phase Two



6.8.2.1. The Interview

The research interview has various definitions that may be summed up as a two-person conversation initiated by the interviewer for the specific purpose of obtaining information, and focused on content specified by research objectives of systematic description, prediction, or explanation. The interview involves the gathering of data through direct verbal interaction between individuals. Interviews can take various forms, and so a decision must be made as to which is suitable. According to Wragg (1994) and Gall and Borg (1989), interviews can be of three different types.

First, **structured interviews** involve a fixed set of questions that the researcher asks in a fixed order. These are based on a carefully worded interview schedule and frequently require short answers or the ticking of a category by the investigator. They are often like a written questionnaire in form. However, it gives the interviewee little space for new insights or deep thinking. The structured interview is useful when a lot of questions are to be asked which are not contentious or deeply thought provoking.

Second, **unstructured interviews** are the opposite. Here the interviewer has a number of topics to cover but the precise questions and their order grow from the exchange with the respondent. Open-ended answers allow people to say as little or as much as they like. Unstructured interviews or what are called 'depth interviews' require considerable skill and training in the necessary techniques. Consequently, they are not to be undertaken lightly or by anyone not well informed about their procedures or hazards. The novice interviewer is not advised to apply this type of interview unless he/she is sure about his/her ability to deal with the interviewees in a more structured situation and about the value system to be used. Moreover, this form of interview is highly subjective and time consuming.

Third, **semi-structured interviews** pose a series of well-worded and structured questions. Often there is an initial question followed by probing more deeply using

open-form questions to obtain additional information. A semi-structured form tends to be the one most favoured by educational researchers as it allows respondents to express themselves at some length, but offers enough shape to prevent aimless details. In semi-structured interviews, as Bell (1993: 93) cites "Certain questions are asked, but the respondents are given freedom to talk about the topic and give their views..."

Exploratory interviews may be used for many different purposes as Oppenheim (1996: 66) states:

> "to develop ideas and research hypotheses rather than to gather facts and statistics. It is concerned with trying to understand how ordinary people think and feel about the topics of concern to the research."

At the exploratory stage of this research and with regard to the type of the data required and the time available, the researcher decided to apply semi-structured interview questionnaire. This technique would allow a thorough investigation of the views, expectations and suggestions for ELT development.

Objectives of the Interviews

These were to:

1) Develop ideas and research hypotheses.
2) Assess the study subjects' perspectives and opinions of the ELT situation in the public secondary schools in Irbid District.
3) Examine the appropriateness of the existing curriculum and its textbooks for learning and teaching English for scientific purposes for the Scientific Stream students at these schools.
4) Gather a wide variety of the study candidates' suggestions to be utilised and incorporated in developing the questionnaires and in designing the proposed programme of EScP.

Construction and Standardisation of the Interview Questionnaire

Based on the previous documentary work, discussions with educators and visits to secondary schools, the researcher identified four areas of the interview to derive clearly stated questions to which a five-point scale was associated (5= strongly agree, 4= agree, 3= undecided, 2= disagree, 1= strongly disagree, see appendix 1). The four areas were:

1) The appropriateness of the existing English textbooks for the students' interests, abilities and needs.
2) The importance of basic scientific English to the Scientific Stream students at the public schools.
3) The possible topics and terms to be included in the programme.
4) Suggestions for improvement of the ELT curriculum.

Then, twelve initial items were generated and worded in the form of statements. The first four statements were designed to elicit answers related to the first area. Four statements provided information relevant to the second area. The last four statements addressed the third area focusing on the possible topic and terms to be included in the programme. The fourth area of the interview aimed to raise discussion and to obtain suggestions related to the characteristics of the proposed programme.

The interview questionnaire was standardised in terms of validity and reliability. Validity refers to the knowledge and meanings that are reported as correct by the informants of the study. Reliability is proven if similar observations are made by different researchers on different occasions.

Validity was achieved by submitting the interview questionnaire to a jury. It included 15 persons: five university lecturers (1chemistry, 1 physics, 1 biology, 1 English language, and 1 English curriculum and teaching methods); four teachers teaching at the scientific secondary streams (2 sciences and 2 English language); four

educational supervisors (2 sciences and 2 English language) and two curriculum development specialists (1 sciences and 1 English).

A copy of the first draft consisting of 12 items was submitted to the jury. They were briefed by the researcher about the purpose of the research in general and the objectives of this instrument in particular. They were asked to evaluate this instrument (Table 6.5) in terms of the clarity of the statements, appropriateness of each item to elicit the information, whether each item belonged to the specified area of the interview and to propose amendment to any item.

A week later the researcher organised a meeting for the jury to give their feedback on these items. Their recommendations were as follows:

1) All the members suggested grouping the items into two areas instead of three. The two areas were: appropriateness of the existing English textbooks for the students' interests, abilities and needs; and the importance of learning basic scientific English to the Scientific Stream students at the public schools. The third area was advised to be included as a major target in another questionnaire.
2) Eighty one percent of the jury suggested amending the phrasing of the items into a form asking for opinion rather than emphatic form; then all the items were restated.
3) Eighty three percent proposed keeping the stems of six items unchanged but to change the introductory verb of each.
4) Seventy six percent recommended amending the statement of two items in terms of appropriateness and belonging to the area.
5) Seventy eight percent advised deletion of two items because they were unclear, inappropriate and irrelevant to the areas and the objective of the instrument.

Table 6.5: Suggested Form for Validation Used by the Jury

Item No.	Degree of Clarity	Degree of Appropriateness	Degree of Belonging to the Area	Proposed Amendment
1				
2.				
Any further comments:.....				

At the end of the meeting, the interview items were revised and another draft was produced including the ten items shown in table 6.6.

Table 6.6: Areas of the Interview Items and their Mean and Standard Deviation

Area	Item No.	Statements	Mean (N=85)	SD
Appropriateness of the existing English textbooks for the students' interests, abilities and needs.	**1**	English textbooks should suit the students' needs for learning sciences.	3.19	0.72
	2	Current English language curriculum for scientific secondary stream should include English subject matter that meets the students' needs.	4.71	0.48
	3	English language curriculum should concentrate on developing the student's ability to deal with scientific situations.	4.62	0.51
	4	English language should teach sciences related students' needs.	2.04	1.14
	5	Studying English for scientific purposes could be essential for preparing scientific secondary stream students for university education.	4.45	0.87
The importance of learning basic scientific English to the Scientific Stream students at the public schools.	**6**	English language textbooks for scientific secondary stream should include general scientific topics, which the students may study when they join the university.	4.46	0.61
	7	Learning scientific English may be effective in raising the achievement of scientific secondary students when joining a university.	4.47	0.72
	8	Learning scientific English should help science students in their future life.	2.65	0.95
	9	Lack of the students' knowledge of scientific English in the Scientific Stream may negatively affect the university student' achievement in sciences.	4.58	0.54
	10	It is recommended that the specific subject matter of the scientific English for the Scientific Stream students should include topics on modern scientific developments.	4.40	0.62
Any other suggestions				

Then, this instrument was used in a pilot test conducted on a sample selected randomly from the population of this study. Although the size of the sample was small, researchers accept such a size for piloting an instrument. This pilot test was administered to 85 subjects including: 22 female FYSSS, 28 Male FYSSS. 15 FYUS representing biology, chemistry and physics, 6 English teachers. 1 English Supervisor, 6 science teachers, 1 science supervisor, 3 university English lecturers and 3 university science lecturers. This pilot was organised in five groups: 6 University lecturers in group A, 14 school teachers and supervisors in group B, 15 FYUS in group C, 22 female FYSSS in group D, and 28 male FYSSS in group E.

The schedule for a single administration of these pilot interviews was arranged in advance with each group. The researcher led these interviews and each respondent filled in the questionnaire and a discussion was created to suggest relevant ideas. The researcher took notes of these suggestions and summarised them and then collected all the questionnaires. The responses were coded and entered into the SPSS programme for analysis. The results of this analysis are shown in table 6.6.

Accordingly, the items whose means were below 3.00 were excluded and those between 3 and 4 were amended. The interviewed teachers, specialists and university lecturers recommended omitting item four, since it did not specify what type of needs were sought besides it should be dealt with as a major area for investigation. They also suggested omission of item eight, because it was vague. It also referred to future life but did not specify what kind of future life, business, education, personal etc. Thus, items four and eight were excluded and item one was amended into ' English textbooks should suit the students' needs for learning English for scientific purposes'.

The eight items were produced in questionnaire format with a five–point Likert scale next to each item and an introduction detailing the objective of the research and the confidentiality of the responses (see appendix 1).

The Sample of the Actual Interviews

A sample was randomly selected from the population of IGD representing two major categories, i.e. the students and the community concerned. The students' category was classified into two clusters: the first Scientific Stream students (FYSSS) at the public secondary schools and the first year science university students (FYUS) at YU and JUST.

The community category was also divided into three clusters: 1) teachers of English and sciences of the scientific secondary stream, 2) senior educators involving curriculum specialists of English and sciences and educational supervisors of English and sciences, and 3) the university lecturers of sciences for the first year students and lecturers of English language and English curriculum and teaching methods.

The rationale for selecting these clusters was that the FYSSS were the targets of the analysis of their needs for scientific English and the targets of the proposed programme to be trialled on them. The FYUS had learned scientific English when they were at school and they perhaps felt the need for scientific English in their university education. The teachers of sciences for Scientific Stream students were selected for their awareness of the school scientific subjects and of their students' needs for learning the basic scientific concepts and terms in English.

The teachers of English for the Scientific Stream students were chosen because they realise the difficulties these students face when learning something irrelevant to their needs and interests. These teachers could also have observed their students' motivation and satisfaction in what they were learning. Therefore, the teachers could assess the students' problems and suggest solutions for them.

The selection of the senior educators was because they are regarded as planners and practitioners of the teaching and learning of the English language, who work with teachers at different levels and in various schools. They may see and understand the

actual situation and detect various problems that might occur in the educational field.

The university science lecturers of the first year level were chosen as they had experience in teaching first year science students and they were aware of their students' academic difficulties related to the English language.

The university lecturers of English language and English curriculum and teaching methods were selected for their acquaintance with the philosophy of teaching English and the national objectives of ELT. They were usually members of the various national committees involved in either writing teaching materials, supervising the national programmes of developing English teaching or training teachers at the pre-service and in-service levels. The sample for the interviews consisted of the following:

1) Seventy FYSSS in two classes representing first Scientific Stream students: 32 Girls from Irbid Girls Secondary School and 38 boys from Irbid Boys Secondary School.
2) Thirty first-year university students of three science subjects: 10 physics, 10 chemistry and 10 biology (five male and five female) from Yarmouk University in Irbid.
3) Twelve teachers: six English teachers and six science teachers from two public secondary schools with scientific stream, they were:
    a) Irbid Boys Secondary School: Three English Teachers and another three for sciences (one for physics, one for chemistry and one for biology);
    b) Irbid Girls Secondary School with the same numbers and categories as well.
4) Six supervisors: three of English language teachers and another three of science teachers(one for physics, one for chemistry and one for biology) from Irbid First Local Directorate
5) Two specialists form the Divisions of English and Sciences at the Curriculum Directorate, which is responsible for curriculum development and school textbooks of both English and Sciences. Actually, the division members could not participate,

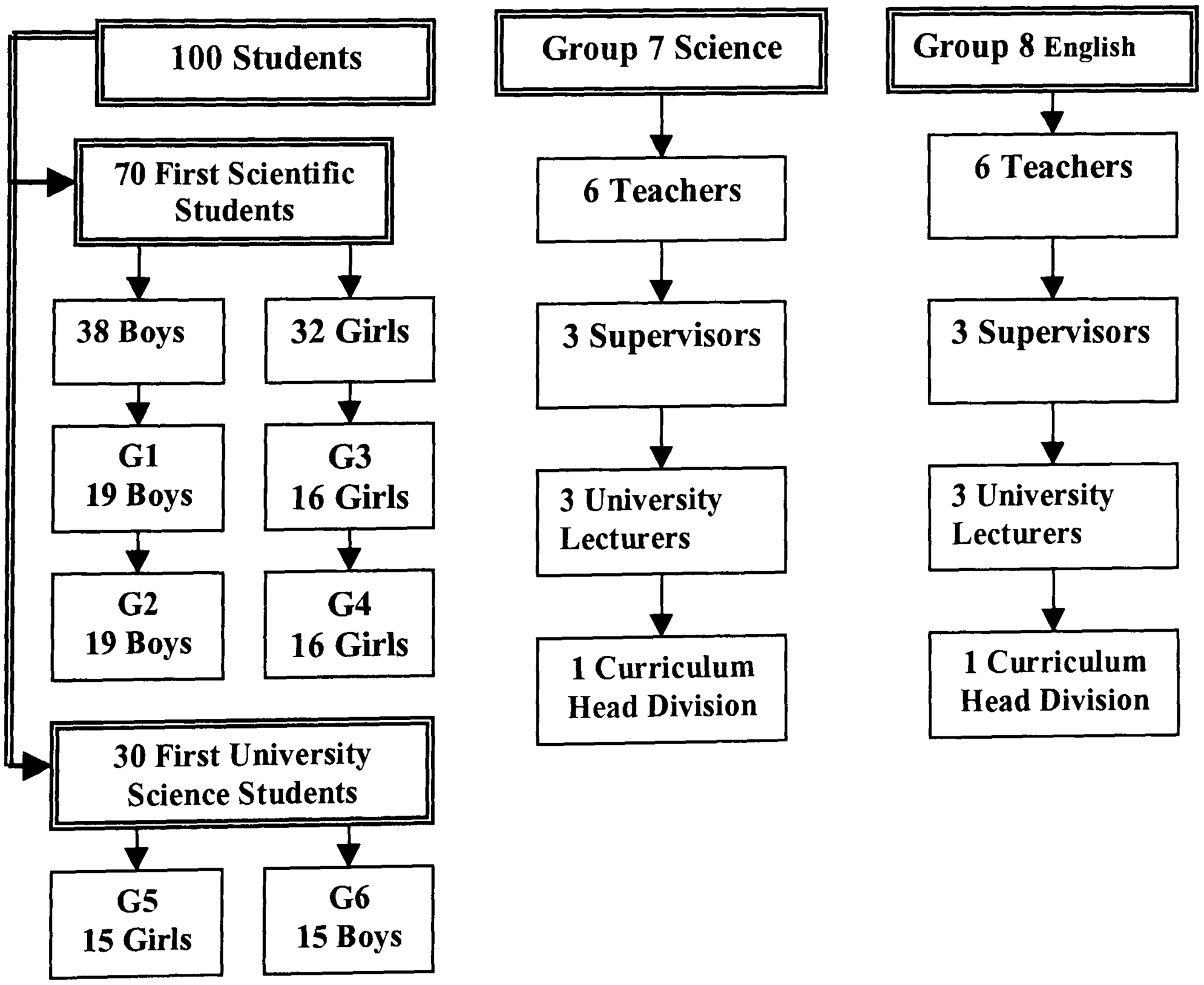
because they were engaged in a three-week workshop at the time of the interviews, but the two Division Heads participated in the interviews.

6) Three university professors who had experience in teaching English at the university and the development of its curricula for the secondary schools as members in the Ministerial National Educational Teams.

7) Three university professors (one for physics, one for chemistry and one for biology) who have been teaching science for the first year students at the faculties of sciences. They were specifically from Yarmouk University in Irbid.

For convenience and for saving time, effort, cost and travel, it was decided to conduct the interviews in groups. Many researchers support this technique (e.g. Oppenheim, 1992). The interviewees were classified into eight groups of 13-19 members in each as shown in figure 6.3.

Figure 6.3: The Distribution of the Interview Groups



Based on their study level, the 100 students were grouped into 30 FYUS and 70 FYSSS. Because of segregation at schools the FYSSS were grouped into 38 boys (two groups with 19 each) and 32 girls (two groups with 16 each). All efforts were made to lead the group interviews effectively, objectively and nondirectively.

The Interview Schedule

In consultation with the respondents, a schedule was drawn up to carry out these interviews at the time and place they preferred (see table 6.7). A request that the interviews be audio-taped was made, but many respondents did not agree and it was inconvenient to audio-tape a group interview. So, writing down notes was regarded as sufficient.

A few subjects apologised for not being able to attend the interviews for personal reasons. They were two university boys in group 1, two university girls in group 2; and two school boys in group three, two girls in group five and one girl in group six. One teacher of English apologised for being unable to join the interview.

Table 6.7: The Group Interviews Schedule

Cluster	Group	Date	Time	Place
University Students	**One**	Sunday 26.4.98	09:00-10:10 a.m.	Meeting Room 2 Yarmouk Univ. Campus
	Two	Sunday 26.4.98	10:20-11:30 a.m.	Meeting Room 2 Yarmouk Univ. Campus
School Students	**Three**	Monday 27.4.98	09:00-10:10 a.m.	Irbid Boys' School library
	Four	Monday 27.4.98	10:20-11:30 a.m.	Irbid Boys' School library
	Five	Tuesday 28.4.98	09:00-10:10 a.m.	Irbid Girls' School library
	Six	Tuesday 28.4.98	10:20-11:30 a.m.	Irbid Girls' School library
	Seven	Wednesday 29.4.98	10:00-11:10 a.m.	Meeting Room, Biology Department at Yarmouk University Campus
	Eight	Wednesday 29.4.98	11:30-12:40a.m.	Meeting Room, Education Department at Yarmouk University Campus
Timing	40 minutes for 8 items = 5 minutes each item +10 minutes for discussion; +20 minutes for closing and summary report = 70 minutes total.			

Before implementing the interview, the researcher took the following actions:

1) The interview questions were translated into Arabic, the native language of the interviewees, because of the differences in their background in English. The researcher and six specialists in translation with educational background and experience translated this questionnaire. Then, the researcher met the six translators to discuss the translated versions and agreed on the final version of the interview questionnaire.
2) Official permission was obtained to conduct the interviews.
3) The nominated subjects were contacted to confirm the interview schedule in terms of the time and place that were convenient to the subjects.
4) The schedule of the interviews was posted to each subject.

Conducting the Interviews

The researcher himself led the interviews. The interviewer began by stressing the importance and significance of the research and significance of the informants' contribution to it. They were assured about the confidentiality of the information they provided. In the section to be filled in with personal information when answering the questionnaire, they were not required to write their names only their workplace (school, faculty or directorate), qualification(s) and occupation. The whole group was divided into three or four-person groups. Each group selected a person to lead the discussion and another person to present the final responses that the whole group agreed upon. Every member in each group was asked to read his/her own copy individually before starting the small group discussion. During the interviews, lively discussion between the group members was attempted with the intention of sparking off new ideas. The interviewer intervened when someone was seen to be dominating the group or the group was splitting into two or more opposing parties.

Finally, one strategy was followed to conclude the interviews. At the end of every group interview, a written summary was presented by each group leader to report the responses of his/her small group and of the whole group to the interviewer. In each group discussion, notes were taken of the ideas emerging from the respondents. Then, the researcher collected eight reports. The collected data were grouped into three categories in accordance with the categorisation of the interviewees; i.e. students, science and English groups. Thus, three reports were derived from eight reports. Finally, these were used to provide one report. This report was written in Arabic, as the native language of the interviewees is Arabic, and it was the language of communication between the respondents and the interviewer and among the group members. More detailed analysis of the findings of the interviews will be presented and discussed in chapter eight.

6.9. Summary

Analysing qualitative data is a systematic process. It is a constant evolving activity to organise the data into manageable units, combine and synthesise ideas and then to develop constructs and themes to be examined further during the research implementation (Anderson and Arsenault, 1998).

The research methods described earlier emphasised the importance of teaching scientific English at the school level and the respondents showed strong agreement on the inclusion of scientific topics in the English textbooks if there would be no specific course for the science students at these schools. Then the next step was to develop questionnaires to collect the required quantitative data as explained in the next chapter.

CHAPTER SEVEN

THE QUESTIONNAIRES AND ACHIEVEMENT TEST

7.1. Introduction

The collected data from the documentary work and content analysis of curricula and textbooks, the pertinent empirical studies and the interviews formed three sources for building the suggested programme. The fourth source was the quantitative data collected by the questionnaires that assessed the target students' needs and the concerned community's perspectives for learning and teaching scientific English at the public secondary schools in the target region of this study. The assessed needs helped to identify the characteristics of the language functions and the scientific content to be included in the suggested programme. Thus, the programme was based on: 1) documentary analysis and content analysis of the existing English curricula and textbooks of the secondary stage, 2) previous literature review, 3) recent approaches to teaching and learning EFL and to designing ESP courses 4) interviews and 5) questionnaires.

In this chapter, the study's instruments are described as well as the rationale for using them, the devising of each instrument and the establishment of their validity and reliability. The pre and post achievement tests are described. They were constructed to measure the students' performance before and after being exposed to the suggested programme of EScP. Then, the target sample of each instrument is specified.

7.2. Constructing the Questionnaires

The questionnaires were designed by determining the overall topic areas of investigation, drafting and sequencing the items. It was necessary to pilot-test the questionnaires, revise them and finally develop a strategy for analysing the collected

data. The use of a standardised-item questionnaire saves time, effort, cost and has the possibility of a high return rate (Oppenheim, 1996; Munn and Driver, 1995).

First, the related literature was reviewed to identify the general information needed and the objectives of applying the instrument; i.e. what the instrument was supposed to find out. Verma and Mallick (1999: 117,118) recommend that:

> "Care should also be taken to ensure that, so far as can possibly be foreseen, the questions cover all aspects of the study. On the other hand, in designing a questionnaire, the researcher must be wary of making excessive demands on the people for whom it is intended."

Prior to constructing the questionnaire, identifying the sources of the questionnaire items or questions is of crucial importance. The results of the exploratory interviews helped to identify the areas of the questionnaire items.

So, the general topic areas of the required information were decided and the sort of people from whom data would be obtained. Two major categories were suggested as sources of collecting the desired information. Therefore, it was decided to split this instrument into two questionnaires. The first was the English category because it was concerned with the English language speciality concerning language skills and teaching methods. The second focused on the scientific content of the EScP programme to be developed to meet the needs of its users. For the validation of these questionnaires, face validity was used.

Face validity is considered as the easiest and the most basic type of validity. It is concerned with the degree to which an instrument appears to measure what it is meant to measure when there is no specific content to be measured by the items of the instrument (Gall, et.al, 1996). The instruments were subjected to scrutiny by a jury as described in the following sections.

7.2.1. The English Language Questionnaire

This questionnaire was designed to identify the language functions to be

included in the EScP programme. Since the nature of data was very much related to the English specialism, a questionnaire was addressed to an English group comprising teachers, supervisors, curriculum specialists and university lecturers of English language and TEFL. The sample will be described later on.

The overall topic areas of the questionnaire were arranged in four sections in order to cover the four language skills. There is no sharp distinction between these skills because they are integrated and interrelated. The areas of the questionnaire items were selected to identify the sub-skills (themes and functions) the target students would need to communicate in scientific contexts. The terms of reference for these items were the criteria of the communicative approach to ELT and ESP described in chapter four.

Accordingly, the following sources were scrutinised:

1) The national educational documents regarding ELT in Jordan.
2) The curriculum of English and its textbooks for the secondary stage in Jordan.
3) Theories and approaches to language acquisition and learning.
4) Approaches, methods and models of EFL/ESP development.

To generate the items initially, visits were made to two secondary schools in First Irbid Local Directorate as one of the directorates of the study that had been involved in the exploratory interviews. Two types of group meetings were held: one with the first scientific students and another one with the teachers of English. A special schedule was drawn up with the school principals concerned to organise the meeting with the students.

One class of 34 boys and another one of 38 girls from the two schools were selected from those who participated in the interviews. At their schools, each class was then split into two groups to answer a direct open question. Groups A1 (19 girls) and A2 (17 boys) were given task 'A' to answer the following question:

If a programme is designed to meet your needs for learning Scientific English what are the language skills that you need to communicate in scientific situations?

Groups B1 (19 girls) and Group B2 (17 boys) were given task 'B' to answer a question related to the scientific context, which will be presented later in this chapter. Each group was met separately in their school. After reminding them of the purpose of the study and the positive effects of their careful and precise responses on this programme, they were asked to answer individually and freely the question during the class period (45 minutes). In response to their emerging questions, some suggestions were written on the chalkboard related to the skills; such as, reading, writing, listening, speaking, in addition to some functions, themes, vocabulary and structures.

Hence, at the end of that meeting, 36 lists of answers (from Groups A1 & A2) were collected from the students. For the teachers' meeting, the question was modified a little to discuss it with the six English teachers who were asked to write their answers individually. This produced six lists of items representing the needs for learning and teaching EScP. Finally, 42 lists of answers from the Groups A1&2 and the six teachers were collected.

Consequently, a large pool of items and questions was assembled covering the four language skills and their sub-skills. This pool needed to be purified; that is, the items required revising, tuning, restating or deleting. For each item an examination was conducted against the following criteria suggested by Bell (1993: 88):

> "Is there any ambiguity, imprecision or assumption? Are you asking respondents to remember? Will they be able to? Are you asking for knowledge respondents may not have? Any double, leading presuming, hypothetical or offensive questions?"

Refining the items was achieved as follows. The researcher made use of his official post as a leader of the National Committee of Developing Training Programmes for English Teachers, which the MOE names annually for official purposes. This

committee meets for three hours once or twice a week. The researcher introduced to the committee the purpose of the study and the objectives of this questionnaire and explained the task of drafting the items in terms of the clarity of the sentences, their belonging to the topic area and the suitability of the items for the target candidates. The committee discussed the 42 lists of answers from Groups A1&2 and the six teachers. The committee members highlighted each item that was relevant to the four topic areas in terms of the four language skills. The items that were regarded as important and relevant were used to produce a first draft of 32 items (eight items each area) in sentence form. The items were then organised in a logical sequence. Editing was necessary to remove the redundant or unnecessary items and restate the lengthy ones.

The next step was to decide on the type of questions that would be adopted. In the light of the nature of the investigation and the size of the sample involved, the closed structured questions with a five-point Likert scale were the appropriate form.

This scale implies that the higher the category chosen the greater the strength of agreement, (Bell, 1991). Anderson (1998:174) states that:

> "The Likert Scale is one of the most useful question forms....a question is not asked. Rather a clear statement is made and the respondent is asked to indicate whether the statement reflects his or her views...a 5-point scale is the most practical for most common purposes. It is easy to respond to, straightforward to analyse, and sufficient for most needs."

This format requires more effort and attention to be paid when responding and it might reduce the rate of response or it might reduce the valid number of returned questionnaires. Getting valid data was better than getting a larger amount of data of doubtful validity.

The language of this questionnaire was English because it was delivered to the English Group including teachers of English, supervisors, curriculum specialists and university lecturers of English and TEFL.

The researcher's present academic supervisors at the University of Hull as well as some university professors of educational research in Jordan recommended some minor corrections and amendments that were incorporated into the first draft of this questionnaire which included 30 items.

This draft was submitted for validation to the same jury who validated the interview questionnaire. They followed the same procedure and used the same form applied for validating the interview questionnaire. In their meetings, the jury revised the questions in terms of clarity of the statements, appropriateness of each item to elicit the information and belonging of each item to the topic area and to the domain. At the end of their meeting they decided to restate some items and delete two items. Then, this questionnaire was produced as final draft with 28 items. Hence, it was considered a valid instrument that needed to be piloted to determine its reliability. Bell (1991: 65) states the purpose of piloting as follows:

> "All data gathering instruments should be piloted to test how long it takes recipients to complete them, to check that all questions and instructions are clear and to enable you to remove any items which do not yield unusable data."

In addition to Bell's suggestion, the pilot test was undertaken to establish the reliability of the instrument, predict the likely problems and difficulties that might happen in the main study and to develop suitable strategies for data analysis.

Oppenheim (1996) mentions that reliability refers to the purity and consistency of a measure. The same result would be obtained again if the measure were to be duplicated. Hence, the reliability of a measuring instrument is the degree of consistency with which it measures whatever it is presumed to measure.

There are several methods for estimating the internal consistency of an instrument, such as Cronbach's Coefficient Alpha, Split-half, Guttman, Parallel and Strict parallel procedures. The most frequently used measure is Cronbach's Alpha (α).

