THE UNIVERSITY OF HULL

THE GRADUATE TRAINING PROGRAMME OF JUBAIL INDUSTRIAL COLLEGE, SAUDI ARABIA: A CASE STUDY OF THE STATUS AND RELEVANCE OF THE GRADUATE QUALIFICATIONS

being a Thesis submitted for the Degree of

Doctor of Philosophy

in the University of Hull

by

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July 2002

ACKNOWLEDGEMENTS

I should like to acknowledge the following people, who have, in various ways, made it possible for me to accomplish this thesis. First of all, I thank my wife and my family for their unfailing patience and constant support throughout this project.

I should like to express my gratitude to my research supervisor, Mr. Kenneth P. Brookes of the Department of Educational Studies in the University of Hull, who has guided my research and made invaluable suggestions related to my thesis.

For his constant support and help I should like to extend my grateful thanks to H.H. Prince Saud Bin Abdullah Bin Thunayyan Al-Saud, Chairman of the Royal Commission for Jubail and Yanbu. I should also like to thank Dr. Jassem M. Al-Ansari, Director-General of the Royal Commission, Jubail Project, for his encouragement and help.

I have received much valuable advice from Dr. Sultan A. Arishi, Senior Lecturer in English at Jubail Industrial College, and for this I extend to him my warmest thanks.

With regard to the analysis of the data collected during the research, I was greatly assisted by Mr. Karamallah Ali Abdulrahman who spent much time and energy ensuring the accuracy of the results. I should also like to thank Mr. Abdullatif Campbell, Senior Lecturer in English at Jubail Industrial College, for his meticulous proof-reading of my thesis, and Messrs. Basilio R. Andir and Farhan S. Al-Kwaikbi, also of the College, for their assistance with the manuscript and production of the thesis.

Finally, I extend my thanks to the panel of experts from Jubail Industrial College, the RC Organisational Development Department and local industrial organisations, who checked the validity of the factors and elements related to the questionnaires, including Messrs. Eric Jones and Mohammed El-Doma from Saudi Aramco Shell Refinery Company.

ABSTRACT

This study examines the status of the technical qualifications accorded to graduates in the training programme at Jubail Industrial College, one of two English-medium colleges in Saudi Arabia, and in particular attempts to assess the relevance of these qualifications to their employment, from the points of view of the graduates and of their employers.

The study uses a sample population taken from technical graduates and their employers in the six cities of the Eastern Region, to evaluate the attitudes of these two groups by means of questionnaires (90%) and interviews (10%), intended to reveal the strengths and weaknesses of the College's training programme. As an adjunct it also seeks to examine the expectations of students who have undertaken their Co-operative Training Programme but not yet entered into employment. It uses the One-Sample T-Test to determine the mean levels of satisfaction of the individual groups and then of the three groups together. The Analysis of Variance Test (ANOVA) and Pair-Wise Comparison Test (Tukey HSD) are used to test differences between the means of the three groups.

The study is divided into nine chapters. Chapter I sets out the aims of the research and describes the College's role in training students for work in industry. Chapter II gives an overview of Saudi Arabia, including its educational system and especially technical education and vocational training. Chapter III describes the Royal Commission for Jubail and Yanbu and then focuses on the College, highlighting its mission within the country's economic development and detailing its programmes. Chapter IV describes the policy of economic diversification to reduce dependence on oil and Chapter V reviews the relevant literature on technical and vocational education in Saudi Arabia and elsewhere. Chapter VI reiterates the aims of the study and explains the null hypotheses associated therewith, as well as the associated factors and elements. Chapter VII presents and analyses the data obtained with

respect to the respondents' levels of satisfaction with the factors and elements, and thereafter Chapter VIII discusses the results and draws conclusions about the validity of the null hypotheses, identifying possible causes for the levels of satisfaction expressed. Finally, Chapter IX provides a summary, makes recommendations for the improvement of the College programme, for industrial organisations and for policy makers, and gives suggestions for further research.

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LIST OF ABBREVIATIONS

ABET	Accreditation Board for Engineering and Technology, USA
A.H.	Anno Hijirae (Islamic Calendar)
ANOVA	Analysis of Variance Test
AOP	Annual Operational Plan
CDC	Curriculum Development Committee
DN	Denial
EJG	Employed JIC Graduates
GPA	Grade Point Average
GOTEVOT	General Organization for Technical Education and Vocational Training
JIC	Jubail Industrial College
JS	JIC Students who have Completed the Co-operative Training Programme
MOE	Ministry of Education
MOHE	Ministry of Higher Education
MOInfo.	Ministry of Information
MOP	Ministry of Planning
MPC	Manpower Council
M&MET	Department of Mechanical and Manufacturing Engineering Technology
OECD	Organization for Economic Co-operation and Development
RCJ&Y	Royal Commission for Jubail and Yanbu
SABIC	Saudi Basic Industries Corporation
SPSS	Statistical Package for Social Sciences
WP	Withdraw with Passing Grade
WS	Work Supervisors

CHAPTER ONE

BACKGROUND OF THE STUDY

1.1 Introduction

Jubail Industrial College (JIC) is one of the best-known industrial colleges in the Kingdom of Saudi Arabia. This college trains and qualifies students mainly for work in the industrial sector of the economy. The quality of tuition offered to students in this college is thorough and comprehensive, and is intended to give them the competence to handle a range of industrial jobs.

Since most graduates go on to work in industrial organisations across the country, it is appropriate to test whether or not these organisations are satisfied with the quality of the college's graduates.

The researcher, as Managing Director of Jubail Industrial College, feels that this quality needs to be investigated and assessed.

1.2 Statement of the Problem

The study is desirable because many graduates of the College, as well as the officials of the industrial organisations where they find employment, feel that it would be beneficial to assess the attitudes of both graduate employees and work supervisors in terms of their satisfaction or dissatisfaction with the standard and quality of training provided to students by Jubail Industrial College. To date there have been no related studies attempting to pinpoint the adequacies or inadequacies of the qualifications of these graduates, and, therefore, the researcher has decided to embark upon the task of evaluating these qualifications in order to find out their strengths and weaknesses. Only when the positive and negative attitudes of graduate employees and their work supervisors have been discovered and clearly defined will it be possible to consider using attitudinal data to formulate procedures leading to such qualifications. This study is therefore an attempt to identify the positive and negative areas as perceived by graduates and their employers.

As an adjunct to the main theme this study will also examine the views of students who have partially completed their studies in the college and have also undertaken their co-operative training programme. Their expectations will be sought as to whether, in the light of their co-operative training, they believe that the content and depth of the courses which they studied in the college will meet their needs in their future employment. This will provide a useful and interesting comment on the main thrust of the study.

1.3 Aims and Objectives of the Study

The aims of the study are to assess the status and relevance of the qualifications of the College's graduates, and to formulate procedures leading to more appropriate and relevant college programmes. To fulfil these aims, the study will seek to achieve the following specific objectives:

1. Give a clear and accurate picture of the quality of tuition on offer in Jubail Industrial College.

2. Assess the current status of the quality of the college's graduates.

3. Find out whether or not the current qualifications of the graduates meet the requirements laid down by the industrial organisations.

4. Investigate whether there are any weaknesses in the qualifications of graduates.

5. Encourage employers to judge the quality of JIC graduates.

6. Encourage employed graduates to judge their own performance.

7. Encourage JIC students who have completed their co-operative training to formulate their expectations as to whether their studies will fulfil the job requirements.

8. Guide those who are involved in designing educational programmes for industrial and technical institutions in Saudi Arabia.

9. Suggest improvements which will not impinge on the areas which are satisfactory.

10. Provide recommendations based above all on the perceptions of the attitudes of the respondents participating in the study, along with the researcher's guidelines.

11. Provide the management and staff of Jubail Industrial College with useful information to guide future methods of running appropriate and relevant programmes.

12. Suggest further studies in this respect.

1.4 Assumptions of the Study

The writer believes that the following assumptions underlie the study:

1. The graduates are capable of forming reasonably well-balanced, objective and valid attitudes concerning their qualifications.

2. The industrial organisations' officials are also in a suitable position to give valid and reasonable judgements concerning the positive and negative areas of the graduates' qualifications.

3. The writer assumes that the questionnaire and interview formats designed are valid instruments for the purpose of this study, although tests of reliability and validity will be used to support such instruments used for survey purposes.

1.5 Limitations of the Study

The study is restricted to the investigation of the level of satisfaction with the qualifications of male graduates only, as co-education is not allowed in the country. In addition, the study will be limited to graduates of the technical stream of the college programme, as the College was primarily established to provide a technical workforce for the local industries. This stream is the predominant one in the College.

The study will also be limited to graduates who have already graduated from Jubail Industrial College and are currently working within industrial organisations in the Eastern Region of Saudi Arabia, in addition to those who have completed their co-operative training. Their attitudes, as well as those of the industrial organisations' officials will also be sought. This college was chosen because it is one of the best-known colleges for training students for industry in Saudi Arabia, and the number of students attending the college's programmes has increased dramatically over the last five years. Therefore, the present study is essentially a unique study for an educational institution like Jubail Industrial College.

1.6 The Research Procedures

In order to cover the subject, the researcher will carry out the following procedures:

1. The collection of materials, references, journals, official documents and publications in relevant fields;

2. The application of his personal experience in the field of management, in order to provide useful information and guidelines;

3. The utilisation of questionnaires and interviews in order to collect the required data.

A sample of employed JIC graduates and work supervisors will be surveyed. Questionnaires will be distributed to 90 per cent of each group, whilst the remaining 10 per cent will be interviewed personally. The answers gained from the interviews will provide additional information, aimed at furnishing the study with reasons and justifications for the replies of the respondents to questionnaires and supporting the descriptive part of the analysis. The expectations of the students who have recently completed their co-operative training will, however, be ascertained solely by questionnaire.

1.7 Outline of the Thesis

The study comprises nine chapters. Chapter One, as stated previously, provides the background information to the study, while the remainder of the thesis is divided into eight chapters. Chapter Two will give an overview of the Kingdom of Saudi Arabia and the educational system in the country with special reference to technical and industrial education. Chapter Three will provide an overview of the Royal Commission for Jubail and Yanbu along with Jubail Industrial College, its tuition system, students, staff and curriculum. Chapter Four will present an overview of the industrial sector in Saudi Arabia as well as a survey of the industrial organisations which are the main employers for the graduates of Jubail Industrial College. Chapter Five will review the literature consulted. Chapter Six will explain the research methodology. Chapter Seven will analyse the data and provide the findings, whilst Chapter Eight will discuss the results in more general terms and draw the conclusions. Finally, Chapter Nine will give a summary and recommendations, with suggestions for further research and final comments.

CHAPTER TWO

A GENERAL OVERVIEW OF SAUDI ARABIA AND ITS EDUCATIONAL SYSTEM

2.1 Part One : An Overview of Saudi Arabia

This part offers a brief overview of Saudi Arabia. It includes sections on its foundation, geography, political system, religion and Holy Places, economy, and human resources development.

2.1.1 Foundation

The first Saudi State began with the uprising lead by the religious reformer Sheikh Muhammad Ibn Abdulwahhaab in 1157 A.H., supported by Prince Muhammad Ibn Saud. This period was concluded in 1233 A.H. when the Egyptian army lead by Ibraheem Pasha seized Der'eyyah, the capital of Najd.