Therefore, the pilot questionnaire was administered to a sample consisting of 18 English teachers in IGD and to the members of the National Committee of English Curriculum Development (an official committee delegated yearly by the MOE including 10 members). This number was considered sufficient for the purpose of piloting, as the sample of the main study was 70 subjects.

Verma and Mallick (1999: 120) suggest that questionnaires should be piloted in "a group similar to the sample for which it is destined. This need not be large: a dozen to 20 is usually adequate". Anderson (1998:179) emphasises that "An effective way to pilot-test a questionnaire is to assemble a group of 6 to 12 volunteers and have them complete the questionnaire individually."

Then, the subjects of the pilot were asked to fill in the questionnaires and to write any comments on the questionnaire. They returned the questionnaires on the same day to the researcher. After completing the questionnaires, a voluntary follow-up discussion with some respondents was organised on the same day so that they would provide feedback to discuss the questionnaire items and to recommend any amendment.

After scoring all the responses to the English questionnaire, the data were entered into the SPSS (Statistical Package for Social Sciences) computer programme of data analysis (Murphy, 1998/99). Then, Cronbach's Alpha was used since it can be determined from a single administration of a single form of the instrument. The Alpha coefficient of the internal consistency of all the items of this questionnaire was 0.83, which was accepted according to Youngman and Eggleston (1979:22) who state that "Typically, values over 0.70 are expected for attitude scales whilst values in excess of 0.95 are common for intellectual measures." Oppenheim (1996:159) mentions that:

> "Reliability is never perfect; it is always a matter of degree. It is, in the social and behavioural sciences, rare to find reliability much above 0.90. The square of a correlation coefficient expresses the percentage of shared true variance; thus, a reliability coefficient of 0.90 means that the two measures have 81 per cent in common- they overlap, or share common variance, by just over four-fifths. If the reliability of a

> scale or other measure drops below 0.80 this means that repeated administrations will cover less than 64 per cent of the same ground, and that the error component is more than one-third; such a measure will come in for serious criticism and might well have to be discarded or rebuilt."

Then, the jury met again to discuss these results. In their first meeting they discussed all the comments concerning the item clarity, length and appearance of the questionnaire. After that discussion, the judges' decisions were as follows:

1) Eighty nine percent of them confirmed the grouping of the items into four areas as they were related to the four language skills.
2) Eighty three percent agreed to keep the stems of 20 items with no change but their introductory verbs.
3) Seventy nine percent agreed to amend the wording of four items in terms of appropriateness and belonging to their areas in the English questionnaire.
4) Seventy eight percent of the members decided to delete four items for their ambiguity, inappropriateness and irrelevance to the areas and the objectives of the questionnaire.

Thus, the final draft of the questionnaire was printed including 24 items and an open question asking the respondents to write any further suggestion (see Appendix 2&3).

7.2.2. The Scientific Content-based Questionnaire

Constructing this questionnaire proceeded through the processes of determining its objectives, the relevant topic areas, selecting, sequencing and drafting the items, laying out the questionnaire appropriately, achieving its validity and reliability and finally administering it to the target respondents. This proceeded in the same way of the English language questionnaire as described earlier.

The audience of this questionnaire involved two groups, the students' group and the science group. The first group included students of the first Scientific Stream at the secondary stage in (IGD), first year university science students at YU and JUST universities. The second involved teachers of sciences at the secondary stage and sciences supervisors at IGD, besides the science curriculum specialists and university lecturers of sciences at the two universities.

The focus of this questionnaire was to identify the needs for EScP based on the scientific content of the three basic science subjects and general science the students learn at the secondary stage, in addition to applications of science. Consequently, the general topics of the questionnaire were organised into the areas of general science, scientific applications, biology, chemistry and physics. These areas were based on the same sources that were scrutinised in the interview questionnaire.

Generating the questionnaire items passed through the same steps of generating the English language questionnaire as described earlier. On the same schedule of visits to the target schools in First Irbid Directorate a series of meetings was organised with the students and the science teachers. Three scheduled meetings were held with two groups of students (group B 19 girls, group B 17 boys) and the six-science teachers group at these schools. The following question was asked individually:

If a programme will be designed to meet your needs for learning Scientific English what are the scientific topics and concepts that you may need to learn in English?

At the end of the class period, the researcher collected 36 individual lists of the students' answers representing their needs for EScP.

In another meeting with the six science teachers at these two schools, who were included in the exploratory interviews, the same question with a little modification to suit the teachers, was discussed with them in-groups. Then, each teacher produced an individual list of the likely needs of the students for EScP. Eventually, 42 lists of

answers were obtained representing the view of both the learners and the teachers.

Hence, a large pool of items was collected covering the five specified areas. This item pool was scrutinised in the official weekly meetings of the National Committee of Science Training Programmes Developing (NCSTD) as described above. The committee attributed each item to its relevant topic area of four scientific subjects and applications. They identified the important and relevant items and produced a first draft of 30 items (six items in each area) in sentence form ending with an open section for free suggestions. The items were produced in Arabic because of the differences in the respondents' background in English and education level.

To validate this questionnaire, it was submitted to the same jury who validated the previous questionnaires and they followed the same procedure and used the same form. They revised all the items. Some items were amended and two items were deleted. Therefore, the final draft was produced containing 26 items ready for piloting.

Using the pyramid network technique, this pilot questionnaire was administered to a sample similar to that of the main study. Twenty first-year university students, 25 female and 22 male school students and 15 science teachers and 3 education supervisors were randomly selected from IGD besides 10 members of the committee of science curriculum development. They were asked to fill in the questionnaire and to write their comments and suggestions. They returned the questionnaire to the researcher and some students agreed to attend to a follow-up discussion. The comments and notes were collected and summarised. The responses were scored and entered into the SPSS programme to compute the reliability by using the Alpha coefficient. This coefficient for the questionnaire was 0.85.

Then, the same jury met to discuss the piloting results. In their first meeting they discussed the comments and suggestions following the same procedure and the validation form they used for validating the previous two questionnaires. The results of

their discussion were as follows:

1) Eighty nine percent of them confirmed grouping the items into five areas because they represent the basic scientific subjects and their applications, which are the basic requirements for the Scientific Stream students in Jordan.
2) Eighty one percent agreed to maintain the stems of 16 items unchanged but to change the introductory verb of each.
3) Seventy two percent agreed to amend the statement of five items in terms of appropriateness and belonging to their areas.
4) And 83% decided to delete seven items for the lack of clarity, inappropriateness and irrelevance to the areas and the objective of the questionnaire.

All the comments and corrections were incorporated into the final draft of the questionnaire including 21 items in Arabic and one open question for any suggestion. Then, the researcher and six other specialists in translation with educational background and experience translated this questionnaire into English. Then, the researcher met the six translators to discuss the translated versions and agreed on the final version. The English version was discussed with the Academic supervisors of the research and then approved (see appendix 4).

These procedures for assessing the validity and estimating the reliability were perceived to be sufficient to use these instruments in the main study.

7.3. The Achievement Test

The achievement test described here was the other instrument for quantitative data collection. The achievement test was constructed to measure the performance of the target school students before and after the testing of the two units designed as a sample of the EScP programme.

Youngman and Eggleston (1979:3) suggest that "the researcher should hypothesise the qualities that are to be measured as constructs representing the correct responses the examinees give to a test question."

When constructing an achievement test, the constructor should determine the specifications of the test, the type of questions (closed structured or open- ended or a variety of different types), time available and needed for administration, the weighting of each question, scoring the answers and the content to be tested. An achievement test may contain a wide range of skills or topics, such as reading, writing, grammar and listening as in the test mentioned here.

In this study it was particularly important to ensure that the whole test was equally appropriate to measure the attainment of both control and experimental groups. This was achieved by testing domains that were part of the overall English programme and not specifically represented in the trial units. The next sections will describe the construction procedure of the present test.

7.3.1. Constructing the Achievement Test

Since all the schools in Jordan are bound to a centralised system of education, the specifications of the test were set to measure the target students' performance on the contents of the national curriculum of English. The form and the type of the test adopted for this study were similar to those that were commonly used for both the school tests and the General Examination set annually.

The specifications of the achievement test followed the weighting of the areas tested in the written school tests according to the MOE General Regulations of the School Examinations (Ministry of Education, 1998). The listening and speaking skills are tested through formative assessment techniques. The school teachers follow these techniques during the observations of the students' conversations and activities inside

the classrooms according to suggested procedures in the teachers' guides, with which the MOE supplied every teacher.

In this study listening and speaking skills were not tested, because it was difficult to test a large number of the candidates in different locations of the public schools in the span of the time available to the researcher. For the purpose of this study, the specifications of the test were as follows:

General Specifications

1) The items test the examinees' performance on two major language skills of reading and writing with the sub-skills of reading comprehension, scanning a text for specific information, recognising the meaning of words and their usage, writing short sentences. The test includes a task to write freely about a topic. The examinee chooses from 3-5 topics related to his/her experience and interests.
2) The items reflect the objectives and the content of the Curriculum of the English language of the secondary stage of education.
3) The form of the test varies between objective questions with multiple-choices, fill-in the blank spaces, completion, to short-answer questions and free writing.
4) The format of the test is 4-5 one side printed pages with double spacing.
5) The fonts are 18 points for the title, 16 for the first headings, 14 for the second headings and 12 for the text.
6) The answers are to be written on the same question paper where proper spaces are provided after each item.
7) The examinee writes down his/her name (optionally) and the school name.
8) The time of the test is 90 minutes in one session of two class periods in the classrooms of the schools concerned in this study as approved by the principals of the concerned schools.
9) Scoring of the answers is manual to every answer.

Specific Specifications

These are show in this table:

Table 7. 1: Specific Specifications of the Achievement Test

Part	Sub-skill	Objective	Number &Type of Items	Weight
1	**Reading Comprehension**	Read a passage with 15-20 lines about a general scientific topic familiar to the examinees	5-8 short-answer questions	30 marks
2	**Vocabulary**	Recognising general scientific terms and concepts related to the school science subjects	5-8 completion items	10 marks
3	**Language**	Recognize the correct meaning and structure of the words in the context of the sentence: A. Fill in the blank spaces with the provided words in correct structures B. Choose the most correct from of a word or phrase from three-four choices to complete sentences	 A. 5-10 sentences B. complete 8-12 sentences	 A. 10 marks B. 20 marks
4	**Writing**	Choose one from 3-4 topics related to the examinees' experience and interest	One topic for free writing	30 marks

Scoring Criteria

The scoring criteria were derived from the scoring regulations circulated annually to the supervisors and teachers who score the GCSE test. The researcher developed these criteria to suit the test in this study. The model correct answers to the objective multiple-choice questions were given to the supervisors beforehand. But the answers to the writing question may vary from person to another since the examinees are asked to write freely on a topic of their interest chosen out of different topics. Therefore the following guidelines were considered in scoring the papers as objectively as possible. The 30 marks for writing were distributed as follows:

1) Layout of the writing into paragraphs (3 marks).
2) Clarity of the idea (7 marks).
3) Development of the idea (7 marks): using supporting sentences and examples.
4) Organisation of the ideas (6 marks): the ideas are related to each other, sequential and consistent

5) Grammatical and meaningful sentences (5 marks): using correct structure and proper vocabulary for the context.

6) Correct spelling (2 marks).

The supervisors were briefed about the scoring process to enhance their understanding of this process and thus avoid subjectivity.

7.3.2. Writing the Test Items

Writing test items was not a new task to the researcher. He had constructed two achievement tests in his research as fulfilment for the Master degree in Jordan (Abd Al-Razaq, 1985). Besides, he had experience of constructing the annual national GCSE achievement test for several years. Moreover, he participated in the English teachers' training programme in writing training materials and leading training workshops on testing and other topics as official tasks of his post in the MOE during 1994-98.

As the literature reviewed failed to identify an appropriate test instrument, a new instrument was produced to meet the objectives of this study. Hence, the researcher produced draft items. Additionally, 20 copies were selected randomly from school teacher-made tests for the first scientific secondary grade available at the General Directorate of Examination of the MOE. Thus, a pool of items was assembled from which analysis, discrimination and judgement against the specifications could be conducted.

Then, an official approval was obtained from the General Directorate of Educational Training to organise a specialist group to support this research. The group involved two university associate professors of TEFL who were experienced in working for the MOE in organising training programmes and evaluating the GCSE test. two educational supervisors of English who often share in constructing the GCSE, and two teachers of English at secondary schools. When this group met, the researcher discussed

the research objectives and explained the task to them. Then, they discussed the test specifications set by the researcher in order to come to a common understanding of these specifications.

At the next meeting, the specialist group began the discussion of the 20 versions of tests and the researcher's draft test items. They matched these items with the specifications of the test and highlighted each item relevant to these specifications. The specialists group purified the collected items and produced a new version including: five reading passages with different lengths and different variety of questions; 30 questions on vocabulary; 42 language questions with matching, completion and rewriting types and 12 topics for free writing.

In the next meeting, the specialist group categorised the items into their relevant areas as defined in the specifications. They also sequenced these items in a logical order from the easy and less-time consuming to the more advanced questions requiring more time to read, think, infer, recall and comment on or evaluate. As a final step, the group of specialists revised all the items to restate unclear questions, change the alternatives of the multiple-choice questions and delete the irrelevant ones. Then, the items' weight and timing were balanced taking into consideration the examinees' cognitive level and previous experience. The weighting of the areas conformed to the MOE regulations of the school examinations; that is, 30 marks for reading comprehension, 10 for vocabulary, 30 for language and 30 for writing tasks. The timing of the study's test was 90 minutes, which was similar to the time of the school final-term examinations administered in one session at the classroom. Thus a final version was produced with the following contents:

1) **Reading Comprehension:** a reading passage about a scientific topic with 20 lines and 16 scientific terms and concepts of environment pollution, followed by eight short-answer questions.

2) **Vocabulary:** eight completion questions including choosing eight words out of ten suitable to the contexts of these sentences.

3) **Language:** two types of questions; a) fill in eight sentences with the correct form of a word given in brackets next to each sentence, and b) choose the right word from three alternatives to fill in spaces of 15 sentences.

4) **Writing:** to choose one out of four scientific topics for free writing of 170-180 words with no helpful words or phrases, but on a topic familiar to the examinees.

This group of specialists approved the scoring criteria since they are in line with the general regulations of the GCSE.

7.3.3. Validation of the Test

It was important to ensure that this instrument measured the content that it was designed to measure. Content validity explores the relationship of the items with the construct or domain to be assessed; i.e. each domain had to be represented and was relevant to the content under measurement.

Accordingly, the content validity of the test items was established by the judgement of a jury including specialists with experience in educational testing in general and in language testing in particular. Four of The National Committee members who had gained this experience while taking part in constructing the GCSE tests, revised the questionnaires used in this study as described in the preceding sections. The test was submitted to this jury for validation. The researcher reminded the jury of the study objectives and explained the new task to them. Following this, they discussed the test specifications set by the researcher and developed by the specialist group. The jury confirmed the general specifications, but made some amendments to produce the final version of the test. The revised structure is shown below.

Part One: Reading Comprehension (30 marks)

1) The reading passage was shortened to 18 lines about a general scientific topic with 14 scientific terms and concepts familiar to the examinees.
2) Seven short-answer comprehension questions.
3) Deleting two questions that demanded inferring and judging skills that were not based on the reading text.

Part two: Vocabulary (10 marks)

Five completion questions on general scientific terms and concepts related to the school science subjects.

Part Three: Language with two sections

It is supposed to measure the examinees' abilities to recognise the correct form and meaning of the words in the context of the sentence.

1) Fill in the blank spaces with the provided words in a correct structure in five sentences **(10 marks)**.
2) Choose the most correct structure of the word from three choices to complete 10 sentences **(20 marks)**.

Part Four: Free Writing (30points)

The examinees chose one topic out of three to write freely about in 150 words related to their experience and interests with no cue words or phrases provided.

The jury confirmed the validity of the test and its appropriateness to measure the examinees' performance on the domains concerned. The jury also confirmed the appropriateness of the scoring criteria.

Finally, the reliability of the test had to be established. Reliability refers to the test consistency in measuring the examinee's levels of mastery of the test domains, as a test should show similar results if it were repeated on different occasions. An instrument

cannot be valid unless it is reliable. Youngman and Eggleston (1979: 20) define reliability as:

> "..related to the difference between an individual's 'true' score on a construct and the 'measured' value resulting from an application of the test. This difference is caused by various factors and therefore a range of reliability of measures can be computed, each reflecting a separate error component."

In this study, the test– retest method was used to compute the test reliability taking into account the time available and the circumstances of the target schools.

The sample of this pilot study involved 111 students selected randomly from the first secondary scientific grade representing four classes of students in public schools from Salt Directorate in the Middle region of Jordan that had a similar educational environment in terms of school facilities, teachers and equipment. These schools follow the same national curriculum for English and they use the same textbooks and educational aid materials.

Two schools (one for girls and one for boys) were selected in consultation with the Local Director of Salt and the supervisors concerned. Two classes from each school were then chosen. The numbers in each class were 28 girls, 26 girls, 29 boys and 28 boys. Later one student moved to another school before the first session of the test.

The test was administered on two occasions within a three-week period. The researcher arranged to meet the teachers and principals of the target schools, so that the objectives of the study were explained and the confidentiality of the test scores was assured since they were used for research purposes. The supervisors scored the examination papers. They take part annually in scoring the national GCSE and they have Master degrees in Education. The teachers administered the test on their students in their classrooms in one session of two class periods (90 minutes) and collected the test papers.

Before handing the test papers to the supervisors for scoring, these papers were numbered according to the students' serial numbers in the school record. Thus the teacher in the next administration of the test could attribute the retest paper to the same student with the same previous number. Hence, it was easy to make the associations and calculate the correlation of the two sets of the scores for the same examinees. Three weeks later, the same test was administered for the second session under the same conditions and with the same sample. The tests were administered smoothly and the papers were handed to the supervisors to score them according to the set criteria. Thereafter, the scores were handed to the researcher for the necessary analysis.

The scores were entered into the SPSS programme to analyse the data. The reliability was calculated using Gay's formula (1978): 'Raa=2R/1+R' where Raa = Coefficient of Reliability, R =Correlation Coefficient. Thus the Correlation Coefficient was 'R = 0.80' 'and the Coefficient of Reliability was Raa = 0.89. These values indicated that the test was consistent and was sufficiently reliable and stable to measure the target domains.

Eventually, the test was ready to be administered to the sample in the main study to test the students' achievement in basic scientific English related to the contents of the General English course and the contents of the basic scientific subjects they learn at school. This test was used to measure the effectiveness of the suggested communicative programme of EScP on the target students participating in this study. Appendix 5 is the final version of the test after establishing its validity and reliability.

7.4. The Main Study

It includes the administration of the English language questionnaire, scientific content-based questionnaire, the pre/post-tests and the trial units.

7.4.1. Administering the Questionnaires

Questionnaires can be given to respondents directly (self-administered) or mailed to respondents who read the instructions, respond to the questions and then record their answers. Determination of the method to be adopted, should be made at an early stage according to Bell (1993) and Youngman (1994: 263) who emphasise that:

> "Cost, effort, delay and willingness are just a selection of the factors affecting choice of distribution method and therefore no single ideal procedure can be offered."

Since it was difficult for the researcher to distribute all the questionnaires to every respondent and to collect them within a certain period of the time available, the researcher adopted a pyramid network strategy for this to ensure a high rate of return of the questionnaires. Anderson (1998: 181) supports this strategy:

> "Pyramid networks use key people to pass out and collect questionnaires on your behalf. Generally, personal networks are the best way to get a high level of returns."

Hence, in this study various key persons were involved in the process of distributing and collecting the questionnaires. For the first scientific grade students and the teachers, it was agreed that the supervisors, who were involved in the exploratory interviews, would deliver the questionnaires to the students and the teachers and collect them the same day through their official visits to the schools. Therefore they arranged these visits with the school principals. The supervisors explained to the school principals, teachers and students in the participant schools the study objectives and the importance of the confidentiality of their responses and the significance of their contribution to this research.

For the university lecturers and first year science students, the researcher arranged with two university lecturers to administer the questionnaires to their colleagues and the students. The two persons participated in the interviews, knew the

study objectives and had experience in administering research instruments. At Yarmouk University, one distributed every questionnaire to his target colleagues in their offices and to the students in their lecture hall and collected them on the same day. The other one did the same task with his colleagues and the students at the Jordanian University for Sciences and Technology.

The researcher administered and collected the questionnaires to the English supervisors and curriculum specialists in a meeting arranged with them beforehand. Simultaneously, the researcher's colleague in the Training Directorate, who arranged for a meeting with the target science supervisors and curriculum specialists, administered and collected the questionnaires on the same day.

Thus, all the questionnaires were handed to the respondents and returned on the same day. The whole process was undertaken during one week by following the strategy of pyramid networking.

The sample of respondents to the questionnaires involved different categories of respondents. The sample, which was randomly selected using cluster sampling technique by region, is described according to each questionnaire as follows below.

7.4.1.1. The English language questionnaire

This involved the following respondents who were selected form the six local directorates in IGD, Yarmouk University and JUST University:

1) Forty eight teachers of English of the scientific secondary stream at twelve secondary schools. Two schools from each directorate participated in this study; one for girls and one for boys.
2) Twelve specialists including two curriculum specialists and ten supervisors.
3) Ten university lecturers: six from Yarmouk and four from JUST.

Table 7.2 below shows the numbers of the questionnaires distributed and the numbers returned. The return rate was high (97.8%) and many of the respondents wrote constructive comments. Three teachers (two males and one female) apologised for not responding to the questionnaires for personal reasons. The responses were analysed using the SPSS computer analysis programme as described in chapter nine.

Table 7.2: Numbers of Distributed and Returned English Questionnaires and Percentage of Respondents

Cluster	Distributed	Returned	Percent
Teachers	48	45	93.5 %
Specialists	12	12	100 %
University Lecturers	10	10	100 %
Total	**70**	**67**	**97.8 %**

7.4.1.2. The Scientific Content-based Questionnaire

This involved the different categories of respondents who were selected form the six local directorates in IGD, YU and JUST Universities according to the previous sampling technique:

1) Fifty four teachers of sciences of the scientific secondary stream at 12 secondary schools; eighteen teachers representing each of physics, chemistry, and biology.
2) Twenty four classes with eight hundred and thirty nine students of the first scientific stream: 431 males and 408 females. They were randomly selected from the 12 secondary schools; two schools (one for boys and one for girls) from every directorate and two student classes from each school.
3) Twelve specialists including two curriculum specialists and 10 supervisors.
4) Twelve university lecturers; six from Yarmouk and six from JUST; two members from each department of physics, chemistry and biology.
5) Eighty five first year university students of sciences (45 male and 40 female) at Yarmouk University and JUST University.

There were some respondents who withdrew from the study for different reasons. Six male teachers did not respond to the questionnaire, because two of them did not wish to fill in the questionnaire, the other three were transferred to another local directorate and the sixth had an illness leave for three weeks. Seven female withdrawals were for similar reasons. The university students' withdrawals were due to transfer to other departments of humanities. The first grade scientific students had similar reasons of moving to other schools.

The overall percentage of the returned questionnaires was 93.8%. The data obtained were processed and entered into the SPSS programme for analysis. This is discussed in chapter nine.

Table 7.3: Numbers of Distributed and Returned Science Questionnaires and Percentage of Respondents

		Distributed	Returned	Percent
Teachers		54	48	88.8 %
Specialists		12	12	100 %
University Lecturers		10	10	100 %
First University students	**Male**	46	40	86.7 %
	Female	52	45	86.5%
First grade Scientific students	**Male**	446	431	96.7 %
	Female	418	408	97.6 %
Total		**1038**	**994**	**93.8 %**

7.4.2. Administering the Achievement Pre and Post-test

Two topics were selected on which to write two teaching units. These two units were trialled in 12 schools in IGD on two classes at each school. The 24 classes of students were grouped randomly into a control group with 12 classes and an experimental group with another 12 classes.

Before the teaching of the trial units, the two groups of the students were pre-tested by administering the achievement test. At the end of the trial period, the same test was administered again as a post-test. Whilst the experimental group were taught the material in the trial units, the control group proceeded with their regular English

programme. Hence, the total amount of teaching received by the experimental and control groups was the same. The pre and post-test sessions were administered by adopting the same procedure applied in the questionnaires, that is by pyramid network technique. The researcher met once again 12 supervisors of English, who administered the questionnaires, and agreed on the procedure to administer the test. For objectivity and unbiased results, the supervisors themselves administered the two sessions assuring the teachers about the confidentiality of the results. The two sessions went smoothly and the examinees felt comfortable and finished answering all the questions as planned within the prescribed time for each session. The administration of every session took two days; the first day was for the boys and the second for the girls. Because the schools are not co-educational there was no threat in administering the test on the second day. The interval between the two sessions was three weeks, which was enough time for trialling the two units. All the papers were collected and scored by the supervisors according to the model answers and the criteria discussed and agreed with them. The scores were then entered into the SPSS programme for the analysis that is discussed in chapter nine.

7.4.3. The Two Trial Units

The needs of the students, which were identified by the previous instruments, were the fourth source used to derive the criteria for building the framework of the suggested EScP programme, besides the other three resources (analysis of national documents and English curricula; review of previous literature related to theories, approaches and methods of EFL/ESP; and the interviews). The results of these analyses will be introduced in the next chapter.

The two units were written in accordance with the findings of this study, theories of English language learning and teaching, principles of the communicative

approach, ESP approach to curriculum design and the findings of the pertinent research studies. The layout of the units was similar to that of the present textbooks of AMRA used recently in the Jordanian schools.

The group of English specialists (described in chapter seven) was called to a meeting to discuss the task of writing the two units. The researcher and these specialists had experience in writing teaching materials for the secondary stage and training materials for teachers and in writing general tests on a national scale. The previous characteristics were discussed so that all the group members had a clear understanding of the task. Every one was assigned part of the task to complete in four weeks and agreed to meet thereafter to discuss and rewrite the whole units. The task was finished and the two units were printed as first drafts. These drafts were submitted to the National Committee of Developing English Curriculum for their advice and comments. The committee discussed the material and suggested some changes that the researcher incorporated into the second draft. This draft was discussed with the researcher's supervisors who suggested some amendments that were incorporated into the final draft. Thus, the two units were produced in their final version to trial them in the actual classrooms at the schools selected for this study, (see appendix 9).

The units were described to the teachers in the Teacher's Booklet and the activities and themes were located in a Student's Booklet, a Workbooklet and a 14 minute audio-taped listening comprehension. The time available for the trial application was two teaching weeks scheduled at the end of the first term of the school year of 1998 when the teachers had finished the formal material allotted to that term.

Before putting the units into trail, a meeting was held for 12 teachers, who would teach the units to the experimental group of the 12 target classes. Every unit was read thoroughly and the teachers discussed how to deal with these units. The participant teachers were familiar with pair and group work as they received in-service training on

such methods. The classroom situations were then prepared to apply the units. The 12 supervisors agreed to visit these teachers to observe the students' interaction in the classrooms.

The pre/post-tests were administered to the target examinees and the findings revealed the effect of the units on the students' performance in the suggested English programme (see chapter nine).

7.5. Summary

In his chapter the quantitative methods that the researcher applied to collect the required data have been described. These methods were based on two questionnaires that were addressed to the stakeholders concerned in the teaching and learning of English at the university and school levels. The learners themselves were asked what they wanted to learn, since the communicative approach is based on student-centerdness and interactivity with what the learners want to learn not what the educators want them to learn. The students' input attributed positively to raising their motivation towards their learning. Moreover, the ESP approach emphasised the responsiveness to the learners' needs.

The construction and the application of the data collection tools were a co-operative process. A pyramid network technique was also adopted to administer the questionnaires and the test. The achievement test was another tool to collect the data that could provide evidence about the effectiveness of the suggested programme. In chapter nine the data analysis and the findings are presented as well as a discussion of these findings.

CHAPTER EIGHT

DATA ANALYSIS AND PRESENTATION OF RESULTS

8.1. Introduction

The documentary resources relevant to ELT and ESP in Jordan were scrutinised. This analysis covered the national documents concerning ELT and the contents of the general English curriculum for the secondary stage. The theoretical and empirical literature was also reviewed geographically and chronologically with regard to ELT, EFL and ESP in Jordan, the Arab world and Worldwide. This chapter presents the results of this analysis and review.

8.2. Analysis of the National ELT Documents and Results

This analysis focused on the national policy of ELT in Jordan in order to identify the features of the educational system relevant to ELT. The researcher scrutinised the articles of Education Act Three for 1994 (Ministry of Education, 1994) with a view to identifying the national goals for teaching. He also reviewed the proceedings of the first National Conference of Education Reform and the report of the National Committee for Education as well as the formal letters and reports related to English language teaching in the country. This analysis revealed general features concerning the principles of the education policy and the specific features related to the purposes of the present study.

The General Features

These features may be summed up as follows:

1) General education is geared towards meeting the needs of the individual and the society. It comprises two main stages, i.e. the basic and the secondary, (see chapter one).

2) The system of education is centralised. The Board of Education is the senior decision taker of general education policy. In particular, it approves the national curricula and the textbooks to all schools. And so, there is one book to every student in all the public schools.

3) The contents of curricula are supposed to be functional and directed to practical and vocational professions in addition to the academic aspect. The textbooks should include functional activities that accord with the society and its environment.

The Specific Features

These features related to ELT in Jordan are summarised as follows:

1) English language is the medium for scientific and technological developments, as it starts from grade one with the inclusion of computer science as a school subject into the education of all the students.

2) There is general agreement amongst many of EFL experts in Jordan that the level of English attained by pupils is unsatisfactory; and, moreover, that it has declined considerably during the past few years. A number of possible factors might be to blame.

3) The inadequacy of time allotted to the teaching of English and the entry date for starting learning it may be one of these factors. Before the school year 2000, there were eight years of learning English starting at the fifth grade, whereas this situation has been recently amended to 13 years starting from grade one. Students show low levels of motivation and interest in participation in English classes because there is very little opportunity to use English meaningfully and their communicative needs are ignored.

4) The teacher and the coursebook are other factors that may have an effect on this situation. The teacher probably occupies the dominant part of the teaching and learning inside the classroom. S/he plays the commander role as s/he says: 'open the

book', 'read', 'write', 'listen carefully', 'do not speak to the student next to you', 'all of you look at the blackboard' etc.

5) The levels of interaction between the learners and the teacher and between the learners is very low, i.e. the activities of the textbooks are not student centred. The textbooks are centrally written and published according to the prescribed specifications and approved by the Board of Education. All the teachers are required to follow the national curriculum and the scheduled plan of the Ministry of Education. The teachers and learners have no role in setting the objectives or selecting the content. Further analysis of the existing curriculum and textbooks is presented below.

8.3. Content Analysis of the English Curriculum for the Secondary Stage

The researcher analysed the general English curricula of the secondary stage of education in Jordan to identify the goals, objectives, content and teaching methods, (see chapter one). He also analysed the contents of the General English course one and two for the first and second grades of the Scientific Stream. These analyses are shown in appendices 6, 7 and 8.

Appendix 6 describes the objectives of ELT at the secondary stage of education, which are identified in relation to each language skill. The students are required to perform four language skills. These skills are taught as an integrative system of language. The student's performance in listening and speaking skills is not assessed in the school examinations. These examinations measure the students' abilities in reading comprehension, structure, vocabulary and writing a three-paragraph essay about a topic the student chooses from three to four alternatives. Appendix 7 details the themes, values, structures and functions included in General English AMRA One.

The General English curriculum has two components: the Student Book and the Workbook. There are also 24 units with three lessons each and each lesson is

allotted one 45-minute class period. The number of lessons is 72. Every course is to be finished within 24 teaching weeks and four weeks every term are allotted to school examinations set at end of unit, monthly, midterm and final-term sessions. Summary of unit contents and layout is presented in table 8.1. Table 8.2 also summarises the scientific concepts that are introduced to the students in General English one and two.

Table 8.1: Summary of Unit Contents and Layout in General English

Lesson One: Reading		Lesson Two: Language		Lesson Three: Writing	
Activity	**Objective**	**Activity**	**Objective**	**Activity**	**Objective**
Before You Read	Focus student's attention on the topic; and stimulate his interest in the reading text, in *Student Book (SB).*	**Grammar Targets**	Revise grammatical structures, in Workbook (*WB)* and *SB.*	**Before You Write**	Focus on the topic and to provoke their ideas about it, in *WB.*
New Vocabulary	Pronounce the new words by individual, group and choral repetitions, in *SB.*	**Grammar Activities**	Practice and use new structures in *WB.*	**Planning**	Collect relevant information and vocabulary; and to present them in an organised coherent text, in *WB.*
While You Read	Guide the students through the text to extract the communicative value in it, in *SB.*	**Pronunciation**	Learn pronunciation, stress, intonation and rhythm provided with an audio-taped native model of English in *WB* and *SB.*	**Writing, Drafting, Editing**	Approach writing as a process of communicating their ideas meaningfully, in *WB.*
After You Read	Understand the events, causes and attitudes in the text, in *SB.*	**Listening**	Understand a wide variety of contexts of spoken English in *WB* and *SB.*		
Vocabulary Activities	Generate new items and use them in selected and self-generated sentences, in *WB.*	**Speaking**	Practice dialogue and discussion in oral communication in *WB* and *SB.*		
About You	Relate and transfer the theme, topic and structure to their personal experiences and their surroundings, in *WB.*				

In General English AMRA One, there are only three lessons dealing with scientific concepts: "Scientific Facts about the Sun and Earth; Scientific Discoveries and Preservation of Natural Resources". Thus, the percentage of scientific lessons to the total content is equal to 2.16 %. The time allotted to these three lessons is equal to 135 minutes out of 3240 minutes through the whole year.

Table 8.2 shows that in General English AMRA Two there are only four out of 72 lessons tackle four general scientific topics through reading four passages in about 60-70 lines and answering short comprehension questions. Again, the percentage of scientific concepts to the total content is equal to 2.88 %. The time allotted to these three lessons is equal to 180 minutes out of 3240 minutes in 24 teaching weeks in the whole year.

The analysis of the curricula showed that in addition to General English as a compulsory requirement for all streams, the Commercial and Nursing streams study Functional English that accords with their specialism and they can also choose Anthology one as an optional English course. The graduate students of these streams do not usually have as many opportunities as other graduates may have either to join a university, post-secondary school colleges or a career. The science stream graduates have the best chances to join a university or a college or to have a career. The vocational streams are allotted only 5% of the university places every year, and the ten highest achievers of them in the GSCE have a place at university. The science students can choose any speciality at any university department; e.g. medicine, engineering, pharmacy, humanities, social studies, arts, law, business, economics etc.

Table 8.2: Scientific Topics Included in the English Textbooks For First and Second Scientific Secondary Grades/ English One and English Two

Course	Unit	Lesson	Theme	Concept	Function
ONE	3	1	Education	Scientific facts bout the sun and earth	Describing scientific facts
	8	1	Science	Scientific discoveries	Expressing truths
	17	1	Ecology	Preservation of natural resources	Describing processes
TWO	8	1	Health	Health in Jordan; Graphs and statistics	Describing trends; Writing a factual report
	17	1	New Technology	The silicon chip; the life cycle of a star	Describing processes (electrical and Electronic appliances)
	20	1	Communication	The information Superhighway; computer equipment in schools	Expressing opinions
	21	1	Scientific Investigation	Survey on career breaks for women; report on air pollution	Describing/ expressing quantity; reporting scientific facts; making generalisations

8.4. Analysis of the Exploratory Interviews and Results

The interviews were administered to 126 interviewees grouped into three clusters. The first included 70 first year scientific stream students at the secondary stage and 35 first year science students at the university. The second was the science cluster consisting of 6 science teachers, 3 science education supervisors, 1 science curriculum specialist and 3 university science lecturers. The last was the English cluster comprising 6 teachers, 3 supervisors, 1 curriculum specialist and 3 university lecturers.

A five-point Likert scale was used to represent the value of the subjects' responses to each item, where 5=strongly agree, 4=agree, 3=undecided, 2=agree and 1= absolutely disagree. In table 8.3, frequencies of 'agree' and 'strongly agree' have been combined to calculate the percentage of agreement. The rank of the items is ordered according to their mean.

Table 8.3: Percentage, Mean and Rank of the Questionnaire Interview Items (N=126)

No.	Item	Agreement Percentage	Mean	Rank
1	English language textbooks should suit the students' needs for learning English for scientific purpose	95	4.44	2nd
2	Current English language curriculum for scientific secondary stream should include scientific English subject matter that meets the students' needs.	84	4.35	5th
3	English language curriculum should concentrate on developing the student's ability to deal with scientific situations.	85	4.25	6th (=)
4	Studying English for Scientific Purposes could be essential for preparing scientific stream students for university education.	96	4.49	1st
5	English language textbooks for scientific secondary stream should include general scientific topics which students may study when they join a university.	92	4.43	4th
6	Learning scientific English may be effective in raising the achievement of scientific secondary students when joining a university	93	4.44	3rd
7	Lack of the students' knowledge of scientific English in the scientific stream may affect negatively the university students' achievement in sciences.	85	4.25	6th (=)
8	It is recommended that the specific subject matter of the scientific English for the scientific stream students should include topics on modern scientific developments.	83	4.21	7th

Table 8.3 shows that:

1) The percentage of agreement with the items is very high.

2) The interviewees felt similarly strongly about all eight items.

From the respondents' written comments, the researcher concluded that 80% of the interviewees strongly recommended that EScP programme should be introduced by the Ministry of Education as an option for the science students either in year one or two.

The students felt that they were not interested in what they had to learn as many of them mentioned in different ways. For example, a male student stated:

> "General English is a basic requirement of all the secondary students. Its content is general and contains a few scientific terms, but it does not respond to our needs or interests. We do not like to attend the school classes of English and therefore we like to attend the private classes with a tutor outside the school ".

On the part of the teachers, a teacher of English expressed his opinion about the English language curriculum by writing that:

> "My students are not well motivated to the English classes at school. They always tell me they want to talk or write in English about their field of knowledge in science".

A teacher of science commented that:

> "The students of this grade expressed many times their wish to talk about a scientific experiment they did at the physics laboratory. They like to watch or listen to audio-visual scientific materials in English."

A university lecturer of English made the following observation of his first year university science students. He wrote:

> "I noticed that many students were coming to the English class enthusiastically and they were so anxious to learn every word or scientific term. When I asked them about the reason they told me that they wished they had learned this scientific language at school."

Another university lecturer of science teaching first year students of chemistry had his own experience in the laboratory. He commented:

> "I feel a large number of my students were very weak in describing orally or in writing an experiment at the lab. Although, as I understood from them, they recognise the English language rules and memorise many vocabulary items but none of a science nature."

8.5. Analysis of the Quantitative Data

The researcher administered two questionnaires: the scientific questionnaire, which was administered to the scientific cluster of the sample of this study, and the English language questionnaire addressed to the English cluster of this sample. Upon the analysis of the collected data, he identified the needs for EScP as perceived by both the target students of the scientific stream and the community concerned in EScP described previously in chapter seven. And these needs led the researcher to set the characteristics of the suggested programme out of which two units were designed and piloted at the target schools.

After that a test was applied to measure the students' achievement in English before and after the teaching of the two trial units devised to investigate the effectiveness of the suggested EScP programme. Pre and post-test scores were collected, analysed and compared for possible treatment effects.

8.5.1. Analysing the Questionnaires

Each questionnaire item was coded and associated with the area to which it belonged and the subjects' responses were categorised according to these areas. As the researcher was interested in identifying the communicative needs for learning/teaching scientific English from the view points of the learners and their community, the analysis of the responses was geared towards finding out the agreement percentage, mean, standard deviation and rank of each item. The agreement percentage was calculated from the two values representing '4= agree' and 5=strongly agree'. This percentage is an indicator to the level of agreement of the respondents on the items and ranking the items, according to the mean of each item shows the degree of importance of the item. Then the data were coded and entered into the statistical analysis programme of SPSS/9.

8.5.1.1. The English Language-based Questionnaire

This questionnaire was designed with the aim of assessing the students' communicative needs for practising English language skills as perceived by the English educators who were chosen randomly from the IGD (see chapter seven). The overall topic areas of the questionnaire were defined according to four sections covering the four English language skills, i.e. listening, speaking, reading and writing. The analysis merged all the responses of the subjects. Each set of items was analysed and ranked within its area using the SPSS programme. For example, the listening skill items were analysed and reordered separately from other skill items in the questionnaire. Table 8.4

shows the descriptive statistical analysis of the responses to each item; i.e. agreement percentage, mean, standard deviation and rank of each item. The results of the analysis of each skill items are presented below.

The Listening Skill

This skill included five items (1-5). The ranking of these items is as follows:

1) Identify the major idea of scientific context.

2) Understand operational instructions in detail.

3) Define the meaning of scientific terms in listening passages.

4) Grasp information implied in a spoken text.

5) Differentiate a process from its stages and the whole from its parts.

Table 8.4: Rank, Percentage, Mean and Standard Deviation of the Responses to each Item of English Questionnaire (N=67)

SKILL	Item No.	Rank	Agreement Percentage	Mean	SD
LISTENING	1	2nd	95	4.39	0.89
	2	1st	96	4.40	0.89
	3	3rd	92	4.37	0.76
	4	4th	85	4.13	0.92
	5	5th	82	3.99	1.12
SPEAKING	6	1st	97	4.49	0.66
	7	7th	72	3.85	1.26
	8	5th	82	4.01	1.12
	9	2nd	94	4.42	0.70
	10	8th	67	3.64	1.38
	11	3rd	96	4.31	0.87
	12	6th	75	3.93	1.02
	13	4th	88	4.09	1.08
READING	14	6th	78	3.91	1.30
	15	4th	87	4.10	1.05
	16	3rd	79	4.13	1.13
	17	7th	60	3.43	1.44
	18	2nd	95	4.39	0.89
	19	5th	85	3.93	1.02
	20	1st	93	4.40	0.72
WRITING	21	4th	80	4.09	1.19
	22	3rd	88	4.13	0.85
	23	1st	97	4.27	0.51
	24	2nd	90	4.22	0.90

The Speaking Skill

This area included eight items (6- 13). The rank order of the items is as below:

1) Use basic scientific English language functions in different situations.

2) Explain in detail a scientific situation.

3) Report events shown in photos, pictures or drawings.

4) Present a simple scientific research, project, survey, etc.

5) Describe scientific objects, experiments, etc.

6) Compare and contrast two systems in biology chemistry, etc.

7) Respond appropriately to what is seen or heard in scientific contexts.

8) Ask and answer questions in scientific dialogues and conversations.

The Reading Skill

This skill covered seven items (14-20). The rank of the items is as follows:

1) Summarise scientific texts.

2) Grasp information implied in scientific texts through making inferences.

3) Scan scientific text to locate specifically required information.

4) Skim scientific text to obtain the gist.

5) Distinguish the main idea from supporting details.

6) Approach scientific texts with expectancies based upon their knowledge of the subject.

7) Define the meaning of scientific terms through contextual clues in reading texts.

The Writing Skill

There are four writing functions represented by four items (21-24). The rank order of the items is as below:

1) Use a variety of appropriate functions such as explanation, illustration, etc

2) Produce a term paper about a simple scientific research using appropriate English.

3) Transform scientific texts into diagrams, tables, graphs, etc.

4) Organise information in scientific language using rhetorical functions.

Table 8.4 shows that the respondents regarded all the items as being important. The item weightings reveal that the all the items are important but not equally important. The ranking indicates the degree of priority of each item. These priorities were the terms of reference used by the researcher for designing the suggested programme. The language functions were laid out and presented in sequence with these priorities (see chapter 9, table 9.1).

8.5.1.2. The Scientific Content-based Questionnaire

This questionnaire was devised with the objective of identifying scientific topics in the proposed programme of English by assessing the students' needs as rated by different concerned stakeholders. The total number of the distributed questionnaires was 1038 and the returned number was 994, a percentage return of 93.8%. There were 839 First Year Scientific Secondary Stream Students (FYSSS) 431 male and 408 female, 85 First Year University Students of Sciences (FYUS) 40 males and 45 females and 70 Science Educators (SCED) including 48 teachers of science, 10 science education supervisors, 2 curriculum Specialists, and 10 university lecturers of science. The descriptive analysis of the primary data is shown in the following table 8.5.

The subjects were different in education level, experience, age and probably in their familiarity with responding to questionnaires. Table 8.5 revealed differences in the mean scores of the subjects' responses, but are these differences significant? Therefore, the null hypothesis needed to be tested about the relationship between the subjects' responses. The hypothesis taken was that "there are no statistical differences between the responses of the FYSSS, FYUS, and SCED".

Table 8.5: Descriptive Basic Statistics of the Responses to all Items of the Science Questionnaire

Groups	Mean	SD
All FYSSS (N=839)	69.79	13.63
FYSSS/ Female (N=408)	72.18	12.56
FYSSS/ Male (N=431)	67.47	14.24
All FYUS (N=85)	78.37	1.35
FYUS/ male (N= 40)	78.28	1.43
FYUS/ Females (N=45)	78.44	1.29
Science Educators (N=70)	79.94	2.26

The ANOVA statistical procedure was used to test the hypothesis. Table 8.6 shows that this hypothesis must be rejected, as the significance level of 'F' (0.000) is less than 0.05. Thus, the conclusion is that there are significant differences between the mean responses of the FYSSS, FYUS, and SCED groups. Hence, they need to be analysed separately.

Table 8.6: Analysis of Variance of the Responses of All the Subjects of the Science Sample (α = .05)

Source of Variation	Sum Of Sq.	DF	Mean Square	F	Grand Mean	Sig.
Between Groups	63774.72	52	414.12	11.9	3.54	0.00
Within Groups	90582.80	877	116.88	--	--	--

The difference in mean scores of the FYSSS was also investigated for a gender effect by using the two-tailed 't' test for independent samples. Table 8.7 shows that there are significant differences between the responses of the male and female FYSSS. Hence, the female students perceived they had greater needs for learning scientific English than the male students did.

Table 8.7: Descriptive Statistics and Two-tailed 't' Test for the Mean Scores of the Female and Male FYSSS

FYSSS	Mean	SD	Sig.	t value	DF	Sig. (2-tailed)
Male (N=408)	67.46	14.23	--	--	--	--
Female (N=431)	72.16	12.57	0.000	-4.868	775	0.000

Differences in the mean responses of the male FYUS and female FYUS to all the items were also investigated by using the 't' test. The result is shown in table 8.8.

Table 8.8: The t-test for Differences between the Male and Female FYUS

Std. Error for Difference (SE)	Sig.	t value	DF	Sig. (2-tailed)
0.30	0.99	-0.57	83	0.57

This table shows that the obtained value of significance is 0.57, which is greater than the specified level 0.05. Hence, there is no statistical difference between the male and female university students' mean scores.

Then, the responses to the items of each area were analysed according to four sub-groups: 1) Female First Year Scientific Secondary Students (FYSSS), 2) Male FYSSS, 3) First Year University Science Students (FYUS) and 4) the Science Educators (SCED). The analysis of responses to these items led then to the identification of the scientific topics to be included in the suggested programme, (see table 8.2).

The results are presented sequentially according to five areas of the questionnaire in relation to the four sub-groups of the science sample separately; each area is related to four subgroups. The responses to each item are analysed and the resultant figures in table 8.9 showing the rank, percentage, mean and standard deviation of each item. The five areas of science came from the suggestions of the interviewees in the exploratory interview and these areas are also related to the science subjects the target students receive at school in Jordan. The results are summed as follows:

1) The female and male FYSSS showed their agreement on only seven items (5, 6, 12, 13, 14, 20 and 21) out of the 21 items. This indicates that there are differences in their perceptions of what they actually need.
2) The degree of agreement of the FYUS is more positive than that of the FYSSS. The FYUS gave the items a different rank from that of the FYSSS but identical to the SCED's. This result indicates that the FYUS are possibly more aware of their real

needs than the FYSSS as the former are studying at the university and they face and actually feel the problem of their lack of scientific English.

3) The responses of the FYUS and SCED groups reveal agreement on the ranking of items 1, 2, 3, 4, 7, 8, 11, 12 and 15, but not on items 16 and 21.

4) The specialised and experienced science educators show their agreement that all the items are important but not equally important. They ranked the items differently from other groups.

Table 8.9: Rank, Percentage, Mean and Standard Deviation of the Responses to the Science questionnaire Items

FYSSS Females (N=408)				FYSSS Males (N=431)			FYUS (N= 85)			SCED (N=70)		
No.	Rank	Mean	S.D.	Rank	Mean	S.D.	Rank	Mean	S.D.	Rank	Mean	S.D.
1	1st	3.45	1.18	3rd	3.03	1.36	3rd	4.05	0.94	3rd	3.00	1.53
2	2nd	3.45	1.18	1st	3.35	1.31	2nd	4.16	0.88	2nd	4.08	0.92
3	3rd	3.29	1.18	2nd	3.05	1.35	1st	4.19	1.04	1st	4.15	0.50
4	4th	2.98	1.43	3rd	2.70	1.34	4th	3.44	1.24	4th	3.41	1.56
5	1st	3.76	1.24	1st	3.52	1.26	1st	4.28	0.81	2nd	4.07	1.22
6	2nd	3.35	1.24	2nd	2.90	1.55	2nd	4.22	0.88	1st	4.11	1.35
7	3rd	3.10	1.50	4th	2.65	1.24	3rd	4.13	0.83	3rd	3.86	1.09
8	3rd	3.32	1.51	4th	2.86	1.48	1st	3.84	1.42	1st	4.26	0.96
9	2nd	3.46	1.28	1st	3.40	1.29	2nd	3.09	1.35	3rd	3.77	1.18
10	1st	3.49	1.31	2nd	3.30	1.32	3rd	2.93	1.43	2nd	4.19	0.82
11	4th	3.19	1.38	3rd	3.03	1.35	4th	2.80	1.39	4th	3.73	1.33
12	5th	2.90	1.25	5th	2.68	1.22	5th	2.62	1.25	5th	3.63	1.12
13	4th	3.15	1.41	4th	3.04	1.36	3rd	2.88	0.43	1st	3.71	1.44
14	3rd	3.34	1.43	3rd	3.34	1.37	4th	2.87	1.25	3rd	3.53	1.60
15	2nd	3.51	1.31	1st	3.51	1.33	2nd	3.55	1.34	2nd	3.56	1.19
16	1st	3.55	1.23	2nd	3.49	1.19	1st	3.86	1.07	4th	3.51	1.39
17	3rd	3.65	1.22	4th	3.38	1.30	4th	4.22	0.70	3rd	4.03	1.09
18	4th	3.60	1.26	2nd	3.50	1.30	3rd	4.32	0.68	5th	3.46	1.33
19	2nd	3.74	1.28	3rd	3.45	1.33	2nd	4.34	0.61	1st	4.21	1.18
20	1st	3.79	1.24	1st	3.60	1.30	5th	4.17	0.88	2nd	4.07	1.12
21	5th	3.47	1.36	5th	3.18	1.40	1st	4.45	0.60	4th	3.71	1.14

The Items of General Science 1-3, Applications of Science 4-7, Biology 8-12, Chemistry 13-16 and Physics 17-21.

It is apparent from this table that the responses are on the supportive side. Yet, the degree of importance or rank of every item varies in accordance with the value of the need.

Table 8.10 summarises the differences in the four groups' ranking of the items according to the five target areas. Since there were variations in the ranking of the items, the decision was made to adopt the combined ranking of all the groups as follows:

General Science

1) Energy (sources, forms and uses).
2) The structure of the earth.
3) Subjects in solar system.

Applications of Science

4) Applications of science into information technology and communications.
5) Real-life applications of science.
6) Scientific solutions for real-life problems.
7) General applications of science explaining natural phenomena.

Table 8.10: Summary of the Four Science Groups' Ranks of each Item

Area	Item No.	FYSSS/ Females	FYSSS/ Males	FYUS	SCED	All the Groups
General Science	1	1st	3rd	3rd	3rd	3rd
	2	2nd	1st	2nd	2nd	1st
	3	3rd	2nd	1st	1st	2nd
Science Applications	4	4th	3rd	4th	4th	4th
	5	1st	1st	1st	2nd	1st
	6	2nd	2nd	2nd	1st	2nd
	7	3rd	4th	3rd	3rd	3rd
Biology	8	3rd	4th	1st	1st	3rd
	9	2nd	1st	2nd	3rd	1st
	10	1st	2nd	3rd	2nd	2nd
	11	4th	3rd	4th	4th	4th
	12	5th	5th	5th	5th	5th
Chemistry	13	4th	4th	3rd	1st	4th
	14	3rd	3rd	4th	3rd	3rd
	15	2nd	1st	2nd	2nd	2nd
	16	1st	2nd	1st	4th	1st
PHYSICS	17	3rd	4th	4th	3rd	4th
	18	4th	2nd	3rd	5th	3rd
	19	2nd	3rd	2nd	1st	2nd
	20	1st	1st	4th	2nd	1st
	21	5th	5th	1st	4th	5th

Biology

8) Parts and functions of the cell.

9) Types of tissues in the human organism.

10) Parts and basic functions of the human body.

11) Functions of the digestive system in human body.

12) Subjects in seas and oceanography.

Chemistry

13) Chemical interactions and bonds.

14) Subjects in petrochemical science.

15) Properties and uses of alkalis.

16) Properties and uses of acids.

Physics

17) Magnetism – related concepts and terminology.

18) Sound-related subjects.

19) Laws of motion.

20) Science of light (nature of light).

21) Subjects dealing with electricity.

The items of both the English language and the science content-based questionnaires were used to define the scientific content of the suggested programme. These characteristics constitute the framework of this programme for which the two trial units were developed (see chapter nine).

Thus, the needs for teaching and learning English for scientific purposes were identified from both the learners themselves and the ELT community. These needs have two essential foundations that have been used to compose the content of the suggested programme. The first component of this content focuses on introducing

scientific topics and concepts identified by the questionnaire. The second one focuses on teaching the language skills by practising the language functions in scientific contexts as specified by the English questionnaire. To assess the effectiveness and efficiency of this suggested programme, two sample units had to be tested in actual classroom situations.

8.5.2. Analysis of the Achievement Test

As mentioned in chapter seven, the researcher constructed a test to measure the effects of the suggested programme on the students' achievement in English. This test was administered to control and experimental groups chosen randomly from six local directorates in IGD. The administration of experimental/control group design helps to determine the effect of the suggested programme on improving the language skills. Borg and Gall (1989:670) mentioned that this design:

> ".. involves three steps: first, the administration of a pre-test measuring the dependent variable; second, the application of the experimental treatment (independent variable) to the subjects; and finally, the administration of a post-test measuring the dependent variable again."

Table 8.11 shows the numbers of participants in the testing programme.

Table 8.11: Number of the Participants in the Testing Programme

	GROUP		Experimental	Control	Total
			409	430	939
Gender	**Male**		205	226	431
	Female		204	204	408
Region	**Irbid 1**	**Male**	32	42	147
		Female	39	34	
	Irbid 2	**Male**	33	40	140
		Female	33	34	
	Ramtha	**Male**	34	37	135
		Female	31	33	
	Bani Kenaneh	**Male**	37	39	143
		Female	35	32	
	North Shoneh	**Male**	31	34	134
		Female	34	35	
	Kora	**Male**	38	34	140
		Female	32	36	

The students' scores on the pre-test and post-test were collected (see chapter seven) associated, coded and entered into the SPSS programme. The 't' test was used to investigate the differences between the mean scores of the examinees by group, gender, and region. The dependent variables were the subjects' mean scores on a) pre/post-tests, b) pre/post 1= reading, c) pre/post 2= language, d) pre/post 3= vocabulary and e) pre/post 4= writing. The independent variables were the group, gender and region.

8.5.2.1. Analysis of the Data by Group

The mean scores of the experimental and control groups on the pre/post-tests were analysed using the paired sample 't' test for the difference between these means. This test is appropriate for this study to determine whether the two mean scores of the experimental and control groups differ significantly from each other. Borg and Gall (1989: 548) stated that "the t-test is probably the most commonly used statistical tool in causal-comparative studies."