The second Saudi State was established in 1240 A.H., when Prince Turki Ibn Abdulaziz seized Riyadh and liberated all the towns of Najd from Egyptian domination. This period was concluded by the seizure of Riyadh by Mohammed Ibn Rasheed, the Prince of Hail, in 1309 A.H.

The third Saudi State was formed in 1319 A.H. (1902), when King Abdulaziz Ibn Abdulrahman Al-Saud captured Riyadh, and the other towns in Najd and Hijaz and founded the Kingdom of Saudi Arabia (Shaheen, n.d., pp. 21-23).

2.1.2 Geography

The geography of Saudi Arabia can be described under four headings. These are location and boundaries, physical features, area and population, and climate.

2.1.2.1 Location and Boundaries

The Kingdom of Saudi Arabia is located in South-West Asia and occupies about four-fifths or nearly 80 per cent of the Arabian Peninsula (MOInfo., 1991, p. 27).

It is bordered on the east by the Arabian Gulf, Bahrain, Qatar, and the United Arab Emirates, on the west by the Red Sea, on the north by Jordan, Iraq, and Kuwait, and on the south by Oman and Yemen.

2.1.2.2 Physical Features

Saudi Arabia may conveniently be divided into five major regions. In the heart of the country is the vast plateau of Najd; along the Red Sea coast lies Hijaz; in the south-west is Asir; in the sandy and stormy eastern part of Saudi Arabia is Al-Hasa; and in the south and east is the Rub Al-Khali, or Empty Quarter, one of the largest sand deserts in the world (Al-Farsy, 1994, p. 11).

The topographical features of Saudi Arabia are diverse. A coastal plain extends along the Red Sea, and ranges in width from 64 kilometers (40 miles) in the south to 16 kilometers (10 miles) in the north. Beyond this plain to the east rise the mountains known as Al-Sarawat, which rise in the south to a height of 9000 feet.

To the east of this chain of mountains, lies the Najd plateau ranging in height from 6000 feet down to 2000 feet where it merges with the Dahna and As-Summan deserts in the east. The Najd plateau extends to Wadi Al-Dawasir in the south and towards the Iraqi and Jordanian borders in the north. In Najd, there are some mountains and high lands such as Al-Aridh and Uwayridh, Aja and Salma, and Tuwaiq, as well as the Nafud desert of sandy hills (MOInfo., n.d., pp. 7-9).

In the east of the country, there is the flat Arabian Gulf Coast, the country's wealthiest part, containing its massive petroleum resources (Al-Farsy, 1994, p.11).

2.1.2.3 Area and Population

Saudi Arabia occupies approximately 2,240,000 square kilometres (865,000 square miles) (Al-Farsy, 1994, p. 2). This is an area roughly six times the area of the British Isles, four times the area of France and about one-third of the area of the United States of America (MOInfo., n.d., p. 7).

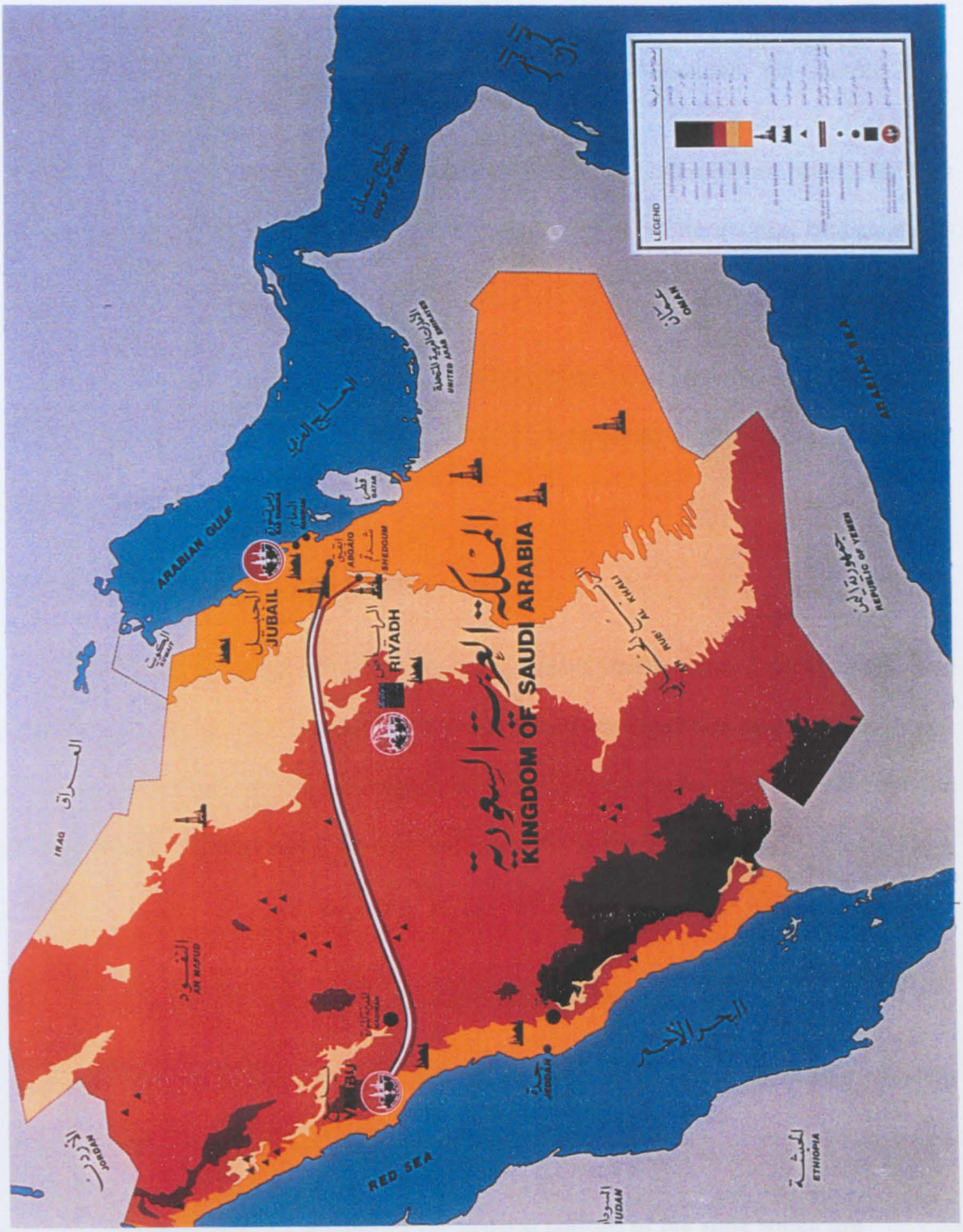
According to the 1992 census, Saudi Arabia's population is 16,948,388, of which 12,310,053 are Saudis and 4,638,335 are non-Saudis (MOP, 1996, p. 465). This shows the country's reliance on the foreign work force, which began in 1975. The population density is 6 inhabitants per square kilometre (MOInfo., 1996, p. 17), and the annual rate of growth is 4 per cent (Al-Sarhan, 1995, p. 13).