Since statistical differences may occur because large sample sizes are used, each difference cannot be claimed to be of educational significance. Hence, another statistic was used to measure the size of effects of this programme on the achievement of the experimental and control groups on the post-test and on their achievement in each of the sub-post-tests of the language skills. The effect size (ES) is used to test whether the programme is effective in terms of education practice. Glass (1984) and Borg and Gall (1989) claim that the ES helps the educational researcher to assess the practical significance of relationships, interpret and describe group differences upon the application of an experimental treatment. The effect size is calculated from the formula:

$$\Delta = \frac{\bar{X}_E - \bar{X}_C}{SD_C}$$

(Where Δ = **ES,** $\bar{X}_E$ = *mean score of the experimental group on the post- test,* X_C= *mean score of the control group on the post-test and* SD_C = *Standard Deviation of control group on the post-test.)*

Borg and Gall (1989) state that:

> "An effect size of 0.0 means that the average student receiving intervention did no better or worse than the average student not receiving the intervention. Positive effect sizes mean that the average student receiving the intervention did better than the average student not receiving it. The larger the effect size, the more powerful is the intervention. Researchers consider effect sizes larger than 0.33 to have *practical significance*, that is, the effect size is large enough to make a worthwhile difference in the outcome. Negative effect sizes mean that the average student receiving the intervention did less well than the average student not receiving it", (p: 7).

> "An ES of 1.00 means that the average student in the experimental group scored at the 84th percentile of the control group distribution... Also, the impressiveness of the result is dependent on the absolute difference in points between the 84th percentile and the 50th percentile of the control group distribution", (p: 363)

Table 8.12 shows the results.

Table 8.12: Paired Sample Statistics and t-test for Differences between the Experimental and Control Groups on the Pre and Post-tests ($\propto$ =0.05) and the Effect Size Values

	Pair	Pre-test	Mean	SD	Post-test	Mean	SD	t value	Sig. (2-tailed)	Effect Size
Experimental (df =407)	1	PRE	51.51	18.13	Post	59.60	18.50	-19.49	0.000	0.65
	2	PRE1	17.45	5.73	Post 1	19.67	5.63	-11.15	0.000	0.62
	3	PRE2	11.06	4.57	Post 2	12.59	4.30	-9.11	0.000	0.49
	4	PRE3	15.42	5.99	Post 3	17.73	6.22	-10.97	0.000	0.52
	5	PRE4	7.58	4.37	Post 4	9.61	4.61	-10.94	0.000	0.55
Control (df = 430)	1	PRE	47.89	17.41	Post	48.57	17.04	-2.69	0.007	
	2	PRE1	16.73	5.59	Post 1	16.37	5.33	2.06	0.040	
	3	PRE2	10.48	4.26	Post 2	10.49	4.26	-0.03	0.975	
	4	PRE3	13.41	5.64	Post 3	14.48	5.62	-6.31	0.000	
	5	PRE4	7.27	4.02	Post 4	7.23	4.36	0.26	0.794	

1) The experimental and control groups showed significant gains in total post-test over pre-test scores.

2) The experimental group showed significant gains in post-test scores on all sub-tests.

3) The control group showed significant gains in post-test scores on sub-tests 1and 3 but not on 2 and 4.

Table 8.12.also shows that all the effect size values for the experimental group are higher than 0.33, which means that the experimental group students did better than

the control group student due to the effect of the trial units. The lowest effect size values were on the sub-tests 2 and 3 (language structures 0.49, and vocabulary 0.52). In educational practice, this means that the experimental group's gain was greater in reading and writing than in language and vocabulary. These results mean that the experimental group achieved higher on the post-test than the control group did, because of the effect of the trial units.

8.5.2.2. Analysis of the Data by Gender

The paired sample t-test was applied to find whether there were significant differences between the mean scores of the male and female students of the experimental and control groups on the test as a whole and on the four sub-tests. Then, the effect sizes were also calculated to assess the programme effectiveness in educational terms. Table 8.13 shows the results.

Table 8.13: Paired Samples Statistics and t-test for the Differences between the Male and Female FYSSS of the Experimental and Control Groups

		Pair	Pre-test	Mean	SD	Post-test	Mean	SD	t value	Sig. (2-tailed)	Effect Size
Experimental	Male (df = 204)	1	PRE	50.11	17.92	Post	59.19	18.26	-17.15	0.000	0.70
		2	PRE1	17.06	5.84	Post 1	19.61	5.60	-8.63	0.000	0.77
		3	PRE2	10.78	4.81	Post 2	12.36	4.54	-3.63	0.000	0.56
		4	PRE3	15.53	5.95	Post 3	18.17	6.02	4.28	0.000	0.71
		5	PRE4	6.75	4.35	Post 4	9.06	4.67	-8.44	0.000	0.37
	Female (df =202)	1	PRE	52.92	18.28	Post	60.00	18.78	-11.19	0.000	0.56
		2	PRE1	17.84	5.59	Post 1	19.74	5.68	-7.12	0.000	0.41
		3	PRE2	11.34	4.31	Post 2	12.82	4.03	-6.70	0.000	0.36
		4	PRE3	15.31	6.05	Post 3	17.29	6.40	-6.69	0.000	0.42
		5	PRE4	8.42	4.24	Post 4	10.16	4.49	-7.00	0.000	0.73
Control	Male (df =261)	1	PRE	46.30	17.54	Post	47.15	17.19	-2.39	0.018	
		2	PRE1	16.01	5.55	Post 1	15.60	5.25	1.83	0.069	
		3	PRE2	10.24	4.42	Post 2	9.91	4.34	1.61	0.109	
		4	PRE3	12.80	5.41	Post 3	14.18	5.63	-7.16	0.000	
		5	PRE4	7.26	3.97	Post	7.47	4.25	-1.15	0.250	
	Female (df =168)	1	PRE	50.34	16.97	Post	50.76	16.62	-1.26	0.211	
		2	PRE1	17.84	5.48	Post 1	17.57	5.25	1.00	0.319	
		3	PRE2	10.87	3.99	Post 2	11.39	3.98	-2.47	0.015	
		4	PRE3	14.35	5.86	Post 3	14.93	5.60	-1.89	0.060	
		5	PRE4	7.28	4.11	Post 4	6.86	4.52	1.64	0.102	

1) In the control group, the males' whole post-test mean scores was significantly greater than that of the pre-test, but this was not so in the case of the females.
2) On the whole test and all sub-tests, males and females of the experimental group had higher post-test scores than pre-test ones.
3) In the control group, males had higher post-test scores on sub-test 3 than pre-test; females had higher post-test scores on sub-test 2 than pre-test.

In table 8.13, the effect size values reveal that:

1) On the post-test as a whole, the testing programme was educationally significant for both the males and females of the experimental group. The effect size value for the males' post-test was higher (0.70) than that of the females (0.56), which means that the males gained more from the trial units than the females did.
2) On the sub-post-tests of reading, language and vocabulary, the ES values for the male experimental group were higher than the females, i.e. the former gained more than the latter did in language and vocabulary.
3) On the sub-post-test of writing, the ES value for the female experimental group was higher than that of the males, i.e. the former gained more than the latter did in writing.

8.5.2.3. Analysis of the Data by Region

The paired sample t-test was used to test for the possible differences between the mean scores of the experimental and control groups in every region separately on the pre-test and post-test as whole and on the sub-tests. The results are shown in tables 8.14A and B. On the pre-test and post-test as a whole, these tables show that:

1) There were statistically significant differences between the two groups in favour of the experimental group in each region on the post-test. This means that the target students in all the regions scored higher on the post-test.

Table 8. 14A: Paired Samples Statistics and t-test for Differences between the Experimental and Control Groups in Irbid 1st, Ramtha and Bani Kenaneh

		Pair	Pre-test	Mean	SD	Post-test	Mean	SD	t value	Sig. (2-tailed)
Irbid First Region	Experimental (df =70)	1	Pre	51.59	20.54	Post	58.45	19.72	-6.514	0.000
		2	Pre 1	17.35	6.52	Post 1	19.18	6.19	-3.537	0.001
		3	Pre 2	10.68	5.21	Post 2	12.32	4.60	-3.414	0.001
		4	Pre 3	15.86	6.66	Post 3	17.62	6.41	-3.342	0.001
		5	Pre 4	7.70	4.56	Post 4	9.32	4.50	-3.461	0.001
	Control (df = 93)	1	Pre	45.71	17.46	Post	46.63	16.72	-1.898	0.061
		2	Pre 1	16.23	5.53	Post 1	15.39	5.03	2.222	0.029
		3	Pre 2	10.09	4.50	Post 2	9.65	4.28	1.281	0.203
		4	Pre 3	12.21	4.68	Post 3	14.07	5.39	-5.952	0.000
		5	Pre 4	7.18	4.04	Post 4	7.51	4.43	-1.091	0.278
Ramtha	Exp. (df =64)	1	Pre	54.29	16.08	Post	60.38	17.74	-5.755	0.000
		2	Pre 1	18.00	4.72	Post 1	19.45	5.49	-3.155	0.002
		3	Pre 2	11.68	3.93	Post 2	12.82	3.99	-3.455	0.001
		4	Pre 3	16.23	5.75	Post 3	18.18	6.17	-3.447	0.001
		5	Pre 4	8.38	3.92	Post 4	9.94	3.66	-3.949	0.000
	Control (df = 69)	1	Pre	45.71	14.86	Post	46.63	15.06	-1.939	0.057
		2	Pre 1	15.39	4.52	Post 1	14.97	4.93	1.279	0.205
		3	Pre 2	10.36	3.70	Post 2	10.29	4.03	0.203	0.840
		4	Pre 3	12.46	4.43	Post 3	14.19	5.15	-5.041	0.000
		5	Pre 4	7.51	3.29	Post 4	7.19	3.92	1.049	0.298
Bani Kenaneh	Exp. (df =70)	1	Pre	48.89	17.08	Post	58.24	17.06	-10.479	0.000
		2	Pre 1	16.77	5.20	Post 1	19.55	5.01	-7.308	0.000
		3	Pre 2	10.34	4.49	Post 2	12.34	4.04	-5.815	0.000
		4	Pre 3	14.42	5.29	Post 3	17.10	5.54	-6.262	0.000
		5	Pre 4	7.35	4.11	Post 4	9.25	4.65	-4.635	0.000
	Control (df =84)	1	Pre	47.55	18.55	Post	47.45	17.43	0.133	0.894
		2	Pre 1	16.76	5.82	Post 1	15.74	5.44	2.531	0.013
		3	Pre 2	10.79	4.11	Post 2	10.82	3.94	-0.108	0.914
		4	Pre 3	13.64	6.27	Post 3	14.09	5.39	-1.126	0.263
		5	Pre 4	6.36	4.01	Post 4	6.79	4.23	-1.315	0.192

2) In Irbid First region, Ramtha, Bani Kenaneh (table 8.14A) and Kora (table 8.14B) the mean scores of the experimental group on all the sub-post-tests were significantly different from their mean scores on the sub-pre-tests and from those of the control group on both sub-tests.

3) In Irbid Second region (table 8.14B), the mean scores of the experimental group on the sub-post-tests of reading, vocabulary and writing were significantly different from those on the sub-pre-tests and those of the control group in favour of the experimental on the post-tests. But there were no differences for the experimental group on the post-test of language.

4) In North Shoneh (table 8.14B), the mean scores of the experimental group on the sub-post-tests of reading, language and writing were statistically and significantly higher than on the sub-pre-tests of these areas, while they were not significant for vocabulary.

To sum up, the participant students of the experimental group in Irbid First, Ramtha, Bani Kenaneh and Kora scored higher on the post-test as whole and the sub-post-tests than the pre-test and its sub-tests and higher than their peers of the control group.

Table 8. 14B: Paired Samples Statistics and t-test for Differences between the Experimental and Control Groups in Irbid Second, North Shoneh and Kora

		Pair	Pre-test	Mean	SD	Post-test	Mean	SD	t value	Sig. (2-tailed)
Irbid Second Region	Exp. (df = 65)	1	Pre	51.30	19.58	Post	59.94	20.04	-10.920	0.000
		2	Pre 1	17.09	6.43	Post 1	19.56	5.70	-4.496	0.000
		3	Pre 2	11.06	4.85	Post 2	12.08	5.06	-1.986	0.051
		4	Pre 3	15.17	6.30	Post 3	18.74	6.48	-6.942	0.000
		5	Pre 4	7.98	5.13	Post 4	9.56	5.40	-3.135	0.003
	Control (df =43)	1	Pre	53.70	18.07	Post	54.32	18.31	-0.725	0.473
		2	Pre 1	18.50	6.26	Post	18.39	5.73	0.191	0.849
		3	Pre 2	11.16	3.77	Post	12.02	4.03	-1.826	0.075
		4	Pre 3	15.41	5.82	Post	15.50	6.46	-0.149	0.882
		5	Pre 4	8.64	5.09	Post	8.41	4.48	0.452	0.653
North Shoneh	Exp. (df =)	1	Pre	48.51	14.69	Post	54.72	16.66	-4.798	0.000
		2	Pre 1	16.28	4.34	Post 1	18.42	5.49	-3.593	0.001
		3	Pre 2	11.14	4.07	Post 2	12.38	3.65	-3.594	0.001
		4	Pre 3	14.54	5.14	Post 3	14.92	5.70	-0.743	0.460
		5	Pre 4	6.55	3.91	Post 4	9.00	4.50	-4.974	0.000
	Control (df =)	1	Pre	45.67	15.43	Post	45.48	14.80	0.389	0.698
		2	Pre 1	15.70	4.95	Post 1	16.48	4.72	-2.437	0.017
		3	Pre 2	10.59	3.84	Post 2	10.25	3.60	1.236	0.221
		4	Pre 3	11.61	4.62	Post 3	12.74	5.16	-3.443	0.001
		5	Pre 4	7.77	3.03	Post 4	6.01	3.36	5.856	0.000
Kora	Exp. (df = 69)	1	Pre	54.47	19.56	Post	65.60	18.42	-13.233	0.000
		2	Pre 1	19.14	6.37	Post 1	21.79	5.47	-6.360	0.000
		3	Pre 2	11.51	4.71	Post 2	13.57	4.26	-5.030	0.000
		4	Pre 3	16.29	6.51	Post 3	19.70	6.11	-7.470	0.000
		5	Pre 4	7.53	4.41	Post 4	10.54	4.75	-7.018	0.000
	Control (df =68)	1	Pre	51.97	18.74	Post	53.97	18.62	-3.514	0.001
		2	Pre 1	18.62	5.89	Post 1	18.51	5.44	0217	0.289
		3	Pre 2	10.25	5.29	Post 2	10.70	5.31	-1.004	0.319
		4	Pre 3	16.23	6.54	Post 3	16.88	5.86	-1.213	0.229
		5	Pre 4	6.87	4.56	Post 4	7.88	5.35	-2.210	0.030

To interpret these differences in educational terms, the effect size values were calculated as mentioned above. These values vary from one region to another as shown in table 8.15.

Table 8. 15: Effect Sizes for the Regions

Pair	Post-test	Irbid 1	Irbid 2	Ramtha	Bani Kenaneh	North Shoneh	Kora
1	**Post**	0.71	0.31	0.91	0.62	0.62	0.62
2	**Post 1**	0.75	0.20	0.91	0.70	0.41	0.60
3	**Post 2**	0.62	0.15	0.63	0.39	0.59	0.54
4	**Post 3**	0.66	0.50	0.77	0.56	0.42	0.48
5	**Post 4**	0.41	0.26	0.70	0.58	0.89	0.50

This table shows that:

1) The significant effect size values for these differences mean that the experimental group students in these regions did better on the post-test as a whole than on the pre-test and better than their peers of the control group due to the effect of the trial units.

2) The effect size values on the post-test and all its sub-tests of the experimental groups in Irbid First, Ramtha, Bani Kenaneh, North Shoneh and Kora indicate an educationally significant effect of the testing programme

3) In Irbid Second region, the effect size values for the post-test as whole and for the sub-post-tests 1, 2 and 4 (reading, language and writing) were not of educational significance (below 0.33), while it was of significance for the sub-post-test 3 (vocabulary).

4) The experimental groups in Ramtha 0.91, Irbid First 0.75, Bani Kenaneh 0.70 and Kora 0.60 did the best at reading, while North Shoneh did the best at writing 0.89. These figures mean that achievement in reading of the experimental group students in four regions was greater than that of the control group in the same regions.

8.6. Discussion of the Results

The analysis of the qualitative and quantitative data yielded significant results from the documentary work, literature review and the empirical work, which entail further discussion.

The researcher found that the learners and teachers of English had no active direct role in the development of the educational materials they use. This lack of involvement is a feature of the centralised system of education in Jordan where the development process of educational plans, programmes and curricula is dominated by the central departments of the MOE with the co-operation of central national committees. Hence, such an educational environment does not give the proper chance for the education stakeholders to participate interactively and be involved in that process. Besides, this kind of system does not take account of the differences between the learners, i.e. there are differences in the needs of the students of different gender and from different regions.

This study showed that meeting the learners' needs made learning more motivating to attain the objectives of this learning because they were involved in setting these objectives. To activate the components of the communication process (transmitter-message- receiver), the organiser of this process should determine what communication skills the transmitter has, what is the proper content of the message to be transmitted and what needs, interests and background the receiver has. Then, the organiser could ensure that the message would be passed effectively and meaningfully to both sides of this process. The present study indicated that more than 90% of the respondents to the exploratory interview questionnaire agreed that the contents of the English curriculum should have met the learners' needs for learning EScP at the scientific stream of the secondary stage.

The gender of the students had an effect on both their responses to the science content-based questionnaire and on their achievement in the English test. The female students showed a higher level of perception of their needs for learning EScP than the males did. The female students also achieved significantly higher scores than the males on the writing sub-test, whereas, the males achieved better than the females did in reading, language and vocabulary. This result may provoke other researchers to investigate further the gender differences between the students in learning English in general and in ESP in particular. And it may attract the attention of the education policy makers, curriculum developers and methodology researchers.

On the regional comparisons, the experimental group of students in Irbid First, Ramtha, Bani Kenaneh and Kora achieved better on the post-test as whole and its sub-tests than the pre-test and its sub-tests and better than their peers of the control group due to the effect of the trial units. But the levels of achievement vary from one region to another. In reading, the experimental group of students in Ramtha, Irbid First, Bani Kenaneh and Kora were the most significant achievers. And in writing North Shoneh students were the highest achievers. This result sheds light on the differences between the six regions that are possibly due to the socio-economic status of the regions. Another explanation could be related to the possible differences between the teachers in these regions in terms of teaching practices and learning activities and interactivity inside classrooms. Otherwise, there could be other factors related to teachers' experience, qualifications, pre-service and/or in-service training and job satisfaction.

However, these findings may raise the concern and attract the attention of the education policy makers, curriculum developers and other researchers for further investigation and consideration. The education policy makers might think of creating non-centralised systems for managing the development of educational plans and curricula on the bases of regional environments. This requires the MOE to revise its

management policies on the whole, and partially it should rethink the provision of one book to all the students all over the country regardless of the differences between the learners, teachers and educational environments.

The values of the effect sizes provided the researcher with practical significant evidence of the effectiveness of the framework he set as a suggested model. This framework could be of use to course designers, curriculum developers and those who might be interested in developing ELT and ESP in Jordan or other countries with similar situations. Thus, the trial units presented a positive indicator of the practicality of the proposed programme. These units showed significantly the importance of the engagement of the stakeholders in the process of building the kind of education its clients would like and need to receive.

Accordingly, the suggested programme of EScP was effective and applicable to the actual classroom situations of the target environment of this study.

CHAPTER NINE

CONCLUSIONS AND RECOMMENDATIONS

9.1. Introduction

This chapter reveals the conclusions drawn from the findings of this study and presents recommendations that may be of concern to education stakeholders including teachers, education supervisors, curriculum planners, education policy makers and researchers. The chapter also includes a description of the suggested programme and the trial units.

There were four foundations on which the framework of this programme was built. These foundations were: the Communicative and ESP major approaches to EFL; analysis of the national documents related to ELT and the English curricula; theories and empirical studies relevant to EFL and ESP; and assessment of the learners' needs and the concerned community perspectives. The communicative approach to ELT and the ESP approach to course design are based on student-centredness, responsiveness and interactivity with what the learners need to learn, not what the educators want them to learn. Hence, this programme is a product of the participatory views of the concerned stakeholders.

In parallel with commercial and nursing streams of the secondary stage of education in Jordan, the scientific stream should be given equivalent opportunity by provision of a course which meets the science students' speciality needs of the subject for learning scientific English. The present study was an attempt to meet a national need for a design suggesting ESP programme for science students at the school level. Accordingly, a Communicative EScP programme is suggested for the scientific stream students of the secondary stage of education in Jordan. The framework of this programme includes general and specific characteristics; examples of its components and a sample design are represented by the two trial units (see appendix 9).

9.2. General Characteristics of the Recommended EScP Programme

Based on the above-mentioned foundations, the following points emerged that were taken into consideration in designing the framework of the suggested EScP communicative programme. Because such a programme aims to teach the learners how to use English in scientific contexts, not to teach science, teachers of English should be provided with special prior training.

These considerations could also be guidelines for choosing or evaluating textbooks. They are as follows:

1) the teaching materials should be based on and relevant to students needs to ensure their motivation.
2) the content of the programme should be relevant to students' needs, environment, and their scientific and linguistic background.
3) the programme should take into account the objectives of the national curriculum and the objectives of teaching English in general.
4) the textbook should provide students with meaningful situations in which they can play real roles using authentic language.
5) language skills and micro-skills should be organised integratively and developmentally.
6) the content of the programme should deal with various scientific topics and include various activities and tasks considering the individual differences among students.
7) the programme should be accompanied by appropriate techniques and available audio-visual aids.
8) the programme should provide teachers with guidance explaining objectives of the programme and demonstrating suggested teaching methods and assessment techniques.

9) the design should be attractive to students by including illustrations and colourful pictures, since the scientific content requires such illustrations.

10) the objectives and summary of each unit in this programme should be clearly stated and explained to the students.

11) students should be given enough opportunity to practice language through exercises and tasks that reinforce the communicative functions of the language.

The main features of the design of the suggested programme in this study were derived from principles of the communicative approach to EFL and ESP. These features are summed up below.

1) Learning through use: language was presented in real contexts and real situations.

2) Authentic language: the language presented by this programme should be authentic and relevant to students' needs. In this respect, students should be given enough practice in listening to lectures and note-taking using authentic discourse materials, because they are expected to such a situation in future.

3) Appropriacy: the student should be provided with appropriate language in appropriate roles in appropriate situations.

4) Reality: students should be involved in real communication purposeful to them giving the opportunity to deal with spontaneous language contexts and structures. They should be involved in real roles in meaningful situations and there should be some flexibility and unpredictability, as in real-life situations.

5) Sufficient exposure to language use: the students' exposure to language use should be extensive not restricted only to classroom situations.

6) Task control: communication tasks are given priority. The major four skills are divided into micro-skills and tasks to enhance them. Students are required to perform tasks that may include a composite of skills to achieve a certain goal. Therefore, topics of conversations and situations are goal-oriented.

7) Student-centredness: the programme considers students as whole people with needs, fears, hopes, goals and commitments. Working individually, in pairs and/or groups, self-learning activities were encouraged as well as doing project work on individual tasks and playing a range of major roles. Teachers were trained to play the roles of organiser, manager of the whole group and small groups and facilitator of learning.

8) Information gaps: students share information not previously known but relevant to their needs. For example, information about the times of flights from Amman to Aqaba is not relevant to a student who is not from Amman or Aqaba and does not need to go to Aqaba or Amman.

9) Interaction: the programme provides students with the ability to use small talks and to exploit the interactional aspects of communication. A student who lacks this ability may find many tasks difficult and may avoid talking where talking would be appropriate.

9.3. Components of the Programme

This programme should include three written components (Teacher Booklet, Student Booklet and Work Booklet) and audio-taped passages for listening activities as described below.

Teacher Booklet (TB)

This is a guide for the teacher providing him/her with a brief of the programme and suggested procedures and techniques for teaching. Its aspects are described below.

1) Statement of the objectives the students are expected to attain at the end of the programme.

2) Description of the content of each unit defining the lessons, themes, topics, and activities of each lesson.

3) Recommended methods and techniques of teaching and learning.

4) Proposed techniques for assessment and sample tests.

Student Booklet (SB)

The SB comprised the following:

1) organised classroom activities the students perform individually, in pairs and in groups.

2) themes related to science concepts and topics.

3) illustrations relevant to the topics.

Work Booklet (WB)

Based on the previous learning of the skills in the students' booklet, the WB provides them with exercises to consolidate this learning with a focus on the following aspects:

1) reading comprehension,

2) vocabulary,

3) language structures,

4) listening comprehension,

5) writing proceeding from short answers, transformation of illustrations into text and free writing.

Audio-taped Cassette

The taped material aims to reinforce the learners' abilities in listening and speaking. The cassette includes 14-minute audio-taped material to support listening and speaking activities. These activities provide the learners with a model of native speakers' pronunciation and intonation and opportunities for dialogue and discussion of scientific topics.

9.4. Specific Characteristics of the Programme

These characteristics are described below.

9.4.1. Aims of the Programme

This programme should:

1) develop the abilities of the scientific stream students of the secondary stage to communicate in English in scientific situations,
2) provide them with English scientific terms and concepts relevant to their needs,
3) raise their interest in learning English for scientific purposes,
4) improve their performance in Scientific English.

9.4.2. Specific Objectives

The explicit objectives of this programme are stated in behavioural terms taking into account the logical sequence of the topics, concepts and activities from simple to difficult and to demanding. The individual differences among the learners and the learning styles were considered as well. These objectives are organised according to the sequential procedures of the unit.

Thus, at the end of this programme, the students are expected to be able to perform the objectives as specified below.

Lesson 1: Focus on Reading

Before your Read

1) Identify the gist of the topic and the related vocabulary.
2) Make predictions about the reading text.
3) Scan the text and locate specific information.

New Vocabulary

1) Pronounce correctly the new vocabulary items

2) Define the meaning of each item.

3) Expand the items into the antonyms, synonyms and homonyms.

4) Generate new vocabulary from the kwon items.

5) Understand the vocabulary in scientific contexts.

6) Use these items in self-generated scientific contexts.

While you Read

1) Use the text in a communicative context.

2) Skim the text to identify the required information.

After you Read

1) Comprehend the events, causes and the relationships between them.

2) Summarise the text.

3) Apply what they have learnt into new situations.

Try This

1) Relate the topic/theme to their personal experiences.

2) Transfer the learnt structures and vocabulary to talk about their experiences.

3) Express their personal opinions on selected contemporary scientific issues.

Lesson 2: Focus on Language

Grammar

1) Express themselves in different language forms.

2) Use the new structures appropriately.

Listening

1) Comprehend spoken native English in different scientific contexts.

2) Identify the major idea in the listening text.

3) Understand the description of process and illustrations.

Speaking

1) Practice oral communication in the classroom.

2) Participate in scientific dialogue and discussions.

3) Explain a scientific context.

4) Describe scientific process and operations.

5) Express orally their opinions on contemporary scientific issues.

Lesson 3: Focus on Writing

1) Write a well-organised cohesive essay (100-200 words) about scientific topics of their choice.

2) Write about a process.

3) Produce a term paper about a simple scientific research

4) Transform scientific texts into diagrams, tables, graphs, etc.

5) Exchange each other's drafts to comment and discuss.

9.4.3. The Content

The content concentrates on creating situations so that the students can engage in meaningful interactive communication with each other using scientific English. The framework considers that the four language skills are integrative. The material is based on the language communicative functions in scientific contexts. In other words, the content marries the language functions to the scientific contexts in a communicative atmosphere. Table 9.1 shows the organisation of the scientific content.

This scientific content is communicatively activated through the performing of language functions for practising the four skills of listening, speaking, reading and writing. These language skills and functions are incorporated into the suggested programme as shown in the table 9.2 and described as follows.

Listening Skill

The researcher found that the respondents strongly agreed that the learners placed high values on activities in listening to the scientific contexts, instructional operations and the meaning of scientific terms, which could be related to the nature of the scientific situations that the science students are likely to experience. The respondents also agree that the learners need to deal with spoken scientific texts related to describing processes and illustrations.