2.1.2.4 Climate

Generally speaking, most of Saudi Arabia has a desert climate with very little rainfall, and the average temperature nationwide is around 18°C (64°F) (MOIinfo., 1991, p.30).

The western coast of Saudi Arabia, facing the Red Sea, has a subtropical climate with very high humidity. Winters are mild with light rain from November through February. The Central Region, Najd, has dry and relatively hot summers and dry cold winters.

The climate in the Eastern Region is similar to that of the Western Region and the humidity is very high in summer. In the Southern Region, rains fall throughout the year and the climate in the summer resorts on the heights is equable (MOInfo., n.d. p 3).



(Fig. 2.1) KINGDOM OF SAUDI ARABIA

2.1.3 Political System

The Constitution of Saudi Arabia is the Holy Qur'an. Al-Farsy (1994) states:

> **"It is the fundamental assumption of the polity of Saudi Arabia that the Holy Qur'an, correctly implemented, is more suitable for Saudi Muslims than any secular constitution"** (p. 45).

All the drafted laws and regulations in Saudi Arabia are based on the Islamic Sharia, the laws laid down by the Holy Qur'an and the Sunna (the traditions of the Prophet Mohammed – Peace be upon him).

The Government of Saudi Arabia includes certain systems and organisational bodies, namely the Council of Ministers, the Consultative Council, the Regional Governments and the Basic System.

2.1.3.1 The Council of Ministers

In 1953, the country's first administrative body, known as the Council of Ministers, was established by the late King Abdulaziz Al-Saud. The Council operates under the presidency of the King, who is also the Prime Minister, and includes the First Deputy Prime Minister, the Second Deputy Prime Minister and all the Ministers in the government (Al-Farsy, 1994, p.48).

2.1.3.2 The Consultative Council (Majlis Al-Shura)

This council was set up in 1412 A.H. with 60 members (later 70) of well-qualified Saudi nationals. The main role of the Council is:

> **"... to express its opinion on the general policies of the state which are referred to by the Prime Minister"** (Al-Farsy, 1994, p. 58).

2.1.3.3 Regional Governments

The Regional Governments are responsible for fostering improvements in the administrative and developmental activities in the regions, as well as the preservation of security and order, aiming at ensuring the rights and freedom of citizens within the framework of Islam (Al-Farsy, 1994, p. 60).

2.1.3.4 The Basic System

The Basic System, as stated by Al-Farsy (1994), was first introduced in 1993. This system initiated a process leading towards the modernisation of the political system in Saudi Arabia. It includes the Consultative Council and Regional Governments and is considered:

> **"... the essential structure and organization of government and, in effect, a bill of rights of the citizens"** (p. 61).

2.1.4 Religion and the Holy Places

Saudi Arabia is the cradle of Islam, and Islam is the only recognized and accepted religion for all Saudi citizens.

2.1.4.1 The Holy Mosques of Makkah and Madinah

Makkah

Makkah is located in the western region of Saudi Arabia. It is the holiest place in the Islamic world because it is the location of the Holy Mosque and the sacred Ka'abah and the destination of millions of pilgrims and visitors from all over the world.

Madinah

Madinah is located in the north-west of Saudi Arabia. It is the second holiest place in the Islamic world because it contains the Mosque of the Prophet Mohammed (Peace be upon him).

2.1.5 Economy

Saudi Arabia espouses a free market economy and free trade. Oil is the major source of income in the country, providing 80 per cent of the total national income (MOInfo., 1991, p. 14).

In order to ensure economic stability and growth, Saudi Arabia established several Five-Year Development Plans, emphasizing the need for a more diversified economy. Therefore, investment in agriculture, mining and the petrochemical industry has been encouraged and supported by the government over the last two decades (Al-Sarhan, 1995, p. 40).

2.1.6 Human Resource Development

Over the last three decades, Saudi Arabia has carefully planned the development of its human resources through the five-year development plans.

2.1.6.1 The First Development Plan (1970-1975)

As the second of its three objectives, the first plan has the following one related to human resources:

> **"Developing human resources so that the several elements of society will be able to contribute more effectively to production and participate fully in the process of development"** (Central Planning Organization, First Development Plan, 1970, p.23).