Table 9.1: The Scientific Themes and Contexts of the Suggested Programme

Scientific Theme	SCIENTIFIC CONTEXTS		
General Science	Energy (sources, forms and uses)	Structure of the earth	Solar system
Applications of Science	Information technology and communications	Real-life applications of science	Scientific solutions for real-life problems.
	Scientific explanation of natural phenomena		
Biology	Parts and functions of the cell	Types of tissues in the Human organism	Parts and basic functions of the human body
	Functions of digestive system in human body	Life in seas and oceans	
Chemistry	Chemical interactions and bonds	Subjects in petrochemical science	Properties and uses of alkalise
	Properties and uses of acids		
Physics	Magnetism – related concepts and terminology	Sound	Laws of motion
	Nature of Light	Electricity	

Speaking Skill

The most highly needed skills are to "use basic scientific English language functions in different situations", to "respond appropriately to what is seen or heard in scientific contexts" and to describe illustrated events. Moreover, the students need to be independent learners doing research papers, project work and simple survey.

Reading Skill

Based upon the opinions of the subjects in responding to the English Language questionnaire, the results of the analysis of the reading items demonstrate that science students at the secondary stage need to acquire the sub-skills of summarising, making inferences, scanning, skimming, distinguishing the main idea from the details. Another conclusion emerges is that the students should read texts related to their scientific knowledge and terminology.

Table 9.2: The Language Skills and Functions of the Suggested Programme

	FUNCTIONS		
LISTENING	Identify the major idea of scientific context	Understand operational instructions	Define the meaning of scientific terms in listening passages
	Grasp information in a spoken text	Differentiate a process from its stages and the whole from its parts	
SPEAKING	Use basic scientific English language functions in different scientific situations	Explain in detail a scientific concept	Report events shown in photos, pictures or drawings
	Present a simple scientific research, project or survey	Describe scientific objects and experiments	Compare and contrast two systems in biology, chemistry, etc.
	Respond appropriately to what is seen or heard in scientific contexts	Ask and answer questions in scientific dialogues and conversations	
READING	Summarise scientific texts	Grasp information implied in scientific texts through making inferences	Scan scientific text to locate specifically required information
	Skim scientific text to obtain the gist	Distinguish the main idea from supporting details	Approach scientific texts with expectancies based upon their knowledge of the subject
	Define the meaning of scientific terms through contextual clues in reading texts		
WRITING	Use a variety of appropriate functions such as explanation, illustration, etc	Produce a term paper about a simple scientific research using appropriate English	Transform scientific texts into diagrams, tables, graphs, etc
	Organise information in scientific language using rhetorical functions		

Writing Skill

The analysis of the respondents' assessment of FYSSS' writing needs yielded functions that should be taken into the design of the suggested programme of EScP. The target students need to write explanations, describe illustrations, write a short term paper about a simple scientific research and transform scientific texts into diagrams, tables, graphs.

9.4.4. Teaching Methods

To help the target students achieve the set objectives at the end of this programme and to put its content into actual classroom situations, the teacher is advised to play a new role in accordance with the communicative approach to ELT. The teacher should create a communicative atmosphere so that the students play the major role and perform interactive activities and s/he organises these activities, facilitates the interaction, evaluates not judges and at the end develops their learning. On the role of the students, they perform the activities individually, in pairs and in groups. More detailed description of the suggested methods are presented in the TB in appendix 9.

9.4.5. Assessment

The programme is designed on the bases of formative and summative assessment techniques. The former suggests that the teacher should observe, appraise and give feedback to the learner during the process of teaching and learning for the purpose of improving this process. The latter advises the teacher to assess the level of achievement the learners reach at the end of every part of the programme that could be a class period, on a lesson, on a unit, every four units or at the middle of the programme or on the whole programme. This form of evaluation is exemplified in the two sample tests for the two units appended with the TB.

These constituents of the programme framework are to be reorganised into teaching units taking into consideration the scope and sequence of the scientific concepts and language skills. Therefore, the design of the programme should follow the design of the two trial units.

9.5. The Two Trial Units

Two units were written in which the content was selected from the topics of the suggested programme as identified by the two questionnaires (see chapter seven).

The findings of the pre/post-tests proved that there was a positive significant effect of the units on the performance of the experimental group of students in the trial units. Besides, the participant teachers reported that the experimental group students showed high level of interest and interaction with the material. The students expressed their desires that their formal textbooks would have provided them with what they had learnt from these units.

9.6. Conclusions

The conclusions will be presented according to the phases of the research, i.e. the documentary analysis: analysis of official national documents, review of the academic work related to the present study; the empirical phase: the exploratory interviews and the questionnaires.

9.6.1. Conclusions from the Documentary Analysis

Based on the findings of the documentary analysis, the researcher drew the following conclusions:

1) The education system in Jordan is centralised which means that:

a) There is one national curriculum applied to every subject matter and all the public schools use the same teaching materials.

b) EFL teachers in Jordan are not actively involved in setting the ELT objectives and they have no active role when selecting the ELT materials. They can comment on them in an evaluation form appended at the end of the textbook or sometimes to post a teacher-made form of evaluation to the central Directorate of Curriculum Development through their Local Education Directorates.

c) Teachers have to follow the MOE prescribed methods of planning teaching, organisation and management of the classroom activities and assessment of students' achievement. But, teachers may vary the classroom techniques although they still play the major role inside the classroom.

d) Students at the public schools are seated in desks. Every pair of students has a desk and this pair has to stick to it during the whole class period and the whole school day. Student can not leave either the desk or the class with the teacher's permission or on the regular school breaks. Besides the class size is large ranging between 30-45 students in a room whose area is about 48 square metres. This means that there is no chance for them to perform group activities and they do not have a proper chance for interaction with each other or with the teacher.

e) The students and other stakeholders were not actively and directly involved in the planning, evaluation of the English curriculum. Their views are only considered after finalising the curriculum and its prescribed textbooks and applying them as a trial edition.

2) This study raised the issue that the language content of an EScP programme should present structures, contexts and functions with general scientific background as well as with speciality related to every individual science subject based on the learners' needs.

3) Through the available general English course, the scientific secondary school students had not acquired a sufficient command of scientific English and what they had acquired was not sufficient for their needs.
4) The students needed both general scientific and special English. They also believed that the most important objectives of teaching scientific English were to help them when joining university read science books in English with understanding and also to help them express themselves in writing in their field of specialisation.
5) The language teachers reported that they were in need of special training and the participant supervisors confirmed the teachers' need.

The findings resulting from the analysis of the documents related to the situation of teaching English accord with the findings of the review of previous studies and the pertinent literature. On the whole, the researcher concluded that there was a gap in ELT at the scientific stream of the secondary stage of education in Jordan that necessitated investigating the situation of teaching scientific English for the secondary scientific stream students in Jordan.

9.6.2. Conclusions from the Review of the Reported Empirical Studies

Based on the reviewed studies, there are special characteristics of English for science that should be considered when writing the content of such English.

The researcher concludes that the scientific English programme has its own features. The programme designer should bear in mind that there is a common ground of vocabulary, structure and functions for all the sciences, but each individual science has its own terminology. If this programme is to be based on the communicative approach, it should pay an attention to teaching language structures and vocabulary. The learner should be able to differentiate between the passive and active forms, noun and verb and should also distinguish the content words from the function words and be able

to use the proper word in its proper context. This conclusion conforms with those of Widdowson (1974) and Strevens (1971).

The EScP programme should include both general English and scientific English, as both have common grammar rules, phonology and part of lexis. They share the same pronunciation and spelling of the words, the verb tenses and the function words. The focus should be given to the language functions that are to be used in scientific contexts. General English helps the learner to use the language in daily situations which s/he faces in real life, whereas s/he can use scientific English in scientific situations. The EScP designer should make wise balance between the two Englishes.

However, the decisive word should be heard from the programme users to determine their needs and interests in both types. In comparison with business firms which consult its customers before, during and after the production of any product, the EScP and education programmes designers should also consult the users of these programmes to enhance their satisfaction and ensure the efficiency of these programmes.

9.6.3. Conclusions from the Exploratory Interviews

The findings of the exploratory interviews confirmed that the Jordanian current curriculum of English of the scientific secondary stream and its textbooks were not responsive to students' needs, abilities and future purposes for learning scientific English. The English professionals who participated in the interviews strongly agreed on the integration of all the language skills for communicating in scientific situations provided that these skills should not be sacrificed for the sake of scientific content.

Furthermore, many interviewees strongly recommended involving the concerned people (community) in developing EScP programmes. That is, the students,

teachers, educators and university lecturers should be involved directly and their views, needs and abilities should be encountered in developing these programmes.

The interviewees directed the researcher's attention to the type and content of the scientific subject matter that should be presented to the target students of this study. The science group focused on the inclusion of the basic scientific concepts and terms that the students learn during their study of the science subjects of the secondary stage.

These results agreed with Barmada (1993) who argued that ELT projects' failure in developing countries could be attributed to the neglect of involving the teachers in the early stages of innovation. The case study of Barmada demonstrated the need for involving teachers in innovation in order for it to take root and prosper.

Moreover, the interview findings accorded with Al-Otaibi's study (1994) which emphasised that language teaching must be viewed in relation to the communicative needs of students.

The British Council (1978) mentioned that the ESP programmes, by emphasising communication skills and promoting language in action, reflect the increasing attention to the learners' specific language needs. These programmes should accord with student notions of progress in their vocational studies and their socio-linguistic environment. A specific account should be taken of the available information about the learners' exact language attainments, their background at home and in society, their assumptions about university life, vocational and social aspirations.

9.6.4. Conclusions from the Questionnaires

The responses of the FYSSS to the scientific questionnaire revealed that female subjects showed higher levels of perception of their needs than the males did. Both the females and males FYSSS showed lower level of perception of the needs than the university students, teachers and the educators. This may refer to the probable

differences in familiarity, experience and education level of the respondents.

Overall, the English Language-based Questionnaire and the Science Questionnaire resulted in identifying the target students' needs for learning EScP. These needs were used as the characteristics of the proposed programme as described above.

9.6.5. Conclusions from the Achievement Test

The test was constructed to assess the effectiveness of the suggested programme on the target students' achievement in scientific English learnt through two sample units. In this respect, the study proved that the suggested programme was significantly and educationally effective. The progress the students achieved could be attributed to three reasons. First, the students participated in building their programme and they felt that their needs were encountered from the start to the finish of this programme. Second, the content of the programme was relevant to the learners' background knowledge in the science subjects of the school and to their realm of speciality. This reason is supported by the British Council (1978) and Ja'far's study (1992) on the interactive effects of background knowledge on ESP reading comprehension proficiency tests for science students at the University of Jordan. Ja'far concluded that the students perform better on tests whose subject matters are related to their subject field than they do on tests where that does not occur. Third, the teachers were possibly motivated towards such a programme as the supervisors reported to the researcher and they felt they had been consulted and involved in this programme as well. The teachers expressed their need for training on teaching ESP materials, on recent methods of pair/group work and on organising student-centred activities.

With reference to the significant differences between the experimental and control groups, the post-test results revealed educationally significant effects on the students of the experimental group over the control group; the former group gained

more in reading and writing than they did in language and vocabulary.

In terms of gender educational effect on the experimental group, the post-test as a whole clarified that both the males and females of this group scored higher than their peers of the control group. But on the sub-post-tests of reading language and vocabulary, the males of the experimental group gained more than the females of the same group did, whereas the latter gained more in writing than the males did.

Regarding the regional educational significant differences between the mean scores of the experimental group on the post-test as whole and its sub-tests, the target students in the regions showed various levels of gain from the teaching programme under testing. On reading, the students in Ramtha, Irbid First, Bani Kenaneh and Kora gained more than their peers in Irbid Second and North Shoneh did, while North Shoneh gained the most on writing. This will open the opportunity for further investigation by researchers and more consideration by the MOE and educators in Jordan.

This result could be due to the fact that the education policy makers and developers of education materials dominate the central responsibilities of planning and development on common national bases shared by all the regions without considering the probable relevance of such development to regional differences between the students' background, individual differences and local educational environments.

9.7. Recommendations

The following recommendations are made:

1) It is recommended that the Jordanian Ministry of Education (MOE) should involve students, teachers and the concerned stakeholders in the processes of developing, selecting and assessing ESP materials.
2) The MOE should reconsider the system of education management by delegating some central responsibilities to the Local Education directorates and to the schools.

3) The MOE should reconsider the class size, organisation of class furniture and management of activities inside and outside the classroom.

4) The MOE should encourage the schools to create communicative environment to provide the learners with more proper opportunities for functional language contexts inside and outside the school.

5) When applying ESP programmes, The MOE or the ELT developers should develop training programmes for the teachers focusing on:

   a) Teaching English for Scientific Purposes.

   b) Recent teaching methods of pair/group work.

   c) Developing student-centred activities.

6) The universities should investigate the students' needs and background knowledge when joining the science faculties or other faculties that require special English.

7) When selecting EFL/ESP materials, writers, assessors and teachers of such materials should take into consideration the following factors:

   a) When setting the objectives of ESP programmes, the cultural dimension should be considered in terms of the national policy of education and of ELT.

   b) The content of the material should meet the special needs and interests of learners.

   c) The content should be comprehensive by including general English and specific English.

   d) The content should give adequate reinforcement to the learners.

   e) The language of the material should contain generic scientific matter and specialist matter.

   f) The activities of the programme should focus on more dominant role of the learners in terms of individual learning, pair and group work.

9.8. Implications and Requirements

To put these recommendations into application, the following suggestions may be useful with respect to the MOE plan for the curriculum of English language was taken into account. Thus, it is proposed that:

1) The suggested programme could be introduced as an additional course in the scientific stream curricula and offered as an optional to the scientific stream students.

2) This programme should include 24 units with three lessons each covering a period of 24 teaching weeks during two terms throughout the school year, i.e. one unit per week. According to the MOE regulations, the school year is divided into two terms with 16 weeks each term, out of which 12 weeks are allotted to regular teaching and four weeks assigned to induction, school exams, and short quizzes. Three 45-minute class periods per week are also allocated.

3) The MOE may make use of the suggested programme by writing the rest 22 units according to the set characteristics.

4) The MOE can manage a strategy for the evaluation and development of this programme and then make it applicable to all the schools all over the country.

5) The MOE may involve the teachers in setting the objectives, writing and/or assessing the ELT materials.

6) When applying ESP materials to the schools, the MOE may organise training workshops for the teachers to help them in handing such materials.

7) The MOE may develop ESP materials addressed to the vocational stream students at the secondary stage.

8) The MOE can delegate the local education authorities to develop special courses or other educational programmes, and schools as well to organise school-based activities meeting their students' needs and interests and to equip the classrooms

with the proper furniture for pair/group work and school-based activities.

9) It may also delegate the schools the responsibilities to create communicative environment and organise school-based activities to encourage the students to use English on their own pace and interests; such as English Speaking Clubs inside the school or English Speaking Camps outside the school.

10) When the MOE reconsiders the class size, more teachers will be recruited and new type of class equipment will be needed as well.

11) The ELT material writers to assess the students' actual needs and views may consult them through visiting their classrooms.

12) When joining the university, the Jordanian universities may tailor local ESP materials appropriate for meeting the students' needs before starting their study in the faculties of sciences. Otherwise, the universities may produce joint-venture materials considering the Jordanian educational environment, cultural dimensions and students' background.

9.9. Limitations

There were some limitations restricted the implementation of this study. Other researchers are likely to research similar area, conduct similar research or replicate this one are advised to consider the following points:

1) The lack of recent scientific studies that evaluate the existing curriculum of English of the secondary stage, but there were only the letters to the Oxford publishing house and the formal report of education presented in the First National Conference for Educational Reform in 1987.

2) The secondary school students participating in this study were not familiar in responding to interviews or questionnaires.

3) The administration of the oral skills test was not possible for the large number of subjects participated in this study during the permissible and available time for the experimentation of the two units.

4) The researcher could not have more sufficient time for the experimentation of more units of the EScP programme suggested in this study, because of the MOE regulations.

9.10. Suggestions for Further Research

The following points need further research:

1) Investigating the attitudes of the teachers towards ESP and the difficulties they encounter in teaching ESP at school.

2) Exploring the students' motivation and attitudes towards learning ESP.

3) The effects of the students' background knowledge on learning EScP.

4) The effects of the science students' background, motivation and attitudes on their performance in the English language skills.

5) Exploring the differences between the male and female students' needs and motivation to learn EScP and the effect of gender on learning the language skills.

6) Needs assessment of the vocational education stream of the secondary schools in Jordan for learning ESP.

7) Investigating the students' and parents' satisfaction with the assigned materials of English and its effects on the students' achievement in English.

8) Investigating the reasons of the differences between the target regions in learning ESP, such as the socio- economic and cultural factors.

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APPENDICES

1. **Interview Items**
2. **Introduction of the Questionnaires with its Arabic Version**
3. **The English Language Questionnaire**
4. **The Scientific Content-based Questionnaire with its Arabic Version**
5. **Pre/Post Achievement Test**
6. **Content Analysis of English Curriculum In Jordan**
7. **Scope and Sequence of AMRA One**
8. **Scope and Sequence of AMRA Two**
9. **Components of the Two Trial Units**

Appendix 1

The Items of the Group Interviews

No	Items	5 Strongly agree	4 Agree	3 Undecided	2 Disagree	1 Absolutely Disagree
1	English language textbooks should suit the students' needs for learning English for scientific purposes.					
2	Current English language curriculum for scientific secondary stream should include English subject matter that meets the students' needs.					
3	English language curriculum should concentrate on developing the student's ability to deal with scientific situations.					
4	Studying English for scientific purposes could be essential for preparing scientific secondary stream students for university education.					
5	English language textbooks for scientific secondary stream should include general scientific topics, which the students may study when they join the university.					
6	Learning scientific English may be effective in raising the achievement of scientific secondary students when joining a university.					
7	Lack of the students' knowledge of scientific English in the scientific stream may negatively affect the university student' achievement in sciences.					
8	It is recommended that the specific subject matter of the scientific English for the scientific stream students should include topics on modern scientific developments.					
9	**Any other Suggestion:**					

بسم الله الرحمن الرحيم

وزارة التربية والتعليم
المديرية العامة للتدريب التربوي
مديرية التدريب التربوي

استبانة لتحديد حاجات طلبة الصف الأول الثانوي العلمي في الأردن لتعلم اللغة الانجليزية لأغراض علمية

ستستخدم هذه الاستبانة في تحديد حاجات طلبة الصف الأول الثانوي العلمي إلى تعلم اللغة الانجليزية العلمية بهدف تطوير مناهج اللغة الانجليزية لطلبة الفرع العلمي في المرحلة الثانوية في الأردن . لذا فإن اجابتك الدقيقة عن كل فقرة ستسهم في ذلك بشكل فعال .

يرجى وضع اشارة (✓) في المربع المخصص تحت كل فقرة بحسب الدرجة التي تراها مناسبة لاستجابتك وفق المقياس المدرج من (١-٥) ، علماً بأن المعلومات ستعامل بسرية تامة لخدمة اغراض البحث .

شاكرين لكم حسن تعاونكم .

Appendix 2

Introduction to Questionnaires

A Questionnaire for Assessing the Needs of the Jordanian Students of the First Year of the Scientific Secondary Stream for Learning English for Scientific Purposes

Introduction

Dear Respondents

This questionnaire will be used to develop English curricula for the Jordanian students of the first scientific secondary stream. Your precise response to each item will be of great value to cater for the needs of the target students for learning English for scientific purposes. Please, go through all the items, then put a tick in the box under the value on the five-point scale for each item. Your co-operation is highly appreciated.

Muwaffaq Abd Al Razaq

The researcher

N.B.: This introduction was attached to every questionnaire.

استبانة لتحديد حاجات طلبة الصف الأول الثانوي العلمي في الأردن لتعلم اللغة الانجليزية لأغراض علمية

الرجاء تعبئة البيانات التالية :

١. المؤسسة التعليمية/المديرية : .....
٢. المهنة : ..... التاريخ : .....
٣. المؤهلات العليمة :
أ - .....
ب - .....

الفقـــرات	موافق بشدة ٥	موافق ٤	غير مقرر ٣	معترض ٢	معترض بشدة ١
١. ينبغي أن تلبي كتب اللغة الانجليزية حاجات طلبة المرحلة الثانوية لتعلم الانجليزية لاغراض علمية .					
٢. يفضل أن يحتوى منهاج اللغة الانجليزية الحالي للفرع العلمي من المرحلة الثانوية على مادة خاصة للغة الانجليزية العلمية لتلبية حاجات الطلبة .					
٣. يجب أن يركز منهاج اللغة الانجليزية على تطوير قدرة الطالب على التعامل مع مواقف علمية باللغة الانجليزية .					
٤. قد تكون دراسة اللغة الانجليزية لاغراض علمية هامة لإعداد طلبة الفرع العلمي للتعلم الجامعي .					
٥. يجب تضمين كتب اللغة الانجليزية للفرع العلمي في المرحلة الثانوية موضوعات علمية عامة قد يحتاجها الطلبةعند التحاقهم بالجامعة .					
٦. قد يؤثر تعلم اللغة الانجليزية العلمية في رفع تحصيل طلبة الفرع العلمي عند التحاقهم بالجامعة .					
٧. افتقار طلبة الفرع العلمي لمعرفة اللغة الانجليزية العلمية قد يؤثر سلباً على تحصيلهم في المواد العلمية في الجامعة .					
٨. يوصى بأن تحتوي المادة الخاصة للغة الانجليزية العلمية لطلبة الفرع العلمي موضوعات عن التطورات العلمية الحديثة					
٩. أية اقتراحات أخرى					

Appendix 3

The English Language Questionnaire

Please, fill in the following:
1. Educational Institution /Directorate: .....
2. Occupation: ..... Date: / / 1998
3. Academic Qualifications: a).....b).....
c).....d).....

No.	In your opinion, the English programme of the scientific secondary stream should cater for the students' needs to learn the following	5 Strongly Agree	4 Agree	3 Undecided	2 Disagree	1 Absolutely Disagree
A	**LISTENING**					
1	Understand operational instructions in detail.					
2	Identify the major idea of scientific context.					
3	Define the meaning of scientific terms in listening passages.					
4	Grasp information implied in a spoken text.					
5	Differentiate a process from its stages and the whole from its parts.					
B	**SPEAKING**					
6	Use basic scientific English language functions in different situations.					
7	Respond appropriately to what is seen or heard in scientific contexts.					
8	Describe scientific objects, experiments, etc.					
9	Explain in detail a scientific situation					
10	Ask and answer questions in scientific dialogues and conversations.					
11	Report events shown in photos, pictures or drawings.					
12	Compare and contrast two systems in biology chemistry, etc.					
13	Present a simple scientific research, project, survey, etc.					
C	**READING**					
14	Approach scientific texts with expectancies based upon their knowledge of the subject.					
15	Skim scientific text to obtain the gist.					
16	Scan scientific text to locate specifically required information.					
17	Define the meaning of scientific terms through contextual clues in reading texts.					
18	Grasp information implied in scientific texts through making inferences.					
19	Distinguish the main idea from supporting details.					
20	Summarise scientific texts.					

D	WRITING					
21	Organise information in scientific language using rhetorical functions.					
22	Transform scientific texts into diagrams, tables, graphs, etc.					
23	Use a variety of appropriate functions such as explanation, illustration, etc.					
24	Produce a term paper about a simple scientific research using appropriate English.					
25	**Other needs you suggest:**					

Appendix 4

The Scientific Content-based Questionnaire

Please, fill in the following:

1. Educational Institution /Directorate: ..... Date: / / 1998
2. Occupation: .....
3. Academic Qualifications: a).....b).....
   c).....d).....

No.	In your opinion, the suggested English programme of the scientific secondary stream should meet the students' needs to learn the following:	5 Strongly Agree	4 Agree	3 Undecided	2 Disagree	1 Absolutely Disagree
A	**GENERAL SCINCE**					
1	Subjects in solar system.					
2	The structure of earth.					
3	Energy (sources, forms and uses).					
B	**APPLICATIONS OF SCIENCE**					
4	General applications of science explaining natural phenomena.					
5	Applications of science into information technology and communications.					
6	Real-life applications of science.					
7	Scientific solutions for real-life problems.					
C	**BIOLOGY**					
8	Parts and basic functions of the human body					
9	Parts and functions of the cell.					
10	Types of tissues in the human organism.					
11	Functions of digestive system in human body.					
12	Subjects in seas and oceanography.					
D	**CHEMISTRY**					
13	Properties and uses of acids.					
14	Properties and uses of alkalis.					
15	Subjects in petrochemical science.					
16	Chemical interactions and bonds.					
E	**PHYSICS**					
17	Science of light (nature of light).					
18	Laws of motion.					
19	Sound-related subjects.					
20	Magnetism– related concepts and terminology.					
21	Subjects dealing with electricity.					
22	**Any suggested ideas:**					

استبانة لتحديد حاجات طلبة الصف الأول الثانوي العلمي في الأردن لتعلم اللغة الانجليزية لأغراض علمية

الرجاء تعبئة البيانات التالية :

١. المؤسسة التعليمية/المديرية : .....
٢. المهنة : ..... التاريخ : .....
٣. المؤهلات العليمة :

أ - ..... ب - .....

يتوقع من منهاج الانجليزية للفرع العلمي في المرحلة الثانوية ان يلبي حاجات الطلبة إلى تعلم ما يلي :		موافق بشدة ٥	موافق ٤	غير مقرر ٣	معترض ٢	معترض بشدة ١
١.	موضوعات علمية متضمنةفي المباحث العلميةفي المرحلة الثانوية					
٢.	موضوعات علمية عامة سيتم دراستها عند الالتحاق بالجامعة .					
٣.	اجزاء الخلية ووظائف كل منها .					
٤.	أنواع الأنسجة الموجودة في جسم الكائن الحي .					
٥.	وظائف الجهاز الهضمي في جسم الإنسان .					
٦.	مكونات البيئة كشبكة الغذاء مثلاً.					
٧.	تركيب الأرض .					
٨.	صفات واستخدامات الحموض .					
٩.	صفات واستخدامات القواعد والقلويات .					
١٠	موضوعات في علم البتروكيميائيات .					
١١	موضوعات في الزلازل والبراكين .					
١٢	مفاهيم ومصطلحات في علم الذرة .					
١٣	موضوعات في علم البحار والمحيطات .					
١٤	علم الضوء «طبيعة الضوء» .					
١٥	قوانين الحركة .					
١٦	مفاهيم وحقائق تتعلق بالصوت .					
١٧	علم الحرارة .					
١٨	مفاهيم ومصطلحات لها ارتباط بالمغناطيسية .					
١٩	موضوعات تتعلق بالكهرباء .					
٢٠	التطبيقات الحياتية للعلوم .					
٢١	الحلول العلمية للمشكلات الحياتية .					
٢٢	أية أفكار أخرى					

Appendix 5

The Pre/post Achievement Test

English Language Examination

Name: (Optional)..... School:.....

Time: 90 minutes **Date: / /1998**

Part One: Reading Comprehension (30 marks)

Read the following text carefully:

Early humans survived by hunting for meat and gathering seeds, berries and plant roots. They moved from place to place and the local environment recovered quickly from any damage they caused.

However, after the last ice age ended in North Africa and Europe about 10,000 years ago, people began to settle in villages, increase in numbers, and make more permanent changes to their surroundings. They cut down trees to make room for their crops and animals. On the North African coast the once-dense forests disappeared. The cleared land was over-used and became infertile and dusty. Winds swept the soil away and the land became part of the Sahara desert. Some seaports became so silted up that they had to be abandoned.

Today the effects of human activity are greater still. Our huge population demands ever-more land for farming, more raw materials for industry and more factories for goods to improve our standard of living. These demands cause environmental damage that will affect us all. For example, condensed chemical gases (CFCs) used in aerosols, refrigeration systems and foamed plastics damage the ozone layer, which protects us from harmful rays of the Sun. Even if all production of these condensed gases were stopped now the atmosphere could take 60 years to recover. Damage to the ozone layer worries most people. Many shoppers refuse to buy products that contain the condensed chemical gases. This is forcing manufacturers to develop safer chemicals and aerosols free from the condensed gases.

Now answer the following questions:

1. Why did early humans have little long-term effect on the environment?
   .....

2. Why did the human population increase rapidly 10,000 years ago?
   .....

3. Give three reasons for the large scale damage to the environment in modern times.

.....