Since the products of education and training programmes were the main means whereby the country could try to provide manpower suited to its future demands and improve standards, it was important that attention be paid to the following sources in order to achieve this objective:

- Domestic Academic and Technical Education Programmes.
- Overseas Academic and Technical Education Programmes.
- Training Programmes.

(Central Planning Organization, First Development Plan, 1970, pp. 67-71)

2.1.6.2 The Second Development Plan (1975-1980)

The objectives of this plan concerning the development of human resources can be summarized as follows:

1. Raising the labour productivity of new labour-force entrants, giving priority to getting Saudis into managerial and technical positions.

2. Increasing the participation rates of Saudis in the labour force in order to raise the number of Saudis at all age levels actively taking part in the country's massive development.

3. Supplying the labour force with non-Saudis to the extent required for diversified industrial development.

4. Establishing the institutional arrangements for planning and organization needed to implement the above objectives (MOP, Second Development Plan, 1975, p. 216).

2.1.6.3 The Third Development Plan (1980-1985)

At the beginning of this plan, it was realized that the previous development plan had revealed some manpower-related problems which dominated the Third Plan period. These were:

1. The imbalance between the economy's growing manpower requirement and the number of new Saudi entrants into the labour force.

2. The dependence on out-migration from agriculture as an important source of Saudi labour supply for new employment.

3. The restrictive effects of the government's own demand for Saudi labour on the availability of manpower for other sectors.

4. The concentration of demands for non-Saudi labour in the private services sectors (MOP, Third Development Plan, 1980, p.15).

Since human resource development has the highest national priority, the Third Plan had four particular objectives:

1. To increase the total amount of available manpower.
2. To increase the productivity of manpower in all sectors.
3. To deploy manpower to those sectors with the greatest potential for growth and the highest productivity levels (agriculture, industry and mining).
4. To reduce dependence on foreign manpower (MOP, Third Development Plan, 1980, p. 83).

2.1.6.4 The Fourth Development Plan (1985-1990)

The Fourth Development Plan continued to emphasize the priority and importance of the development of human resources. It aimed:

1. To form productive citizen-workers by providing them with education and health services, ensuring their livelihood, and rewarding them on the basis of their work.
2. To develop human resources, thus ensuring a constant supply of manpower, and to upgrade and improve its efficiency to serve all sectors (MOP, Fourth Development Plan, 1985, p. 41).

2.1.6.5 The Fifth Development Plan (1990-1995)

This plan reaffirms the government's commitment to the full development of its people, particularly in its third and fourth strategic objectives, which read as follows:

1. To form a productive national workforce by encouraging citizens to avail themselves of the benefits of the infrastructure and institutions provided for them by the state, ensuring their livelihood and rewarding them on the basis of their work.

2. To develop human resources, thus ensuring a constant supply of manpower, up-grading its quality and improving its efficiency to meet the requirements of the national economy (MOP, Fifth Development Plan, 1990, pp. 45-46).

2.1.6.6 The Sixth Development Plan (1995-2000)

Among its approved important objectives related to human resources, the Sixth Development Plan includes the following:

1. To form the productive national citizen through providing him with the appropriate means and sources of income, and ascertaining his reward on the basis of his work.

2. To develop human resources and continually ensure an increasing supply of manpower, upgrading its efficiency sufficiently to meet the requirement of the national economy, and replacing non-Saudi manpower with suitably qualified Saudis (MOP, the Sixth Development Plan, 1995, p. 87).

2.1.6.7 The Seventh Development Plan (2000-2005)

According to the Statement issued by the Ministry of Planning in August 2000, this plan places special emphasis on the development of human resources and provision of adequate job opportunities. The fifth general objective of the plan reads as follows:

> **"To develop human resources and continually ensure an increasing supply of manpower; upgrading its efficiency through training to meet the requirements of the national economy, and replacing non-Saudi manpower with Saudis"** (MOP, August 2000, p. 2).

The main objectives pertaining to technical education and vocational training are:

1. To improve efficiency and effectiveness of training and develop various pertinent agencies.

2. To improve the quality of training programs with due emphasis on the use of advanced technology.

3. To update the curricula to meet the requirements of the labour market.

4. To ensure horizontal and vertical expansion of technical education and training to cover all regions of the kingdom.

5. To expand on-the-job training programs in the public and private sectors (MOP, August 2000, p. 17).

2.2 Part Two : The Educational System in Saudi Arabia

2.2.1 Early Stages of Education

Nyrop et al. (1977), as cited by Arishi (1995), described the early history of education in Saudi Arabia as follows:

> **"The history of education in Saudi Arabia before 1950 is not clearly known. The earliest education organisations that retain influence in modern Saudi Arabia were established from the seventh century AD on to teach Islam and the Quran. At first, private teachers received students in their homes. Eventually, however, the custom developed of giving lessons in a special room devoted to that purpose, often within the precincts of the community mosque. The school was known as the Maktab or Kuttab from the Arabic root "to write". The training offered in these schools consisted almost entirely of pupils reading and writing the Quran, and emphasised rote methods and reverence for tradition and orthodoxy. In substantial parts of the country these were the only educational institutions"** (p. 11).

In 1932, when the Saudi State was founded by King Abdulaziz Al-Saud, official education was limited to the major cities of Jeddah, Makkah, Madinah and Riyadh. The development of education in Saudi Arabia really began in 1953, when the Custodian of the Two Holy

Mosques, King Fahd Bin Abdulaziz, became the first Minister of Education. He encouraged the government's drive to establish an overall educational system and related policies, placing great emphasis on the quality of education (MOInfo., n.d., pp. 20-21).

2.2.2 Principles of Education

The first and fundamental principle of education in Saudi Arabia is the Islamic heritage and instructions, and in fact, the first message that the Prophet Mohammed (Peace be upon him) received from God (Be He Glorified) was:

"Read in the name of the Lord who created" (Quran, XCVI 1-4).

Furthermore, the Prophet Mohammed (Peace be upon him) advised his followers to seek knowledge from the cradle to the grave.

The second principle of the educational system is that education is free at all stages from primary through to higher education for all the people of Saudi Arabia.

The government of Saudi Arabia allocates a sum in the annual budget for students who are unable to pursue their education because of financial constraints. This support is usually realized through the monthly stipends paid to students and through schooling and travel expenses for those studying abroad.

2.2.3 Organisation of the Educational System

The educational system in Saudi Arabia is divided into two levels: general education and higher education.

General education is subject to the supervision and control of a number of state agencies. The two agencies primarily responsible for this type of education are the Ministry of Education and the General Presidency for Girls' Education. Co-education does not exist in Saudi Arabia. Other Agencies involved include the Ministry of Defence, the Ministry of

Interior, the National Guard, the Ministry of Labour and Social Affairs, the Royal Commission for Jubail and Yanbu and several other institutions (MOP, 1998, p. 41).

Universities come under the control and supervision of the Ministry of Higher Education, but there are Colleges offering higher education which come under different ministries or other bodies. Teacher Training Colleges belong to the Ministry of Education, Health and Science Colleges belong to the Ministry of Health, Girls' Colleges belong to the General Presidency for Girls' Education, Colleges of Technology belong to the General Organisation for Technical Education and Vocational Training, and finally there are the Industrial Colleges at Jubail and Yanbu belonging to the Royal Commission for Jubail and Yanbu.

Other institutions offering technical education and vocational training at secondary level and below are mainly the responsibility of the General Organization for Technical Education and Vocational Training.

The following pages will briefly cover the characteristics and the objectives of General and Higher Education as well as Technical Education and Vocational Training.

2.2.3.1 General Education

General education is divided into four levels: kindergarten, elementary school, intermediate school and secondary school.

Pupils spend one to three years in kindergarten, six years in elementary school, three years in intermediate school and three years in secondary school.

The Objectives of General Education

The objectives of general education in Saudi Arabia are to:

1. Provide Saudi children with good understanding and equip them with Islamic values, ideas and principles.

2. Provide children with various skills and knowledge in order to qualify them to translate from other languages and to understand science and general knowledge within the context of Islamic culture.

3. Provide children with a training programme and reorientation to enable them to keep pace with new developments (MOE, 1974, p. 71 as cited by Arishi, 1995, p. 16).

Table 2.1 shows the numbers of students, classified by sex, type and level of education, enrolled during the period 1414 – 1418/1419 A.H. (1993 – 1997/1998).

Table 2.1

Students, by Sex, Type and Level of Education: 1414 – 1418 / 1419 A.H. (1993 – 1997/1998)

Type and Level of Education \ Year and Sex		1414 A.H. (1993)			1415 A.H. (1994)			1416/1417 A.H. (1995/1996)			1417/1418 A.H. (1996/1997)			1418/1419 A.H. (1997/1998)		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Kindergarten		46528	38887	85415	45896	38403	84299	46836	39616	86452	47904	39596	87500	49795	41557	91352
General Education	Elementary	1117655	997081	2114736	1135637	1033092	2168729	1178655	1069526	2248181	1174411	1081774	2256185	1165378	1078235	2243613
	Intermediate	434073	336764	770837	462207	371557	833764	493369	394558	887927	516786	416919	933705	537635	444795	982430
	Secondary	212138	173615	385753	233059	202016	435075	266491	232168	498659	299821	267519	567340	335013	306529	641542

Source: (MOP, 1998, p. 48)

2.2.3.2 <u>Higher Education</u>

Higher education in Saudi Arabia is offered in universities and colleges and starts upon the successful completion of secondary education.

At present, there are eight universities with eighty-one colleges and institutes distributed all over the different regions of the country.

In addition, there are approximately ninety-four other colleges administered by governmental agencies other than the Ministry of Higher Education responsible also for offering higher education.

Objectives of Higher Education

For higher education to serve the social and economic objectives of the development plans, it aims at the following objectives:

1. Developing loyalty to God and providing the student with an Islamic education which makes him feel responsible for his Islamic nation and puts his practical and scientific capacities into fruitful and useful action;

2. Preparing competent and highly intellectual and scientifically qualified citizens to perform their duty in the service of their country and the progress of their nation in the light of sound Islamic principles and ideology;

3. Providing gifted students with the opportunity to continue higher education in all the fields of academic specialisation;

4. Participating in scientific research in the arts and sciences and finding solutions to technological problems;

5. Promoting writing and scientific production in order to bring the sciences into the service of Islamic thought so that the country can perform its leadership role in building human civilisation on genuine Islamic principles;

6. Translating science and useful areas of knowledge to the language of the Quran, whilst also enriching the Arabic language with new vocabulary;

7. Offering training services and reorientation courses to enable graduates who are already working to keep pace with new developments (Arishi, 1995, pp. 18-19).

Table 2.2 below shows the number of both male and female students and colleges in the Academic Year 1997 and also the number of graduates of both sexes during the Academic Year 1996-1997. It should be noted, however, that Jubail and Yanbu Industrial Colleges only cater for male students.