.....

.....

4. The underlined pronoun "They" refers to.....
5. The underlined word "abandoned" means .....
6. What actions could you take to persuade manufacturers to stop producing CFCs?.....

.....

Part Two: Vocabulary (10 Marks)

Complete each of the following sentences by using the appropriate word from the list given below. There are more words than you need:

analyse, flows, relatively, transfer, finalised, contaminants

1. Pipes ..... hot water from the boiler to every part of the building.
2. In an air conditioning system, the cool air ..... from the supply air line to the conditioned space.
3. When everything is ....., we must prepare our presentation and report to our sponsors.
4. We need to ..... the problem before we can solve it .
5. There are many ..... in the atmosphere.

Part Three: Language

A. Fill in the blank with the correct form of the verb between brackets (10 Marks)

1. I .....work early yesterday. (Leave)
2. Bill called you while you .....(take) a nap.
3. After Mary ..... (hear) the news, she became very upset.
4. Cats ..... very independent animals. (be)
5. Listen! Someone ..... (knock) at the door. Go and see who it is.

B. Choose the right structure of the word to fill in each blank space: (20 Marks)

1. Do you know..... Sami gave Ahmed a present? (why, whom, what)
2. Alloys are ..... prepared by mixing molten metals.

   (general, generally, generalised)
3. One acre seems to be very different from 4047 m^2 at first glance.

   ....., both figures denote the same area. (Although, However, Whereas)

4. Hardening ..... to make metals harder. (are used, is used, has used)
5. Sami turned on the air conditioning ..... it was a hot day.
   (because , despite, on the other hand) .
6. Care ..... when using conversion charts.
   (should take , should be taken , should be taking)
7. Do you know..... Mr. Rami goes to work? Yes, He takes a bus
   (who, how, when)
8. So far rescue teams..... in reaching the miners.
   (were not succeeding, have not succeeded, are not succeeding)
9. A fan is installed ..... excessive air pressure can be avoided.
   (in order to , because of, so that)
10. If Ali ..... hard, he will pass the examination. (study, studies, studied)

Part Four: Writing (30 marks)

Write a composition of about 150 words on one of the following:

A. Good health is the responsibility of the individual. Write your views on this statement.
B. You may be a member of a sports club team. Write about what you see as the value of team spirit.
C. Of all the issues you talk about with your friends, discuss the issue you feel most strongly about.

APPENDIX 6

CONTENT ANALYSIS OF GENERAL ENGLISH CURRICULUM

LISTENING	SPEAKING
1. Approaching the text with expectancies based upon students' knowledge of the subject. 2. Gaining an overall idea of the text. 3. Extracting specifically required information. 4. Distinguishing the main idea from supporting details. 5. Extracting the communicative value of the text. 6. Demonstrating an awareness of the speaker's choice of words and phrases. 7. Deducing the meaning of unfamiliar lexical items from context. 8. Reacting to the text expressing views.	1. Describing places using appropriate language. 2. Asking for and giving personal information. 3. Expressing likes and dislikes. 4. Acting out different roles in life-like situations. 5. Describing graphs/charts/etc. 6. Reporting events. 7. Expressing personal views. 8. Making comparisons giving Appropriate justifications. 9. Describing results of a research/ A questionnaire, etc.
READING	**WRITING**
1. Approaching the text with expectancies based upon students' knowledge of the subject. 2. Skimming the text to obtain the gist. 3. Locating specifically required information. 4. Extracting the communicative value of the text. 5. Demonstrating an awareness of the writer's choice of particular work 6. Recognising the use of structural and grammatical elements. 7. Distinguishing the main idea from supporting details. 8. Reacting to the text expressing views. 9. Going beyond the immediate text through making inferences. 10. Extracting salient points to summarise the whole text. 11. Deducing the meaning of unfamiliar lexical items from context. 12. Grasping feelings, opinions and attitudes implied in the text through making inferences.	1. Writing formal/informal letters. 2. Describing places, characters, processes, etc. 3. Writing short stories. 4. Narrating imaginary events. 5. Writing short biographies. 6. Writing magazine articles about topics of general interest. 7. Writing a report to describe the results of a study, etc. 8. Writing headlines. 9. Writing short essays to describe personal experiences. 10. Making posters. 11. Producing an essay to argue different points of view.

FUNCTIONS AND STRUCTURES

1. Describing present states using simple present.
2. Describing past states and events using simple past.
3. Expressing likes/dislikes/preferences using simple present.
4. Focusing on the object of the verb rather than the subject using the passive form of the verb.
5. Expressing proportion using all, most, many, half, some, a few, and none.
6. Making comparisons using more/less.
7. Expressing present abilities using "can".
8. Expressing specific past actions involving ability by using "was able to", "were able to", etc.
9. Expressing future ability using "will be able to".
10. Expressing possibility in the future using "could".
11. Expressing unlikely future using "conditional type 2".
12. Giving advice by using "conditional type 1".
13. Expressing necessity by using "must".
14. Giving advice by using "should".
15. Talking about experiences in our life/events which started in the past but are connected to the present using present perfect.
16. Expressing news using appropriate verbs.
17. Expressing purpose using infinitive clauses of purpose.
18. Stating rules by using "should".
19. Expressing future arrangements using "will".
20. Introducing a contrast using "but".
21. Adding extra information of a different type using "and".
22. Emphasising addition rather than contrast using "not only... but also".
23. Talking about deductions using must/may/might.
24. Talking about deduction in a negative sentence using "can't".
25. Talking about an idea in particular using the definite article "the".
26. Expressing frequency using frequency adverbs.
27. Expressing relief or regret using conditional- type 3.
28. Narrating past events using past continuos/simple past.
29. Talking about previous events using past perfect.
30. Joining sentences by using the present participle.
31. Joining sentences which contain related information by using relative pronouns.
32. Talking about future events by using "plan to", "to be + going + infinitive", "present continuous + a time adverb to be + infinitive".
33. Talking about immediate plans by using the past form of "be going + infinitive".
34. Talking about changed plans by using the past form of "be going + infinitive".

APPENDIX 7

Scope and Sequence of Themes, Structures and Functions 0f General English One

Unit	Theme	Value	Structures	Functions
1	Historical sites	National heritage	Simple present; Simple past (active And passive)	Talking about Present and past states
2	Communication	Awareness of Cultural Differences	Simple present; Reported speech; Imperatives; Reference words: Pronouns	Describing habits; Giving advice; Describing cause and Effect; Expressing likes, Dislikes, feelings and Attitudes; Summarising
3	Education	Understanding The world Around Us	Simple present; Definite article; Determiners: all, some, none,	Expressing universal Truths; comparing; Expressing proportion
4	Employment	Useful work	Would prefer/rather both, neither More/ less	Expressing preferences; Comparing
5	Women's Employment	Equality of the Sexes in job Opportunities	Simple present;	
6	Poetry Appreciation	Pride in national Talents and Appreciation of Their work	Revision	Revision
7	Technology	Wise use of Technology	Past passive; Modals: Can, could, was able, Will be able	Expressing past and present ability; describing probable future
8	Science	Scientific Discoveries Should Serve Humanity	Too/not enough; modal auxiliary; Passive forms;	Dealing with quantity; Describing unlikely Future; Expressing Attitude to quantity
9	Trade and Industry	Consumer's rights Must be protected	Conditional: type 1 with imperatives; Type 2 if I were you.	Talking about laws and Obligations; Complaint; Giving advice
10	Biography	Seeking Knowledge	Simple past; passive Past	Describing life events
11	Sports	Success needs Hard Work	Present perfect with Ever, never, already	Describing experiences; Present effect; Recent and anticipated Events
12	Great men	History is made By Great Leaders	Revision	Revision
13	Mass media, The press	Dealing with the Mass media require Well-educated Citizens	Simple present; Present perfect; Simple past, Non-finite structures	Explaining purpose; Talking about Unfulfilled Arrangements; Reporting recent event
14	Counting and Numbers-Mathematical Code	Search for Knowledge is the gateway to civilised societies	Simple present ; Countable and Uncountable nouns; Non-defining relative Clauses	Adding information; Expressing Mathematical operations Counting

15	Advertisements	Information should be critically assessed	Adjectival order; Defining relative Clauses	Identifying nationality; Modifying subjects; Describing objects in Detail; Identifying Text organisation
16	Competitions	Appreciation of World literature	Revision of past tenses; Modal auxiliaries: Should, can will; Modal past: should have done	Narrating and describing past events; Talking about rules
17	Ecology	Preservation of natural Resources	Conjunctions	Talking about processes Listing and adding
18	Social development	Commitment to the welfare of the society	Revision	Revision
19	States and countries	Patriotism	Modal auxiliaries; Introductory verbs	Making and rejecting Deductions; giving Opinions
20	Democratic Government	The importance of Democracy	Simple past (active And passive); Articles	Describing systems; Narrating
21	Danger and risk	Accepting physical Challenge and Valuing Perseverance	Conditionals type 3; Simple past vs. past Continuos and past Perfect	Expressing relief; Expressing regret; Narrating
22	The UN	The value of co-operation	Participle clauses; Co-ordinating and Subordinating clauses; Relative pronouns	Describing Organisations; Adding Related information; Describing graphs and Charts
23	Memories, Feelings and Plans	Appreciating the Value of communities	'Going to' future present continuos	Talking about future events; talking about remembered past unfulfilled actions
24	Family health	Physical fitness	Revision	Revision

APPENDIX 8

Scope and Sequence of Themes, Structures and Functions of General English Two

Unit	Theme	Value	Structures	Functions
1	Development of mind and body	Effort and Determination bring Rewards	Revision of verb Forms: passives	Asking for and giving Personal information; Compare and contrast
2	Biography	Dignity and public service by people in high places	Wh-questions; Time Adverbial	Expressing wishes and preferences
3	Written Communication	Importance of written Communication in Modern life	Progressive Tenses	Writing formal and Informal letters; Making polite requests
4	People's Appearance, Character and Behaviour	People should be Judged by their character and behaviour not by their appearance	Phrasal/ Prepositional Verbs; Adjectives	Describing character, Appearance and behaviour
5	Health/ mental	Mental health is as Important as Physical health	Complex noun Phrases	Giving advice, Suggesting, persuading
6	Heroes, people Admired for Their courage	Heroes are admired And respected	Revision	Revision
7	Environmental Problems	The importance of Planting trees	Clauses of reason, Result, condition and concession	Talking about cause And effect
8	Health/ general	Good health is Important to individuals and Nations	Revision of Perfect Tenses	Describing trends; Writing a factual report
9	Newspapers	The importance of reporting events accurately	Reported speech (Revision); passive voice; phrasal verbs	Reporting events
10	Story telling	The value of keeping an open mind when considering evidence	Revision of past Tenses and time Relations	Telling a story; Expressing probability
11	Key moments In History	National independence	Reported Speech 2	Describing a historical Event
12	International Communication	Will and determination To achieve success	Revision	Revision
13	Natural adventures	Travel bring adventure, But problems are Solved at home	Joining sentences; Relative clauses (revision); collective nouns	Describing places; Explanations
14	The future	Enjoy God's gifts in Nature, but in Moderation	Expressing future Time; reference Markers	Talking about future
15	Sport	Importance of physical Exercise and sport	Articles (revision); Phrasal/ prepositional Verbs (2); Superlative Adjectives	Comparing

16	Literary genres	Education through Reading	Sentence types; Narrative tenses	Telling a story; Expressing likes, Dislikes
17	New technology	Progress by Technology	Nouns used as Adjectives; Participles used As adjectives; passives (revision)	Describing processes
18	Living abroad	Love of one's home	Revision	Revision
19	Customs and Traditions	We are all equal before God	Participle clauses	Explaining customs; Retelling information
20	Communication	Value of Knowledge and understanding	Verbs + infinitive Or Gerund (-ing Form); Articles (2)	Expressing opinions
21	Scientific Investigation	Objectivity and accuracy in science	Quantifiers (few/ A few Little/a little; finite Nominal clauses	Describing/ expressing Quantity; reporting scientific facts; making generalisations
22	The future of Planet Earth	Building Jordan's Economy	Articles (3); Conditionals (types 1 & 2) adverbials; modals	Speculating and Predicting
23	Tourism	There is no place like one's country	Sentence and Paragraph Connectors	Expressing opinions; Agreeing and disagreeing
24	Examinations	Hard work brings Good results	Revision	Revision

APPENDIX 9

COMPONENTS OF THE TWO TRIAL UNITS

TEACHERS' BOOKLET

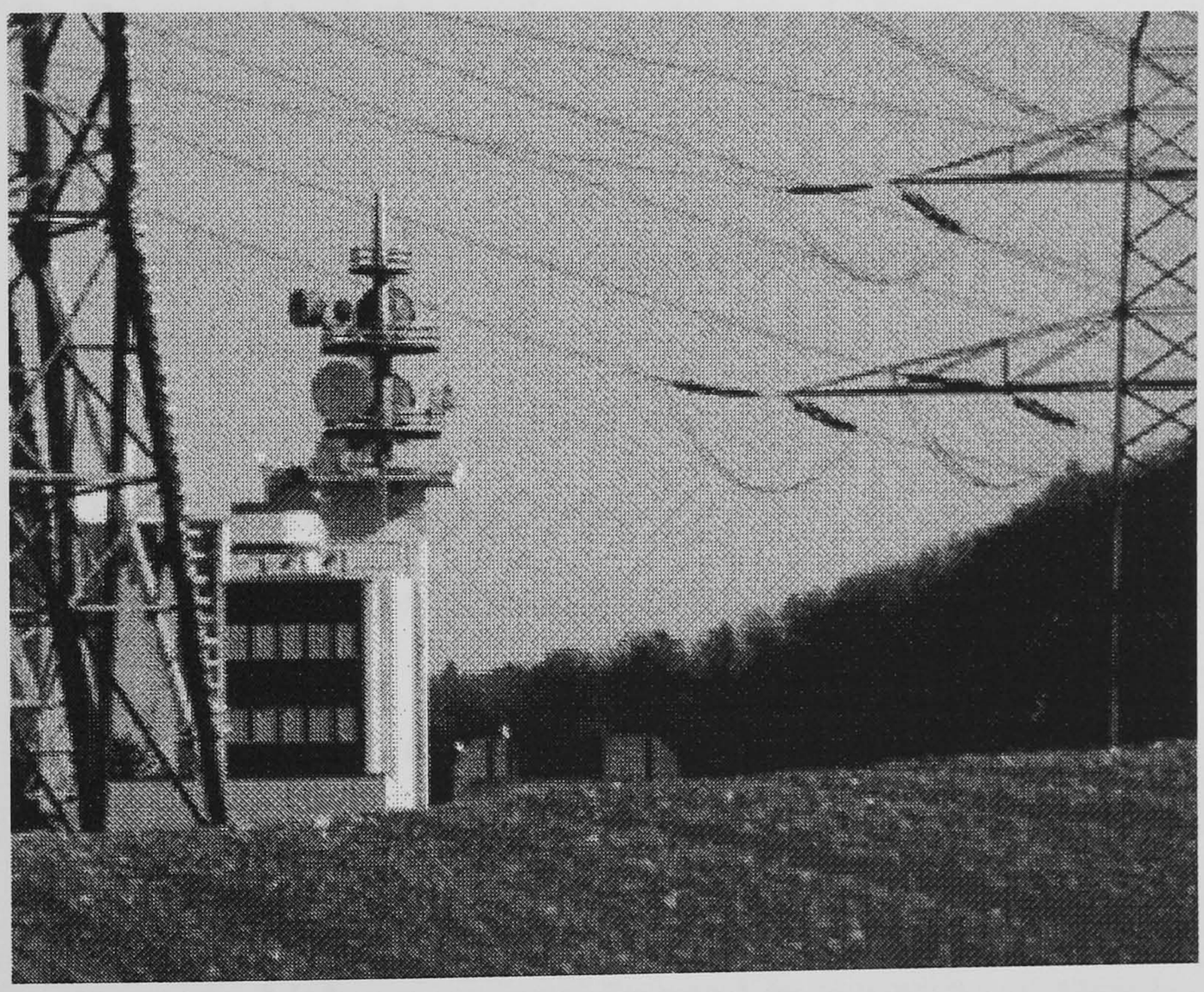
STUDENTS'BOOKLET

WORKBBOKLET

TEACHER'S BOOKLET

A Communicative English Progamme

For the Specific Purposes of Science Students in the Secondary Stage of Education in Jordan





Trial, 1998

INTRODUCTION

This is a guide for the teacher providing him/her with a brief of the programme and suggested procedures and techniques for teaching; more precisely it presents the following aspects:

1) Statement of the behavioural objectives the students are expected to attain at the end of the programme.
2) Description of the content of each unit defining the lessons, themes, topics, and activities of each lesson.
3) Recommended methods and techniques of teaching and learning.
4) Proposed techniques for assessment and sample tests.

The two units have three purposes. They are intended to:

1) Introduce first year students of the scientific secondary stream at public schools to scientific subjects (electricity and telecommunications).
2) Provide examples of authentic texts written in the typical language of the subjects
3) Practise the language skills first year students of the scientific secondary stream at public schools will need in order to study the subjects via English.

The texts are extracted from various publications about the subject. They are not simplified for learners of English: the language they will encounter in them is exactly what they will meet in real life. There are a number of words, expressions, and structures which are commonly used in scientific contexts.

The most important aim of both units, however, is to help students acquire and develop the skills they will need for learning the subject and, when they have finished the units, to use what they will have learned.

AIMS, OBJECTIVES, CONTENTS, COMPONENTS, TEACHING METHODS AND ASSESSMENT

Aims

This programme should:

1. Develop the abilities of the scientific stream students of the secondary stage to communicate in English in scientific situations.
2. Provide them with English scientific terms and concepts relevant to their needs.
3. Raise their interest in learning English for scientific purposes.
4. Improve their performance in Scientific English.

PROGRAMME DESIGN

The course is designed around a selection of themes and areas of interest, chosen for their usefulness and relevance to the university education and future careers.

Contents

Themes

The course consists of two units. Each unit is divided into four lessons. Two thematic areas are presented in two units: Unit 1 'Electricity' and Unit 2 'Telecommunications'.

Topics

1. The Atom.
2. Electrical charges.
3. Saying electricity.
4. Static electricity.
5. Telecommunications.
6. Communications Satellite.

Language skills

All the skills of Listening, Speaking, Reading and Writing are presented and organised integratively.

SPECIFIC OBJECTIVES AND ORGANISATION OF THE UNIT

The explicit objectives of this programme are stated in behavioural terms taking into account the logical sequence of the topics, concepts and activities from simple to difficult and to demanding. The individual differences among the learners and the learning styles were considered as well. These objectives are organised according to the sequential procedures of the unit. Thus, at the end of this programme, the students are expected to be able to perform the following objectives:

Lesson 1: Focus on reading (90 minutes)

1. Before You Read

1) Identify the gist of the topic and the related vocabulary.
2) Make predictions about the reading text.
3) Scan the text and locate specific information.

2. New Vocabulary

1) Pronounce correctly the new vocabulary items
2) Define the meaning of each item.
3) Expand the items into the antonyms, synonyms and homonyms.
4) Generate new vocabulary from the kwon items.
5) Understand the vocabulary in scientific contexts.
6) Use these items in self-generated scientific contexts.

3. While You Read

1) Use the text in a communicative context.
2) Skim the text to identify the required information.

4. After you read

1) Comprehend the events, causes and the relationships between them.
2) Summarise the text.
3) Apply what they have learnt into new situations.

5. Try This

1) Relate the topic/theme to their personal experiences.
2) Transfer the learnt structures and vocabulary to talk about their experiences.
3) Express their personal opinions on selected contemporary scientific issues.

Lesson 2: Focus on language (90 minutes)

1. Grammar

1) Express themselves in different language forms.
2) Use the new structures appropriately.

2. Listening

1) Comprehend spoken native English in different scientific contexts.
2) Identify the major idea in the listening text.
3) Understand the description of process and illustrations.

3. Speaking

1) Practice oral communication in the classroom.
2) Participate in scientific dialogue and discussions.
3) Explain a scientific context.
4) Describe scientific process and operations.

Lesson 3: Focus on writing (45 minutes)

The objectives of this lesson is to make the students able to:

1. Write a well-organised cohesive essay (150-200 words) about scientific topics of their choice.
2. Write about a process.
3. Produce a term paper about a simple scientific research.
4. Transform scientific texts into diagrams, tables, graphs, etc.
5. Exchange each other's drafts to comment and discuss.

This lesson is divided into four stages, and at each stage, the teachers are advised to:

1. Before You Write

1) Focus students' attention on the topic.
2) Provide students with a model for the piece of writing they are going to produce.

2. Gathering Information

1) Provide students with the scientific information and some of the language they will need to complete the writing task.
2) Teach students some of the sub-skills of writing as a process.
3) Help students focus on the text organisation and coherence.

3. Drafting/Editing

1) **Drafting**: to encourage students to approach drafting as a process of communicating ideas
2) **Editing**: to view the draft as the final presentation of a text for public audience and to enable students to comment on and improve each other's drafts

Key Themes

Both units in the Student's booklet end with some Key themes related to the language functions performed in various scientific contexts. These themes may be derived from the contents of the units. The themes are deemed to be fundamental, e.g. seeking of knowledge, the virtue of science, applying science into real life situations.

SUGGESTED TEACHING PROCEDURES

Teaching Reading

1. Before You Read

The aim here is to prepare the students to understand the new text and to arouse their interest in it. The procedure is as follows:

1) Ask the students to predict the theme or topic by reading the title of the unit and by considering the vocabulary listed in the summary.
2) Ask the students to discuss their predictions, guesses or expectations about the content of the text, working in-groups or pairs. Give them time to write their predictions down.
3) Elicit their predictions and guesses, and ask them to explain their answers.
4) Engage the students in a general discussion about the theme/topic by activating their knowledge of the environment around them.

2. While You Read

The aim here is to give the students a reason or purpose for reading by getting the students to skim or scan the text, i.e. to get the gist or general meaning, and to look for some specific facts or information. The procedure is as follows:

1) Let one of the students read the exercise instruction aloud. Make sure the students understand what they are required to do.
2) Tell the students to scan the text silently; to read it rapidly to find the answers to the questions.

3) Elicit answers. Ask the students to point out the part of the text where they found the answers. Give feedback.
4) In-groups, the students compare their earlier predictions and guesses with what the text is all about. Don't discourage them if their predictions were wrong. Tell them that they will eventually learn how to make intelligent guesses by reading the clues correctly.

3. After You Read

The aim of this task is to lead the students to understand the text thoroughly and to build up their vocabulary skills. The students should be able to:

1) Read the text silently again, or listen to the teacher while reading it.
2) Pronounce the new vocabulary as listed in the Summary. (See Teaching Vocabulary).
3) Recognise the meaning and usage of these vocabularies.
4) Extracting the main ideas and distinguishing the supporting sentences.
5) Identify the use of linking devices and discourse markers, e.g. pronouns and their referents, and cohesive devices ('in addition', 'on the other hand', 'therefore', 'but', 'however', 'although'), etc.
6) Do the exercises in the Workbooklet.
7) Discuss their wok in pairs or groups after doing one or two examples and complete the rest of the exercise as homework.

4. Try This

The aim of this task is to relate the content of the reading text to the students' personal views and experiences to enable them to:

1) Summarise the ideas of the text.
2) Comment on relevance and implications of theses ideas for themselves, their family and their community.
3) Use the new language exponents and scientific terms.

Teaching Vocabulary

Students need to develop the vocabulary they have learned. The students' attention should be drawn to the fact that they can guess the meaning through the use of effective strategies. The following techniques should be used to build up the students' vocabulary attack skills and strategies:

1. Guide the students to use all types of clues found in the text in order to guess the meaning of a new lexical item. These are:
   1) Contextual clues, making use of the meaning of the words and sentences that come before or after.
   2) Word forms: noun, verb, adjective etc.
   3) Syntactical functions, e.g. subject, object, structural word, etc.
2. Encourage the students to look up the spelling, meaning and pronunciation of new words in the dictionary.
3. Use visual aids, realia, acting or illustration to explain a new lexical item.
4. Encourage the students to think of antonym e.g. hot/cold, a synonym e.g. clever/smart, or semantic sets e.g. physics/ chemistry/biology to explain further the key word or phrase.
5. Where appropriate, ask the students to think of an Arabic equivalent of the English word or phrase. Use this technique sparingly. Make the students aware of the subtle differences that may exist in meaning, connotation or usage between the two languages.
6. Ask the students to write the new words/phrases and their meaning in their notebook in order to study them carefully at home.
7. Recycle new vocabulary at short intervals.

Teaching Grammar and Functions

Knowledge of grammar is an important component of linguistic competence to perform meaningful communication. Teacher should analyse every structure or function and break it down into its components and demonstrate how they can be put back and fit together in meaningful context. Thus, students at this stage have already been exposed to grammatical structures and are aware of the system of English.

Introducing Grammar Target

The teacher should focus on the Grammar Target box in the Student's Booklet and read it with the students or get one or more students to read it aloud, or when appropriate let the students read it silently. Then, the students should:

1. Infer the rules governing the structure without looking at the Grammar Target box.
2. Compare their answer with the Grammar Target box.
3. Use the structures in functional contexts.

Doing the Grammar exercises

1. Teacher should set the exercises in the Student's Booklet and Workbooklet, in order to reinforce and consolidate previous learning, then s/he explains the task or exercise and does the first item of each exercise as an example. The students should then complete it in class or at home.
2. Teacher should elicit the answers, correct the homework assignment, and give descriptive feedback. Make a note of the students' performance and, if there is need for remedial work.
3. Teacher should help students communicate by providing them with activities which require them to focus their attention on what they want to say or write (fluency of the message), rather than how they are going to do it (accuracy).

Listening

Listening comprehension exercises are intended to develop the skills of understanding spoken English in scientific situations. An audio-taped texts were recorded by a native speaker of English and provided to every teacher, so that the s/he should:

1. Prepare for the lesson by listening to the audio recording and reading the tape script at the same time, then set the cassette counter at 000 at the beginning of the exercise.
2. Introduce the topic of the recording by asking the students what they know about the topic, what they don't know but would like to know, and what they expect to hear.
3. Set one or two pre-questions orally and ask the students to find the answers to the questions while they listen.
4. Play the first recording, then ask the students if their expectations were realised and elicit the answers to the pre-questions.
5. Explain the listening task.
6. Play the second recording pausing at appropriate moments for the students to complete the exercise.
7. Rewind and play the recording a third time for confirmation.
8. Give feedback on the students' answers.

Speaking

Discussion is a valuable technique as it allows students to experiment with language and to learn to use whatever resources they have to communicate meaning and develop their oral fluency. Teacher should involve the students in discussion, e.g. in the

tasks of **'Before you read', 'Try This', 'Before You Write'** and **'Keg Value'** in each unit where there are specific speaking or discussion exercises. Teachers are advised to:

1. Explain the activity to the students by reading the exercise instructions with them and going through the examples.
2. Ask the students to work in pairs or groups. When organising pairs or groups for speaking activities, mix the advanced students with the weaker ones and try to give the advanced/more able students a major role in the activity while you provide support for the less able ones.
3. Go round the class helping with individual difficulties as the students carry out the activity.
4. Correct the students' use of English only when the error is serious enough to cause a breakdown in communication. Make a note of widely- occurring errors and provide time later for correction.

Teaching Writing Skills

Both units focus on the writing skill, because it is undoubtedly a very complex skill that deserves to be given full attention. It requires the students to bring all their linguistic skills into play. Hence, teachers are advised to:

Before You Write

1. Tell the class what they are going to write about a topic in general terms, whom they are going to write to and why, i.e. the function or theme for writing. Elicit what they know about the topic.
2. Read a model of good writing with the students and ask the students: What is the theme of the text? How it is organised and how ideas are developed?

Gathering Information

1. Provide the students with some charts, notes or ideas relevant to the topic to make use of.
2. Lead the students to think how they are going to make use of the provided information. Ask 'How are you going to organise the ideas? What tense or vocabulary item do you need?'
3. Guide the students to put their lists/ideas in logical order.
4. Ask the students to make a chart of a plan on the chalkboard.
5. Ask the students to think of an introductory sentence and a final sentence.