Table 2.2

Summary Statistics of Universities and Colleges in 1997

Name of University/College	No. of Colleges	No. of Students (Males & Females)	No. Graduates 1996 – 1997	Government Agencies
King Saud University	18	47,128	5,384	Ministry of Higher Education
Islamic University	5	3,546	635	Do
King Fahd University	8	7,592	700	Do
King Abdulaziz University	11	42,965	4,956	Do
Imam University	13	34,839	4,254	Do
King Faisal University	6	9,978	1,191	Do
Umm Al-Qura University	10	21,934	4,344	Do
Girls Colleges	50	100,831	13,889	General Presidency for Girls Education
Teachers College	18	17,700	2,503	Ministry of Education
Health Science Colleges	13	1,567	268	Ministry of Health
Communications Colleges	1	208	153	Ministry of Post, Telegraph and Telephone
Jubail & Yanbu Industrial Colleges	2	912	112	Royal Commission for Jubail and Yanbu
Colleges of Technology	6	7,564	1,907	General Organization for Technical Education and Vocational Training
TOTAL	**161**	**296,764**	**40,296**	

Source: (MOHE, 1998, pp. 13-14)

In addition to the seven universities mentioned in table 2.2, there is also King Khalid University, which was established in 1418-1419A.H. (1997-1998), with eight colleges and institutes enrolling approximately 14,000 students.

In 1997 there were also 4,462 students studying abroad (MOHE, 1998, p. 235).

2.2.3.3 Technical Education & Vocational Training

Technical education and vocational training have been the responsibility of the General Organization for Technical Education and Vocational Training (GOTEVOT) since 1400 A.H. (1980) (MOP, 1998, p. 41).

The General Organization for Technical Education and Vocational Training is supervising and controlling the technical education and vocational training through several institutions. These are:

(1) Vocational Training Centres,

(2) Secondary Institutes, and

(3) Colleges of Technology.

In addition to the above major institutions, the General Organization for Technical Education and Vocational Training is responsible for running the Instructor Training Institute/ Instructional Materials Development Centre (ITI/IMDC), which was established in order to prepare instructors in science and technology to teach in the Vocational Training Centres.

The total number of students enrolled in and graduating from the different Training Centres supervised by GOTEVOT for the year 1417 A.H. (1996) to the year 1419 A.H. (1998) is shown in Table 2.3.

Table 2.3

Distribution of Enrollees and Graduates

among Vocational Training Centres Sponsored by GOTEVOT

(1417 – 1419 A.H. / 1996 – 1998)

Types of Vocational Training	Enrollees				Graduates			
	1417AH 1996	1418AH 1997	1419AH 1998	*AAGR	1417AH 1996	1418AH 1997	1419AH 1998	*AAGR
Morning Vocational Training	5985	7795	10122	30.0	4387	3257	3784	7.1 -
Evening Vocational Training	1473	1778	2265	24.0	1157	1492	2052	33.2
On-the-Job (In-Service)	112	46	17782	1160.0	112	46	17782	1160.0
Instructor's Training Institute/ Pre-Service Programmes	85	97	162	38.1	85	97	162	38.1
Instructor's Training Institute/Development Programmes	275	563	-	-	275	563	-	-
TOTAL	7930	10279	30331	112.3	6016	5464	23780	163.3

*Average Annual Growth Rate

Source: (MPC, The Eighteenth Annual Report, 2000, p. 15)

The total number of students enrolled in and graduating from the different secondary and post-secondary institutions supervised by GOTEVOT from the year 1417 A.H. (1996) to the year 1419 A.H. (1998) is shown in Table 2.4 below.

Table 2.4

Distribution of Students and Graduates

of Technical Education Supervised by GOTEVOT

(1417 – 1419 A.H. / 1996 – 1998)

Years / Distribution	1417 A.H. 1996	1418 A.H. 1997	1419 A.H. 1998	*AAGR
Students	28064	27677	33348	9.0
Graduates	6863	7045	5925	7.1 -

*Average Annual Growth Rate

Source: (MPC, The Eighteenth Annual Report, 2000, p. 12)

It is worth mentioning that all the private institutes offering technical education and vocational training are supervised and licensed by the General Organization for Technical Education and Vocational Training.

In the following text, a brief description of each type of institution will be given, with greater emphasis placed on the Colleges of Technology because of the similarity that exists between these colleges and Jubail Industrial College, the case study of this research.

2.2.3.3.1 Vocational Training Centres

Vocational Training Centres offer vocational training below the secondary school level, and aim at qualifying Saudi young people to enter the field of technical manpower. There are thirty centres distributed throughout the country. The number of students enrolled in the year 1418-1419 A.H. (1997-1998) in daytime classes was 7,795 and the number enrolled in evening classes was 1,778 (GOTEVOT, 1418 A.H., pp. 104 and 110).

2.2.3.3.2 Secondary Technical Institutes

There are three types of specialised technical secondary institutes which are operated by the General Organization for Technical Education and Vocational Training in order to provide the country with qualified Saudi manpower in the industrial, commercial and agricultural sectors.

The total number of institutes is thirty and they can be classified as follows:

10 Industrial Institutes,

16 Commercial Institutes, and

4 Agricultural Institutes.

These institutes enrolled 16,664 students in the year 1418-1419 A.H. (1997-1998) (GOTEVOT, 1418 A.H. pp. 36, 56, and 72).

2.2.3.3.3 Colleges of Technology

Since the planning and execution of the country's Development Plan is the responsibility of Saudi nationals, the Government of Saudi Arabia decided in the year 1403-1404 A.H. (1983-1984) to establish the first College of Technology in Riyadh under the authority of the General Organization for Technical Education and Vocational Training. Its purpose is to provide the necessary qualified and skilled national workforce, particularly in the field of technology, who can undertake this task (GOTEVOT, 1418, p. 7).

As the country's need for highly skilled manpower has increased during the last decade and a half, the General Organization for Technical Education and Vocational Training established more colleges in the major cities of the country raising the number of colleges to ten by 1418 A.H. (1998), including the two Telecommunications Colleges in Riyadh and Jeddah, which were transferred from the Ministry of Post, Telegraph and Telephone to the General Organization for Technical Education and Vocational Training.

With the establishment of three more Colleges in Hail, Al-Baha and Najran, the current number of colleges is thirteen.

Objectives of the Colleges of Technology

The objectives of the Colleges of Technology can be summarized as follows:

1. To train national manpower in the fields of science and technology, in order that it respond to the demands of the various national industries in conformity with the Kingdom's development plans.

2. To contribute to the improvement of the competence of those who are in the various professional and technical fields.

3. To spread and clarify technical and professional concepts among citizens.

4. To conduct research and studies in the field of technology, and provide institutions with constant services that may assist them in improving the quality of their products and in finding solutions to the technical problems they may have (College of Technology, Dammam, 1999, p. 4).

Areas of Specialisation

Specialities taught in the colleges differ from one to another and they cover the following areas:

1. Electronics Technology:
   - Industrial Electronics Technology
   - Computer Technology
2. Electrical Technology:
   - Electrical Power Technology
   - Electrical Equipment Technology
3. Mechanical Technology:
   - Air Conditioning/Refrigeration Technology
   - Pneumatic/Hydraulic Technology
   - Production Technology
4. Chemical Technology:
   - Laboratory Technology
   - Chemical Technology

5. Auto/Engine Technology:

    - Automotive Technology
    - Agricultural Technology

6. Construction Technology

7. Commercial/Administrative Technology:

    - Office Management Technology
    - Hotel & Tourism Technology
    - Computer-based Accounting Technology
    - Marketing and Sales Technology
    - Banking Management Technology

8. Telecom Technology:

    - Telecom Networks
    - Telephone Exchanges
    - Transmission (GOTEVOT, 1418 A.H., pp. 7 and 8).

Degree Requirements

A student is required to complete not less than 93 study units in order to graduate and be awarded a diploma by a College of Technology. The duration of study is from 4 to 8 semesters. The academic year is divided into two semesters, each lasting 15 weeks and the study units required for graduation are as follows:

20 Units	College compulsory courses
64-66 Units	Department compulsory courses

2 Units College electives

2-4 Units Department electives

3 Units Co-operative training (College of Technology, Dammam, 1999, p. 5)

Table 2.5 below shows the number of students enrolled in the colleges between 1993 and 1998, while the number of graduates between 1992 and 1997 is shown in Table 2.6.

Table 2.5

Students at Colleges of Technology During the Period 1414/1415 A.H. (1993/1994) – 1418/1419A.H. (1997-1998)

Years / Description	1414/1415A.H. 1993/1994	1415/1416A.H. 1994/1995	1416/1417A.H. 1995/1996	1417/1418.H. 1996/1997	1418/1419A.H. 1997/1998
Students	6,648	7,214	6,999	7,629	8,880

Source: (GOTEVOT, 1418 A.H., p. 20)

Table 2.6

Graduates from Colleges of Technology 1413 A.H. (1992) – 1417/1418 A.H. (1996/1997)

Years / Description	1413A.H. 1992	1414/1415A.H. 1993/1994	1415/1416A.H. 1994/1995	1416/1417A.H. 1995/1996	1417/1418A.H. 1996/1997
Graduates	1,354	1,706	1,967	1,909	1,916

Source: (GOTEVOT, 1418 A.H., p. 20)

2.3 Summary

The first part of the chapter outlines the history of Saudi Arabia and describes the main features of its geography in terms of its location, physical features and climate. It also considers the political system and the role of the Islam. It then discusses the economy, describing the impact of the seven five-year plans on human resource development, and underlines the importance of education, which has the highest national priority in order to replace non-Saudi manpower with qualified Saudis.

The second part of the chapter is concerned with education in Saudi Arabia, and stresses its Islamic foundations. It describes the several bodies responsible for general and higher education, giving a detailed account of technical and vocational training and emphasizing the role of the Colleges of Technology in supplying the country's need for skilled manpower. Tables illustrate the number of students at all levels and in different colleges and universities.

CHAPTER THREE

A GENERAL OVERVIEW OF THE ROYAL COMMISSION FOR JUBAIL AND YANBU WITH PARTICULAR REFERENCE TO JUBAIL INDUSTRIAL COLLEGE (JIC)

3.1 Part One : An Overview of the Royal Commission For Jubail and Yanbu (RCJ&Y)

One of the major elements of the economic strategy in Saudi Arabia is to reduce the Kingdom's dependence on the production of oil as a primary source of national income, through the development of a wide range of industries, especially of the hydrocarbon-based and energy-intensive type (Al-Farsy, 1994, p. 190).

Therefore, the Royal Commission for Jubail and Yanbu (RCJ&Y) was established in 1395A.H. (1975) by Royal Decree No. M/75 to develop the infrastructure facilities necessary to transform the two cities of Jubail and Yanbu into planned industrial complexes and associated urban communities (RCJ&Y, Industries, 1998, p. 2).

3.1.1 Objectives and Policies

The objectives and policies of the RCJ&Y can be summarized as follows:

> **"The Royal Commission's basic charter is to build, operate, and maintain the infrastructure needed to support Jubail and Yanbu Industrial Cities. That infrastructure includes developed sites, shoreline protection, roads, and utilities, as well as housing and facilities for health, education, and other community services. It establishes regulations for community development and environmental protection, using the highest international standards and state-of-the-art technology. The Royal Commission also promotes private-sector investment in the two cities"** (RCJ&Y, 15 Years of Accomplishments, 1991, p. 18).

3.1.2 Jubail Industrial City

Jubail Industrial City is situated on the Arabian Gulf in the Eastern Region of Saudi Arabia, the heart of the country's oil-producing region, and occupies a total area of 932 square kilometers (RCJ&Y, The Annual Report, 1981, p. 19) with a total population of about 100,000 (RCJ&Y, Jubail Industrial City, n.d., p. 26).

Currently, Jubail