Drafting

1. Help the students to draft the article/passage/letter, etc, individually or in pairs or groups.
2. Allow the students sufficient time to write and give help and encouragement whenever needed.

Editing

1. Tell the students to exchange their drafts with their partners in the group.
2. Tell them to read each other's draft and comment on it. Ask 'Which is better: yours or your partner's? Why?'
3. Tell the students to discuss each other's mistakes and suggest corrections.
4. The students get back their articles and correct their mistakes (as a homework assignment if necessary).
5. Check the students' final versions and give feedback.
6. To encourage competition, display copies of the best pieces of work on the classroom notice board, or get the students to choose one or two pieces for display.

Project Work

It is a very creative and extensive work, topic-based, visual as well as verbal, open-ended etc. The essence of the project is that it is the student who does the work. Students make most decisions about content and layout. It is considered an important ' aspect of communicative methodology.

1. Suggested Projects to do

Here are some suggested projects that teachers might assign to students:

1) Make a field trip to a nearby electric station or satellite station and report what they have learnt. (To be done by the students at the end of unit 1).
2) Set up a model of a broadcasting station in your classroom. Use what students know about such stations. (To be done by the students' at the end of unit 2).

It is proposed that teachers should:

1. Provide the students with the basic materials needed for the project.
2. Choose projects that suit the language level of students, and encourage them to use reference books and/or encyclopaedia that can be useful.
3. Start with a small concrete task, then move gradually as students guidance during the early stages.

4. Give the students a clear model of what they should do, what they are going to do and how to do it gradually.
5. As project work takes much time, train the students to do this kind of tasks depending on themselves.

Correcting the Project Work

It should be pointed out that language is only part of the whole project. Creativity and content are also important. Another fact to remember is that project work shouldn't be spoiled since it is motivating. Teachers should not correct the last product. Instead they can correct the last draft by using a pencil giving the corrections on a separate sheet. Some teachers may decide to correct the photocopy that is also acceptable.

ASSESSMENT

Evaluation of educational programmes is a two-sided process. It should assess the students' progress as well as the teaching effectiveness. Students' progress is assessed in terms of their achievement of the behavioural objectives of the evaluated programme. Teaching effectiveness may be measured in terms of students' progress and interaction among the learners and between the learners and their teacher inside the classroom. That is to say, testing students' achievement is not only an end, but it is also a means to assess the teaching and learning process to improve the educational programme.

Normally, tests are the effective technique to assess students' achievement. Determination of the type of test to use is related to the objective of the test, content of the material to be tested, students' abilities and background.

In English language testing, the test constructor takes the all the four language skills into his focus on the test items. But in Jordan, the situation could be different from the ideal situation for testing the EFL learners. At school level, the teacher devises and administers all the school tests for his students. The teacher usually has 4-5 sections of about 150-170 students a year. The teachers have to assess their students' achievement on all the language skills. But, it may be difficult for them to test the oral skills of a large number of students in the time due to administer the school tests. The teacher may be advised to keep a descriptive record of her/his observations of the students' progress

on the oral skills. Meanwhile, testing the other skills and sub-skills of reading, writing, language and vocabulary is probably manageable and normal task to the teacher.

Achievement tests are of various types, such as multiple-choice, matching, completion, reordering scrambled sentences, yes/no and/or short answers, and essay types of tests. Out of his experience in training education supervisors of English as well as the teachers, the researcher state that most of Jordanian teachers are familiar in such tests and many of them have received training on how to construct items for these tests.

However, the researcher suggests two sample tests for the two trial units so that the teacher may make use of them.

Implications for Students

The students should realise the importance of applying what they learn into real life situations, and the relevance of their knowledge to the development of their community. Therefore, teachers should:

1. Create a classroom atmosphere of openness, tolerance, honesty, mutual respect and co-operativeness.
2. Encourage the students to think of a theme that can be derived from the reading text in the Student's Booklet, and elicit some answers and accept any reasonable views.
3. Organise the students in pairs to write down their 'guess' of the key themes of the unit.
4. Let the students read aloud the key themes at the end of the unit in the Student's booklet and compare them with their own 'guesses'.
5. Encourage the students to express their personal views, whether they agree or disagree with the themes of the topic and its applicability and why.

KEY ANSWERS

UNIT ONE: ELECTRIC1TY

Lesson One: Focus on Reading

Before You Read

SB lesson 1

1. Students should be able to state that the balloon sticks to the wall because rubbing has charged it. If the air is dry, these charges will leak away slowly and the balloon will adhere to the wall for a few minutes, or longer.
2. Ask students to relate their own experiences of 'electric shocks' Explain that such 'Shocks' are caused by the build up of electric charge. Then explain and describe positive and negative electric charges.

While You Read

SB lesson 1

Protons, neutrons and electrons

After You Read

SB lesson 1

1. An atom is normally neutral because it has the same number of negative and positive charges
2. An object becomes negatively charged when its atoms gain electrons. An object becomes positively charged when its atoms lose electrons.
3. Electric charge that collects on an object but does flow is called static electricity.
4. Answers will vary, Any metal is a good conductor.
5. An electrical insulator does not conduct charge. Answers will vary. For example, glass, plastic, dry air and rubber are insulators.

Try This

Students should observe that the uncharged comb has , no effect on the paper. When the comb is charged. it will attract the tiny pieces of paper by inducing charge on them. Students will need to analyse the nature of a problem and then formulate possible solutions. Here are some solutions.

1. Use the washer and dryer only when you have enough clothes for a full load.
2. Dry clothes on a clothesline whenever possible.

3. Wear wash-and-wear clothing that does not requite ironing.
4. Turn off heating elements, or the oven, several minutes before the food is thoroughly cooked.
5. Do not open the oven to cheek on food while being cooked.
6. A freezer that is full of food is more efficient than a half-empty one.
7. Frostless models need more energy to operate.

WB lesson 1

Exercises a

1- Conductors 2- Electrons 3- Insulators
4- Neutrons 5- Nucleus 6- Protons 7- Static electricity

Exercises b

1- T 2- F 3- T 4- T 5- F 6- F

Exercise c

1- insulator 2- static electricity 3- induction
4- conductor 5- negative charge.

Lesson Two: Focus on language

WB lesson 1

Exercises a

1. Care should be taken when dealing with electricity.
2. Pure metals are rarely found in nature.
3. Energy of motion is changed into electrical energy by a generator.
4. The tallest objects are often struck by lightening.
5. A balloon with a negative charge is used to find out the charge on another balloon.

Tape script

Listening Passage

Benjamin Franklin, well known for his early studies of electricity called the two types of charge positive and negative. Two positively charged objects repel each other. Two objects that are negatively charged also repel each other. But suppose one object is positively charged and the other is negatively charged. Then the objects attract each other. The important thing to remember is that like charges repel each other and unlike charges attract.

Exercises 'a'

Attraction or Repulsion:

a- attract b- repel d. repel c. attract.

Exercises 'b'

There are two types of charge: positive and negative.

KEY ANSWERS

UNIT TWO: TELECOMMUNICATIONS

Lesson 1: Focus on reading

Before you read

SB lesson 1, Exercise 'a'

Questions 1, 2, 3

Answers: All appropriate and relevant answers should be accepted.

While you read

SB lesson 1, Exercise 'b'

1. Telephone, data broadcasting and telex services.
2. INTELSAT.
3. Middle East Satellite Corporation.

After you read

SB lesson 1, Exercise 'c'

1. is not really stationary at all, but orbits the Earth 'within a 24hour period .
2. was formed when nine world communications agencies signed an agreement in 1964.
3. require a smaller coverage area than INTELSAT satellites.

Try This

Many effective science lessons can be taught outside the classroom and so teachers are advised to encourage students to go to the school library and help them do this task.

WB Lesson 1, Exercises 'a' –and 'b'

Exercise 'a'

1. False 2. False 3. True
4. False 5. False 6. True

Exercise 'b'

1. 'it' in line 1 refers to a communications satellite.
2. 'it' in line 2 refers to energy.
3. 'this' in line 3 refers to returning to Earth
4. 'do so' in line 4 refers to a satellite orbiting the Earth.
5. 'its' in line 5 of a satellite orbiting the Earth.

Exercise 'c'

1. appear : seem 2. expand: grow bigger. 3. prevent: stop.
4. inaugurate: begin with. 5. spot: particular place.

Exercise 'd'

1. share 2. provide. 3. serve. 4. represent.

Lesson 2: Focus on Language

WB Lesson 2, Exercise 'a'

1. however 2. therefore 3. although
4. since. 5. that is to say. 6. while
7. moreover

Listening

listening passage

Although the conceptual difference between a regional and a domestic satellite system is not great, the political difference is enormous! No international conferences are needed: there are no language barriers, no requirements to correlate different national technical standards (making the usual compromises). There is also no necessity to make allowances for the least developed entity in the group, and so on (students will gather from all this that the author speaks from long personal experience!). Moreover, in all the world's countries except one (the United States) there is just one satellite organisation, normally government- owned, so that even domestic friction is avoided. It should come as no surprise, therefore, that domestic satellite systems preceded regional ones by several years and, as might be expected, North America led the field.

WB lesson 2, Exercises 'a – c'

Exercise 'a'

- Differences between regional and domestic satellite systems.

Exercise 'h'

1. False 2. True

Exercise 'c'

The political difference is very large because of required conferences, language differences and different national technical standards.

Sample Test of Unit One

Name:..... School: .....

Time: 90 minutes Date: / /1998

Part One: Reading Comprehension (25 marks)
Read the following text carefully:

Early humans survived by hunting for meat and gathering seeds, berries and plant roots. They moved from place to place and the local environment recovered quickly from any damage they caused.

However, after the last ice age ended in North Africa and Europe about 10000 years ago people began to settle in villages increase in numbers and make more permanent changes to their surroundings. They cut down trees to make room for their crops and animals. On the North African coast the once-dense forests disappeared. The cleared land was over-used and became infertile and dusty. Winds swept the soil away and the land became part of the Sahara desert. Some seaports became so silted up that they had to be abandoned.

Today the effects of human activity are greater still. Our huge population demands ever-more land for farming, more raw materials for industry and more factories for goods to improve our standard of living. These demands cause environmental damage that will affect us all. For example, CFC gases used in aerosols, refrigeration systems and foamed plastics damage the ozone layer which protects us from harmful rays of the Sun. Even if all production of CFCs were stopped now the atmosphere could take 60 years to recover.

Damage to the ozone layer worries most people. Many shoppers refuse to buy products that contain CFCs. This is forcing manufacturers to develop safer chemicals and CFC-free aerosols.

Now answer the following questions:

1. Why did early humans have little long-term effect on the environment?
   .....

2. Why did the human population increase rapidly 10,000 years ago?

   .....

3. Give three reasons for the large-scale damage to the environment in modern times.
   .....

   .....

   .....

4. The underlined pronoun "They" refers to .....

5. The underlined word "abandoned" means .....

6. What actions could you take to persuade manufacturers to stop producing CFCs now? .....
   .....

Part Two: Vocabulary (15 marks)

Complete each of the following sentences by using the appropriate word from the list given below. There are more words than you need:

[analyse, flows, relatively, transfer, finalised, contaminants]

1. Pipes ..... hot water from the boiler to every part of the building.
2. In an air conditioning system, the cool air ..... from the supply air line to the conditioned space .
3. When everything is ....., we must prepare our presentation and report to our sponsors.
4. We need to ..... the problem before we can solve it .
5. There are many ..... in the atmosphere.

Part Three: Language

Fill in the blank with the correct form of the verb between brackets (35 marks)

1. I ..... (Leave)work early yesterday.
2. Bill called you while you .....(take) a nap.
3. After Mary ..... (hear) the news, she became very upset.
4. Cats ..... (be) very independent animals.
5. Listen! Someone .....(knock) at the door. Go and see who it is.

b. Choose the right word to fill in each blank space: (20 marks)

1. Do you know..... Sami gave Ahmed a present?

   (why, whom, what)

2. Alloys are ..... prepared by mixing molten metals.

   (general, generally, generalised)

3. One acre seems to be very different from 4047 m^2 at first glance.

   .....both figures denote the same area.

   (Although, However, Whereas)

4. Hardening ..... to make metals harder.

   (are used, is used, has used)

5. Sami turned on the air conditioning ..... it was a hot day.

   (because , despite, on the other hand) .

6. Care ..... when using conversion charts.

   (should take , should be taken , should be taking)

7. Do you know..... Mr. Rami goes to work?

   - Yes, He takes a bus
   - (who, how, when)

8. So far rescue teams..... in reaching the miners.

   (were not succeeding, have not succeeded, are not succeeding)

9. A fan is installed ..... excessive air pressure can be avoided.

   (in order to , because of, so that)

10. If Ali ..... hard, he will pass the examination.

    (study, studies, studied)

Part Four: Writing (25 marks)

Write a composition of about 150 words on one of the following:

1. Good health is the responsibility of the individual. Write your views on this statement.
2. You may be a member of a sports club team. Write about what you see as the value of team spirit.
2. Of all the issues you talk about with your friends, discuss the issue you feel most strongly about. Then write your views to this issue.

Sample Test of Unit Two

Name: ..... **School: .....**

Time: 90 minutes **Date: / / 1998**

Part One: Reading Comprehension **(30 Pints)**

Read the following text carefully:

If you telephone a friend on another country your message can go either by a cable under the sea or through a communications satellite in space. The journey by satellite is much longer than by cable, and the message has to be sent by radio waves. Even so, it takes less than half a second to travel out to the satellite and back down to your friend on Earth.

The satellites that relay these messages are 35800 km above the earth and move round in an orbit that takes exactly one day. Earth also rotates once in day, so the satellites stay above the earth in the same place. This means that from the Earth they seem to be stationary in the sky. Dish antennas can then easily be pointed at the satellites to send and receive messages.

The Intelsat ''geostationary'' satellite can handle 120 thousand telephone calls and three TV channels at the same time. It is a cylinder about the same size as a railway carriage, with solar panels wrapped around its sides. It weighed about 4.2 tones-the weight of a bus -when it was launched from French Guinea in October 1989, and was expected to work for about 13 years. It has fuel on board for thruster rockets to keep it pointing in the right direction. When this fuel runs out, control will be lost and the satellite will be of no further use.

Intelsat has a number of dish and antennas that receive signals from Earth, boost them and send them back. Some of them are fixed, and some can be pointed to different spots on the Earth's surface as required. The power to do all this is provided by solar panels and back-up batteries (2.2 k.watt.)

Now answer the following questions:

1. Next to the statement, write the word 'True' if the statement is true, and if it is false write the word 'False':
   a. The Earth rotates twice in a day.
   b. Intelsat VI F-2 can handle five T.V channels and 140 thousand telephone calls at the same time.
   c. Geostationary satellites seem to be stationary in the sky.

2. What is the function of dish antennas?

.....

.....

3. When will Intelsat VI F-2 be of no use? .....

4. Which word in the last paragraph means fastened?.....

5. The underlined pronoun 'it' in the first paragraph refers to.....

Part Two: Vocabulary (20 marks)

Complete each of the following sentences by using the appropriate word from the list below. There are more words than need.

Conductor, repel, neutral, charge, atoms, insulators

1. All matter is made up of tiny particles called ..... .
2. We call areas which are neither negatively nor positively charged ..... areas.
3. Materials that keep electrons from moving are called.
4. Unlike charges ..... each other.
5. Rubber is a relatively poor ..... of electricity .

Part Three: Language: (30 marks)

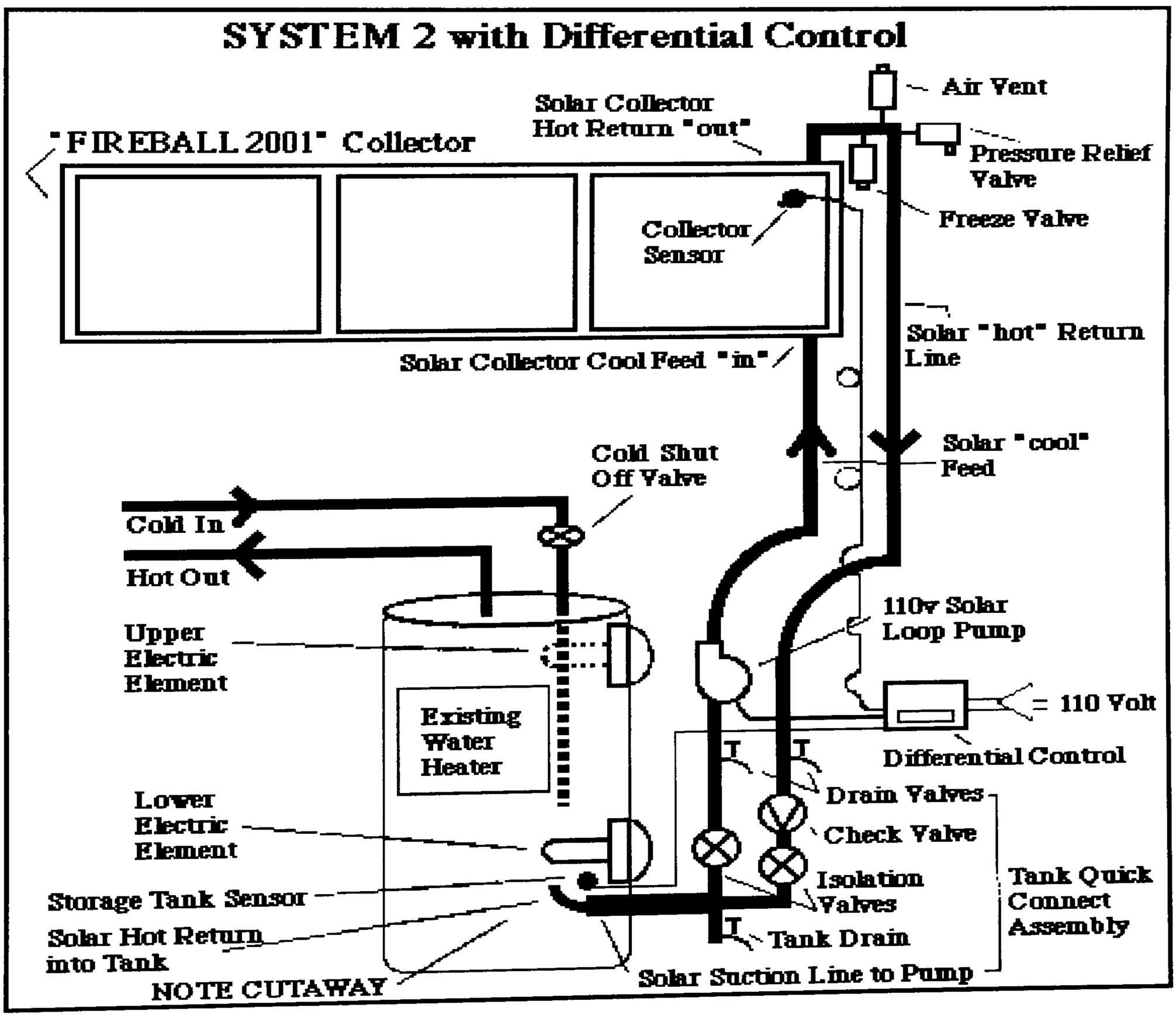
Fill in each blank space with the correct item form those in brackets:

1. The electric light ..... by Bell (have been invented, was invented, invented).
2. In 1964, a third generation of computers ..... to emerge (begin, began, begins).
6. Magnesium.....as a metal which burns brightly. (is known, knowing, knows).
7. Central heating system ..... desirable in cold climates. (have, is, are).
8. A thermometer is an instrument which.....temperature. (measure, measures, measuring)
9. Check valves ..... to limit flow to a single direction in a piping system (use, are used, have used).
10. Engineering systems .....contain one component (don't, doesn't, aren't).

Part Four: Writing (20 marks)

Look at the diagram below which a basic solar heating system. Then look at the notes below the diagram. Reorder and then rewrite these notes to produce a meaningful paragraph describing how the system works. Use the proper articles and linking words.

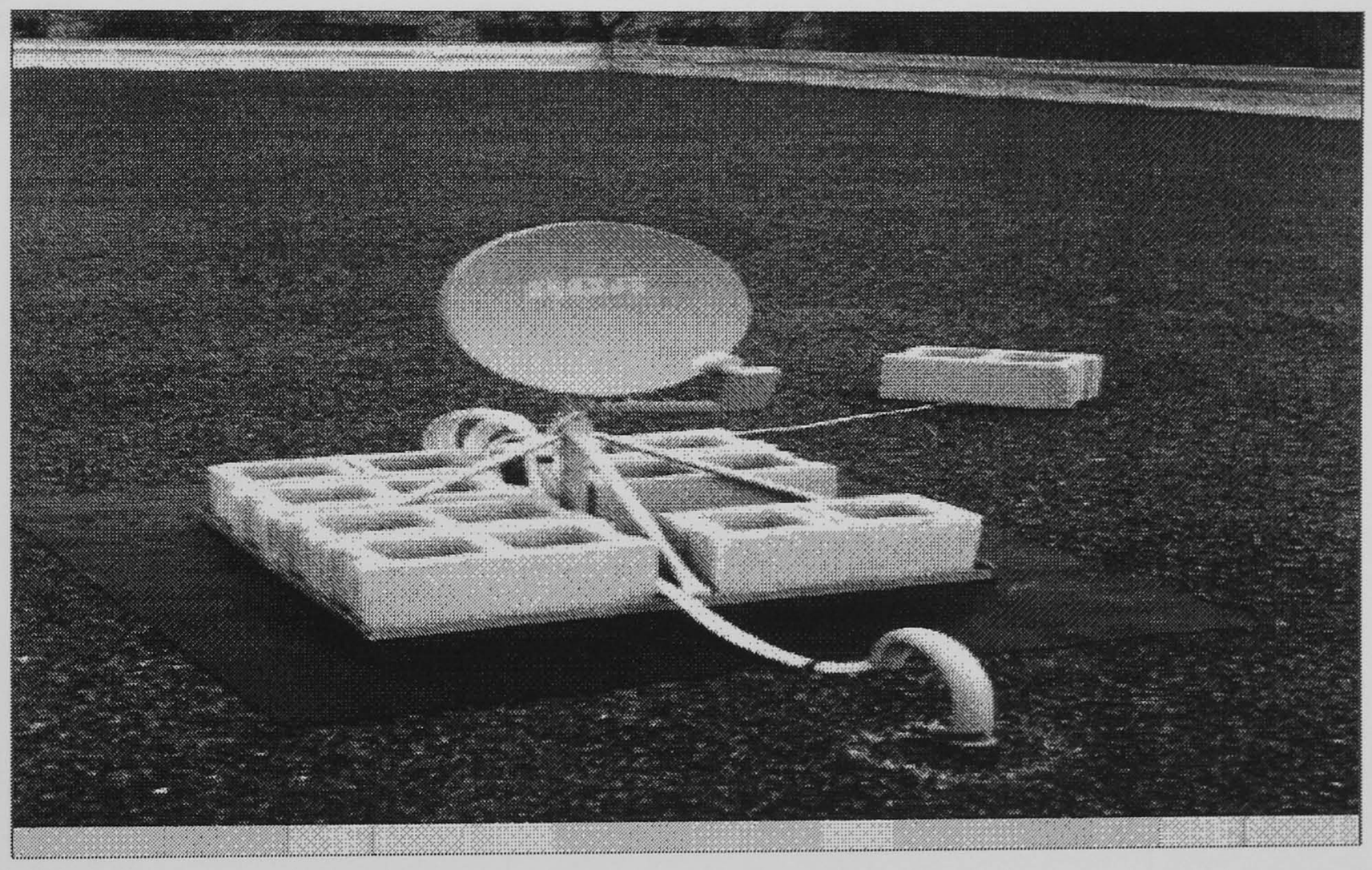
- A simple solar heating system is shown in this diagram.
- First, solar radiation /absorbed /solar collector.
- Liquid in collector/heated/sun's energy.
- Heated liquid/carried/thermal store.
- Thermal storage/required/energy / needed.
- When no radiation/available
- Often, storage tank/heating element/increase temperature.
- Hot liquid/pumped/area where/needed.
- In most building/heat/lost/roof so auxiliary heat/used.
- Cool liquid/returned to tank and then to solar collector/pumps.
- Engineers need to able to calculate the potential for a solar heating system and to be aware of the possibility of using solar energy installations.



STUDENT'S BOOKLET

A Communicative English Progamme

For the Specific Purposes of Science Students in the Secondary Stage of Education in Jordan



TRIAL 1998

Introduction

The units have been specially written for the first year students of the scientific secondary stream at public schools in Jordan. When joining a university, you will be studying science in English. This means you will read scientific materials in English, and listen to lectures and take notes in English as well. You will talk about scientific topics and write essays and reports in English.

One of the main aims of the units is to help you with these tasks. These units, then, are different from the units of the English course taught at public schools recently. The aim of the latter is to help you learn general English, while, in these units, you are learning English for a more limited purpose; i.e. learning English to help you study science in particular.

There is a special term for this kind of English. It is called English for Special Purposes. The specific purpose of these units is to enable you to acquire the language skills in English that will help you study science effectively.

Unit One

+ Electricity -

ummary of the Unit

Structures: Using present simple verbs (active and passive)
Function: Defining and illustrating scientific concepts/ principles

Vocabulary:
Nouns: atom, charge, conductor, excess, insulator, and particle
Verbs: conduct, gain, lose, and rub
Adjectives: electrical, neutral, static, tiny
ressions: electric shock, negative charge, positive charge,
Force of attraction

Lesson 1: Focus on Reading

1. **Before you read....**

a) Rub a balloon on your clothing. Then stick it to a wall or ceiling. How long does it stay attached? What holds it in a place?

b) Relate your own experience of "electric shocks" explaining how such shocks are caused.

Figure 1.3: Electrical Cables and telecommunications



2. **While you read...**

The following text gives you some information about the electrical nature of matter. As you read, look for the answer to the following question:

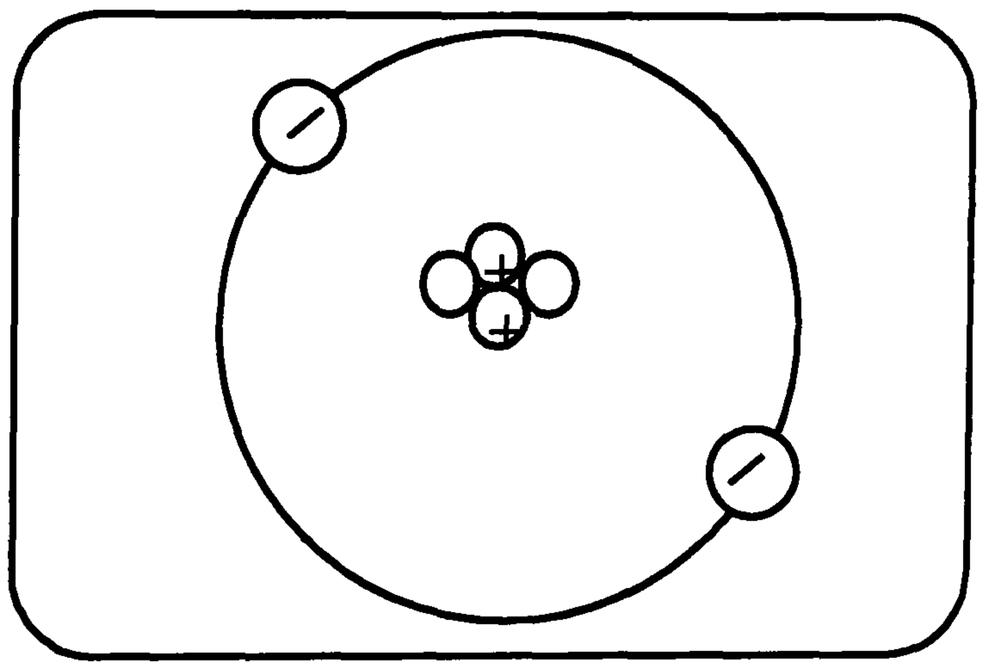
a) What are the three main particles that make up an atom?

The Electrical Nature of Matter

All matter is made up of tiny particles called atoms. Atoms are too small to be seen with the best microscopes available. Atoms are made up of even smaller particles. These particles are called protons, neutrons and electrons.

Protons and neutrons are found in the central core, or what scientists called nucleus, of an atom. Neutrons carry no charge. Thus, they are neutral. Protons carry a positive charge. The particles called electrons are in constant motion around the nucleus. Each electron carries a negative charge equal to the positive charge of a proton. The force of attraction between positive protons and negative electrons gives the atom its structure. A model of real atom is shown in Figure 1.1 in a, electrons are much farther from the nucleus than in the model.

Figure 1-1
A diagram of a model Helium atom. It has two neutrons in the nucleus two electrons outside. The + and – show the charges of the particles.



Different kinds of atoms have different numbers of protons, neutrons and electrons. Normally, whatever the number of particles is, an atom contains equal numbers of protons and electrons. The total positive charge keeps balance of the total negative charge so the atom is neutral.

Atoms can gain or lose electrons. For example, if you rub a glass rod with a piece of silk, the silk will gain electrons and become negatively charged. The glass rod loses electrons and becomes positively charged, because its atoms now have more protons than electrons. A negative charge results from an excess of electrons. A positive charge results from lack of too few electrons to keep balance of the protons in the atoms of an object.

Electrons are more easily removed from some atoms than from others. If you rub a plastic comb with a cloth, the comb will become charged. But, if you rub a metal a metal comb with the cloth, it does not become charged.

This is because electrons move easily along a metal rod. Any charge that builds up flows away immediately. If the metal is in your hand, the extra electrons flow into

your body. Electrons move easily along some materials. Such materials are called conductors of electricity. Metals are good conductors. Because insulators do not conduct electricity, any charge that gains stays in one place. Any thing that stays in one place is said to be static. Thus, charges that stay on an object are called static electricity.

Drawings of conductors and insulators

When electricity 'flows' it is because electrons move. They tend to move from areas that have an excess of electrons to areas that have too few electrons. Electrons can also move to areas that are neutral, that is, neither positively nor negatively charged.

3. After you Read

Answer the following questions:

a) Name three conductors of electricity.

b) What is static electricity?

c) What is an electrical insulator? Give two examples.

d) Why is an atom normally neutral?

e) How can an object become negatively charged?

Workbooklet: Lesson 1, Exercise a-c

Drawing of someone combing his/her hair

3. Try This

Bring a plastic comb or ruler near a pile of tiny pieces of paper. Be careful not to touch the paper. What happens? Now rub the comb or ruler through your hair or on some cloth to put a charge on the plastic. Again, bring the comb or ruler near the paper. What happens this time?

Lesson 2: Focus on Language

1. Grammar and Functions

Grammar Target 1: Using present simple tense

a. In English, present simple tense can be used to describe objects.
Study the following examples showing the use of the present simple tense.

1) Different kinds of atoms have different numbers of proton.
2) The glass rod loses electrons.
3) Metals are good conductors.

b. We also use the present simple tense to describe scientific processes.

Study these examples:

1) A negative charge results from an excess of electrons.
2) A positive charge results from too few electrons to balance the protons in the atom.

Grammar Target 2: Using present Simple Tense in the Passive form

a. In science we often use the passive voice, because we want to focus on the object of the action rather than the agent. For example:

1) All matter is made up of tiny particles.
2) Electrons are more easily removed.
3) Protons and neutrons are found in the nucleus.

Workbooklet: Lesson 2, Exercise a

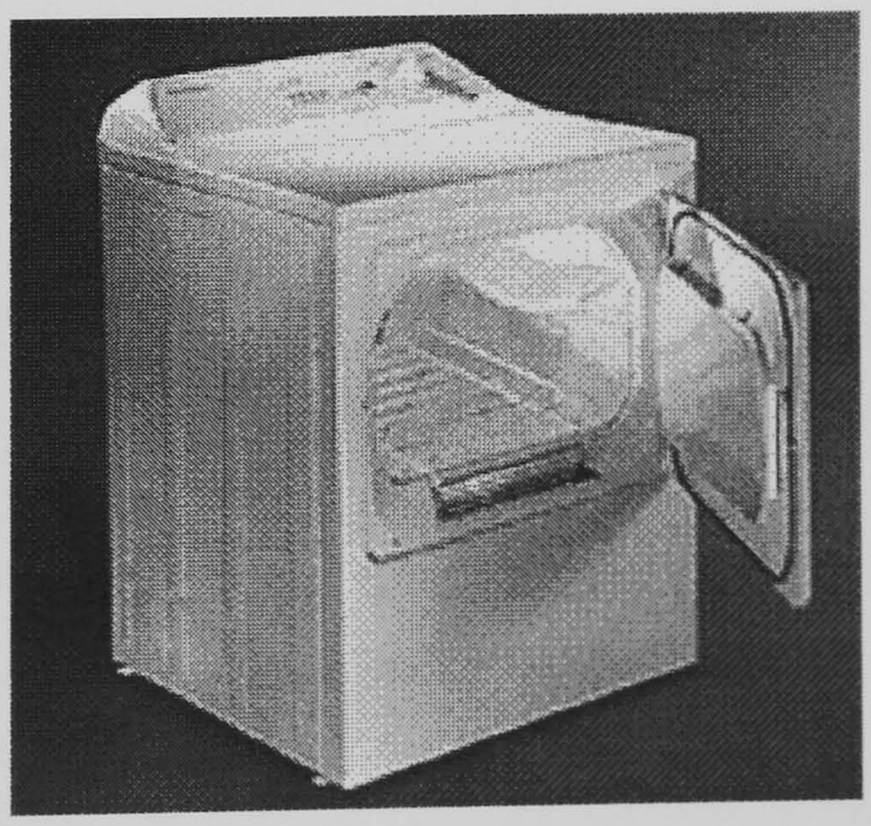
Listening



Workbooklet: Lesson 2, Exercises a - b

Speaking

Explain to your partner why socks may stick together when you take them out of a clothes dryer.



Lesson 3: Focus on Writing

1. Before you Write

Try out an activity related to electricity, then record and analyse what happens.

a) Now, read the following text carefully:

Saving Electricity

The rising cost of fossil fuels is causing the price of electricity to soar. To keep costs down, people can use certain energy conservation measures. These reduce the use electricity and its costs. The following are some important ways in which people can conserve electrical energy:

1. Insulate hot-water electrical heaters and pipes.
2. Turn off the electric water heater when going away.
3. Take quick shower instead of baths.
4. Turn off lights and appliances that are not being used.
5. Use a single high-wattage light bulb in multi-bulb fixtures instead of using many low –wattage bulbs.
6. To keep refrigerator and freezer efficient, the inside of the refrigerator should be no colder than 4 C^{o}.
7. To wash clothes, use cold or warm rather hot than water.
8. If you have an electric stove, be sure to cover pans when you cook food in boiling water.

Drawing of a house with many bulbs and appliances	***Drawing of a house with few bulbs and appliances***

b) List the appliances used in your home throughout one day. After studying the ways in which electricity is used in your home, think of appropriate ways you want your family to reduce the use of electricity.

2. Gather Information

Workbooklet: Lesson 3, Exercise a

3. Drafting

Complete the following report:

Conservation of Electricity

What do you suggest to conserve electricity
a) in your home

1. .....
   .....
2. .....
   .....
3. .....
   .....
4. .....
   .....
5. .....
   .....

b) in your neighbourhood

1. .....
   .....
2. .....
   .....
3. .....
   .....
4. .....
   .....
5. .....
   .....

4. Editing

Read your partner's report. Write your comments on his/her writing.

Key Themes

- ***Science is a vital key to development.***
- ***Scientists discover the mysteries in the universe. Those who fear most God are the scientists.***

UNIT TWO

TELECOMMUNICATIONS

Summary of the Unit

Structures: Connectives

Function: Comparing and contrasting, talking about contrasting ideas, expressing reason/conclusion

Vocabulary:

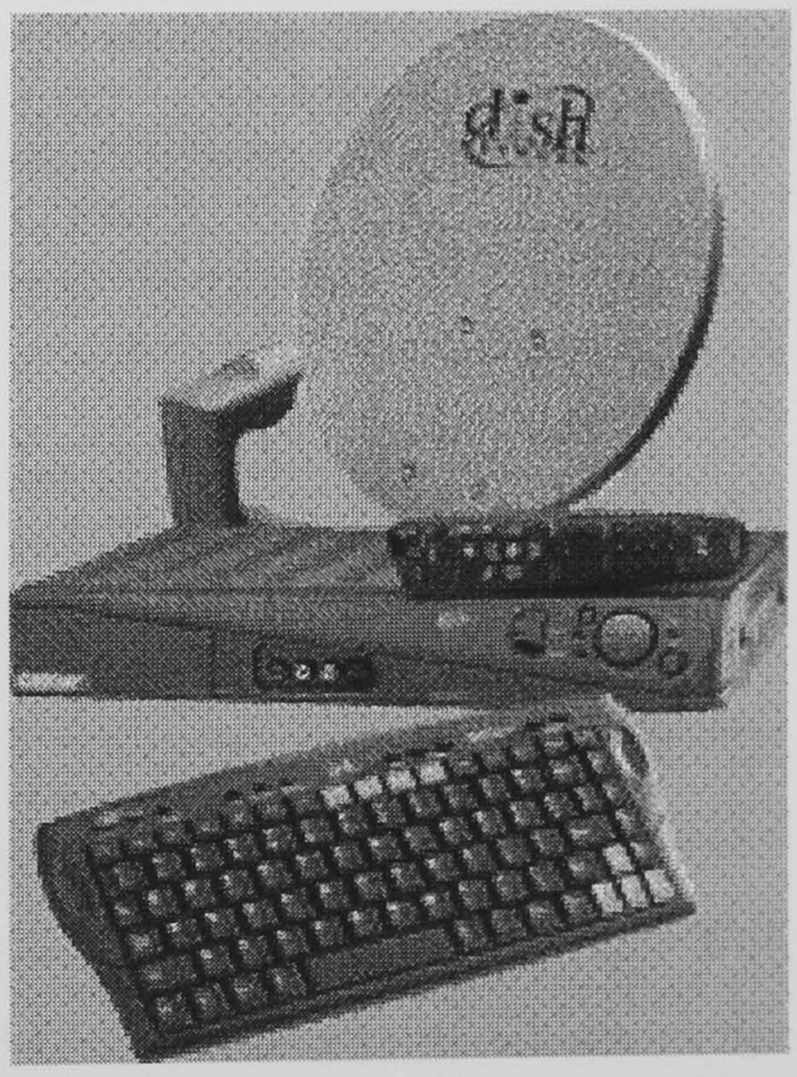
Nouns: antenna, auspices, circuit, distribution, document, entity, equator, founder, friction, gigahertz, globe, interference, satellite, velocity

Verbs: amplify, appear, correlate, hover, launch, precede, receive

Adjectives: accessible, celestial, domestic, elliptical, enormous

Adverbs: initially

Lesson 1: Focus on Reading



1. Before you read

a) What does telecommunications mean? Give examples.

b) Have you ever bought a satellite? Why?

c) What services do telecommunications provide?

2. While you read

The following text introduces the uses of satellites for communication purposes. Read it carefully and answer the questions:

a) What services do communication satellites provide?

b) What organisation operates over a dozen satellites with global coverage?

c) What is Arabsat?

Satellite Communications

A communication satellite receives the energy beamed up at it by an earth station, amplifies and returns it to earth at a frequency of about 2 gigahertz away; this prevents interference between the uplink and the downlink. Communication satellites appear to hover over given spots above the equator. This does not make them stationary, rather geostationary. That is, they have the same angular velocity as the earth (one complete cycle per 24 hours), and so they appear to be stationed over one spot on the globe. Celestial mechanics shows that a satellite orbiting around the earth will do so at a velocity that depends on its distance from the earth, and on whether the satellite is in a circular or elliptical orbit. For example, a satellite in a low circular orbit, as was Sputnik 1, will orbit the earth in 90 minutes. The moon, which is nearly 385 000 km away, orbits the earth in 28 days. A satellite in circular orbit 35800 km away from the earth will complete a revolution in 24 hours, as does the earth below it, and this is why it appears stationary.

The major communication satellite systems include those operated by INTELSAT, whose satellites are used for global point-to-point communications. INMARSAT serves a similar role for ships at sea. And there are various regional and domestic satellite systems being operated in different regions by individual countries.

The Communication Satellite Corporation (COMSAT) of the USA, the Overseas Telecommunications Commission (OTC) of Australia and nine other world communications agencies met in Washington D.C. in 1964 to sign a document that made them founder members of the International Telecommunications Satellite Consortium (INTELSAT). When INTELSAT I, better known as Early Bird, was launched over the Atlantic in 1965. There were just five earth stations made use of the 66 telephone circuits it offered. Today, there are over one dozen INTELSAT IV, IV-A, V and VA satellite in the Atlantic, Indian and Pacific Ocean regions, offering capacities up to 12 500 two-way telephone circuits and two one-way T.V channels per satellite. The INTELSAT VI satellites are capable of providing up to 20 000 telephone circuits each. Over 500 earth stations in nearly 150 countries make use of the INTELSAT satellites in the three ocean regions to provide over 25 000 circuits and T.V services for international and domestic use.

Regional and domestic satellites are a kind of mini- INTELSAT system designed to serve a region with community interests in communications. The world's first regional satellite system was the Indonesian Palapa network, inaugurated in the mid

1970s, initially for domestic services. And by the late1970s Palapa network had expanded to neighbouring countries like the Philippines. The conference of European Post and Telegraph Administration (CEPT) was next on the scene, with EUTELSAT created in the early 1980s, under the auspices of the European Space Agency (ESA). EUTELSAT provides and maintains the space segment for the European Communications Satellite (ECS), while each country provides its own earth station.

The ECS system came into service in 1983 with ground antennas very much like the INTELSAT standard C antennas, but with lower ground and satellite transmit power. The system is used for intra-European telephone, data and telex/telephone services. It was also used by the European Broadcasting Union for distribution of its EUROVISION programs. Another regional satellite system services came into service in the late 1980s was the ARABSAT used by the Middle East countries.

There are differences between the regional and domestic satellite systems. The regional is used by a group of neighbouring countries and the domestic is used by a large or dispersed country. Both systems require much smaller coverage area than that of the INTELSAT. The INTELSAT system requires one-third of the globe as a coverage area.

3. After you Read

Find the best item to complete each sentence according to the text:

1) A geostationary satellite is:

a) Motionless in space except for its spin.

b) Not really stationary but orbits the earth in 24 hours.

c) Stationed over the earth magnetic pole.

d) Located at a height of 35800 km to ensure global coverage.

2) INTELSAT satellite system:

a) Provides both two-way phone circuits and one-way T.V channels.

b) Provides point-to-point communication for ships.

c) Is an international communication satellite system.

d) Was formed in1964 when nine world communications agencies signed a document.

3) Regional satellites:

a) Require a smaller coverage area than that of INTELSAT satellites.

b) Can only be used by countries that have common language.

c) Have only developed for use by the European Community.

d) Operate on a different system from domestic satellites.

4. Try This

Make a visit to your school library or any neighbouring library to find out the recent developments in the communication satellite systems.

Lesson 2: Focus on Language

1. Grammar and Functions

Grammar Target 1: Comparing and Contrasting

Look at these examples

a. Contrasting (unlike, different from, whereas)

1) Domestic systems are quite different from INTELSAT.

2) Domestic systems can be set up without comprising needs, whereas regional systems have to serve many requirements.

3) Domestic systems, unlike regional systems, ca be set up without comprising needs.

b. Comparing (compared with, difference between, like, '-er', '-est', more, most, as with)

1) Compared with the global systems, domestic systems are much smaller.

2) There is not much difference between domestic and regional satellites.

3) The ECS system has antennas very much like INTELSAT standard antennas.

4) Regional satellites require that individual countries have their own earth stations, as with INTELSAT.

Grammar Target 2: Connectives

Notice the following two types of words and phrases, which are used to connect ideas together in writing and speech besides those mentioned above:

a. **Conjunct**: therefore, consequently, moreover, as a result, consequently, and so, therefore, hence, that is to say (i.e.), accordingly, according to, indeed, possibly, probably, perhaps, alternatively, etc.

These connectives are often separated from the rest of the sentences by commas.

Study the following paragraph and see how these words are used:

There is conceptually not a great deal of difference between a regional satellite system used by a group of neighbouring countries and a domestic system used by a large or dispersed country. ***Indeed,*** they share a common characteristic, which makes them quite different from the INTELSAT…All else being equal, it means that the satellite antenna gain can, ***thus,*** be increased by a factor of 26.

b. **Disjunct:** however, on the other hand, since, because, although, despite, in spite of, even if, but, while, nevertheless, on the contrary, etc.

These connectives usually introduce subordinate clauses and should not be followed by commas.

Now, study the following paragraphs and see how these words are used:

Since stationary satellites present no tracking problems, most of operators prefer them…***Although*** the conceptual difference between a regional and a domestic satellite is not great, the political difference is enormous…Each INTELSAT satellite system must have a beam accessible to roughly one third of the globe. ***On the other hand***, a circular beam could cover the whole of India if it had a radius on the ground of 1450 km.

Workbooklet: Lesson 2, Exercise a

Listening



Workbooklet: Lesson 2, Exercise a – c

Speaking

Act out the following roles with the help of your teacher:

Task A: Imagine that you were a highly qualified engineer working as an expert at the Jordanian Telecommunications Corporation. Your partner is a university student preparing a term paper about communications satellites. Create a dialogue between you and your partner about this topic, by asking the expected questions and giving the possible answers.

Task B: Suppose that you were a university student preparing a term paper about communications satellites. You are going to interview your partner who is a highly qualified engineer working as an expert at the Jordanian Telecommunications Corporation.

Ask a number of questions you would like to pose and the possible answers.

Lesson 3: Focus on Writing

1. Before you write

Imagine that you are going to contribute to an English magazine dealing with real-life applications for science. Before writing an article about telecommunications, with your partner, discuss in turn the importance of this topic in today's life.

2. Gathering Information

Workbooklet: Lesson 3, Exercise a

3. Drafting

In no more than 200 words, write an article comparing and contrasting between the systems of telecommunications used at present, and those used forty years ago.

4. Editing

Exchange your draft with one of your classmates to write your comments to improve each other's draft.

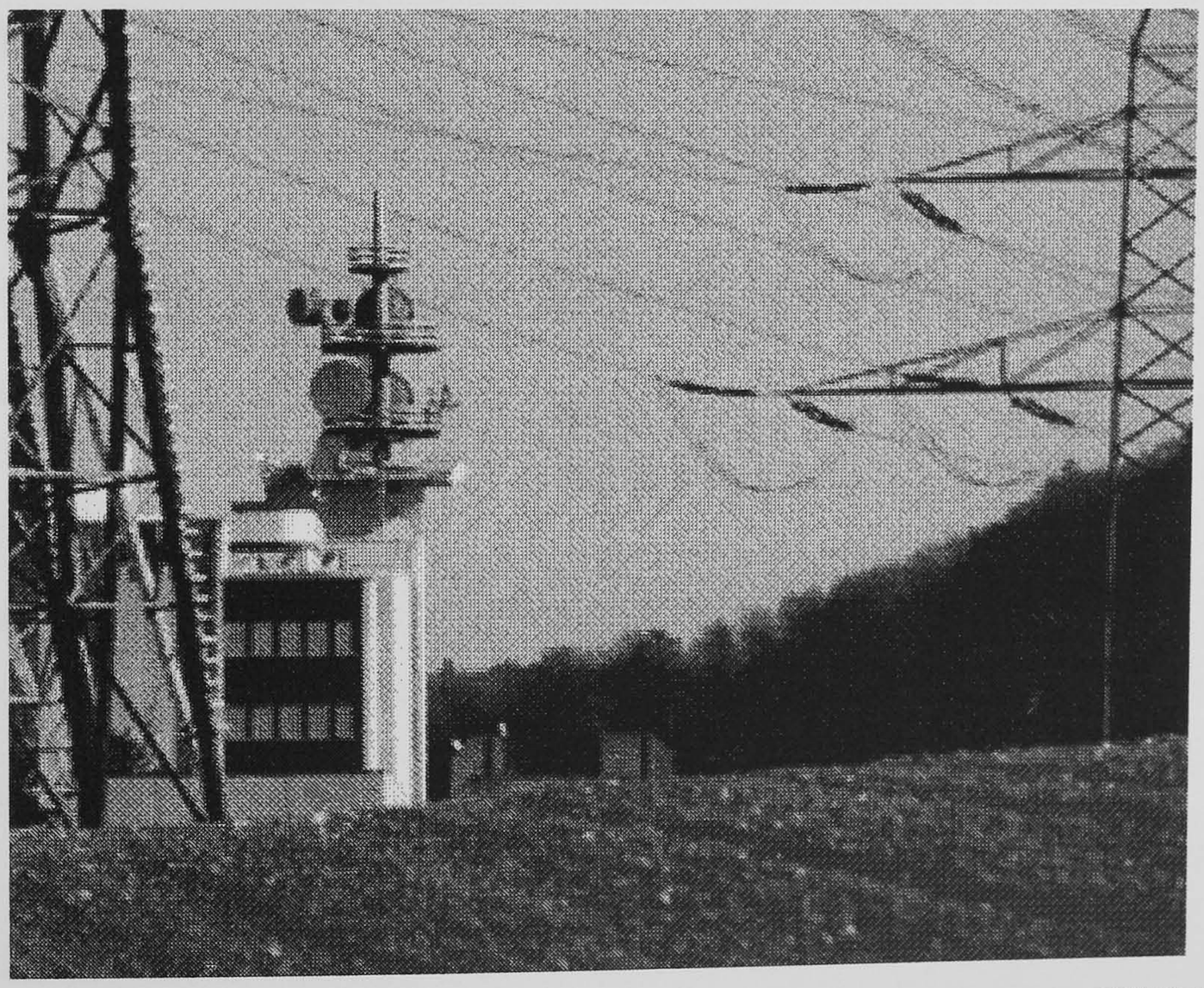
Key Themes

- ***World has bee a global village because of great developments in telecommunications.***
- ***Science requires keen observation, powerful perception, objective reasoning and accurate generalisation.***

WORKBOOKLET

A Communicative English Progamme

For the Specific Purposes of Science Students in the Secondary Stage of Education in Jordan





Trial 1998

UNIT 1: ELECTRICITY

Lesson 1: Focus on Reading

Exercise a

Find a word in the text about the electrical nature of matter to match each definition:

1. Materials along which electrons move easily …….
2. Negatively charged particle present in all matter …….
3. Materials that keep electrons from moving…….
4. Uncharged particle in the Nucleus of an atom ……
5. .....centre of an atom containing all its positive charge and most of its mass .....
6. Positively charged particle in the nucleus of an atom……
7. Charges that stay on an object ……

Exercise b

Based on the reading text in the Student's Booklet, write the word True if the statement is true. If the statement is false write the word false:

1. ……All matter is made up of tiny particles called atoms.
2. ……. A neutron is a positively charge particle that is present in the nucleus of an atom.
3. ……The electron is a negatively charged particle that is present in an atom.
4. ……Electrons are in constant motion about the nucleus.
5. ……A neutral atom must contain equal numbers of protons and neutrons.
6. ……If a neutral atom loses an electron, the atom becomes negatively charged.

Exercise c

Complete each sentence below by using the appropriate word/phrase from the box.

There are more words than you need below.

conductor	**static electricity**	**atoms**
negative charge	**induction**	**insulator**

1. A poor conductor of electric charge is an ……
2. Charges that don't move are ……
3. ..... is one way of generating a static electric charge.
4. Your body is a reasonably good ..... of electricity.
5. A positive charge attracts a ……

Lesson 2: Focus on Language

Exercise a

Change the following sentences into the passive form:

1. You should take care when using electricity.

   Care .....

2. We rarely find pure metals in nature.

   Pure metals .....

3. A generator changes energy of motion into electrical energy.

   Energy of motion .....

4. Lightening often strikes the tallest objects

   The tallest objects .....

5. We use a balloon with a negative charge to find out the charge on another balloon

   A balloon .....

Listening

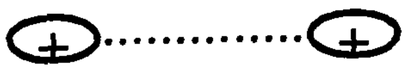
Listen to the passage the teacher will play on the cassette, then answer the questions:

Exercise a

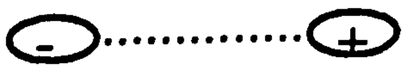
Attraction or Repulsion

Decide whether each pair of charges shown below will attract or repel each other.

1. 

2. 

3. 

4. 

Exercise b

How many kinds of charge are there? What are they called?

Lesson 3: Focus on Writing

Contact your local electric company. Ask them for information about ways to save electricity in your home.

Drawing of electrical power station

UNIT 2:TELECOMMUNICATIONS

Lesson 1: Focus on Reading

Exercise a

Write the word 'True' if the statement is true. If the statement is false write the word 'False':

1. Sputnik 1 had an elliptical orbit.
2. Early Bird was the name of the first communications satellite to be launched.
3. INTELSAT V offers a capacity of 12,500 two-way phone circuits.
4. INTELSAT VI was launched in the early 1980s.
5. More than 500 countries make use of INTELSAT satellite communications.
6. The Indonesian satellite system was originally developed to serve domestic purposes.

Exercise b

What do the underlined words/phrases refer to in the following sentences taken from the text:

A communication satellite receives the energy beamed up at <u>it</u> by an Earth station and amplifies and returns <u>it</u> to Earth at a frequency of about 2 gigahertz; <u>this</u> prevents interference between the uplink and the downlink.

Celestial mechanics shows that a satellite orbiting the Earth will <u>do so</u> at a velocity that depends on <u>its</u> distance from the Earth.

1. In line 1, <u>it</u> refers to .....
2. In line 2, <u>it</u> refers to .....
3. In line 3, <u>this</u> refers to .....
4. In line 4, <u>do so</u> refers to .....
5. In line 5, <u>its</u> refers to .....

Exercise c

Increase your vocabulary

Match the words on the left, which are from the text, with a word or phrase that has the same meaning from the list on the right.

1. Appear	grow bigger	2. Expand	begin
3. Prevent	seem	4. Inaugurate	stop

Exercise d

Notice how these verbs are used in the text. Then choose the correct one to complete each sentence below:

represent provide serve share

1. Many countries .....the benefits of the INTELSAT satellite service.
2. Satellite systems help to.....services for remote communities.
3. Satellite communications.....an alternative to terrestrial links such as cable networks.
4. The red lines on the map .....railways.

Lesson 2: Focus on Language

Exercise a

Grammar and Functions

Choose the appropriate word or phrase to connect each of the following sentences:

1. It is difficult to make predictions about technological changes in the future. (However, Consequently, Although), it is possible to get some idea of the changes which might occur.
2. When making an international telephone call, the signal may travel a distance of 72,000 km. It is, (moreover, whereas, therefore), not surprising that 600 milliseconds passes between the time you finish speaking and the time when the reply comes back.
3. (Although, Indeed, Because) satellites have a high reliability, earth stations are frequently affected by weather and require more maintenance.
4. (While, Since, On the other hand) high frequency radio is still used a lot for ship-to-ship communications, many ship-to-shore communications are now conducted via satellites.
5. Initially only three satellites were used for maritime communications, (consequently, that is to say, because) one for each ocean region.
6. Many countries have domestic satellite systems using their own satellites. (Moreover, While, In this case), nearly 20 countries operate domestic services by leasing spacecraft from INTELSAT.
7. The price is too high, and (whereas, moreover, although) the house isn't in a suitable position.

Listening 

Understanding a Lecture

Exercise a

You will hear part of a lecture. Listen attentively, then answer this question: "What is the main idea of the lecture?

Exercise b

Listen again to the lecture and take notes. Then, try to answer the following questions:

1. **Writ the word 'True' if the statement is true. If the statement is false, writ the word 'False' in the blank space next to each:**
   a. (.....) The conceptual difference between a regional satellite and a domestic satellite system is considerable.
   b. (.....) Domestic satellites came into use before regional satellites.

Exercise c

Discus what the lecturer means by the following statement:

"The political difference between a regional and a domestic satellite system is enormous."

Lesson 3: Focus on Writing

Exercise a: Project work

In pairs then in groups, discuss each of the following, then individually write your conclusions in no more than 200 words:

1. Telecommunications used at present.
2. Telecommunications used forty years ago.



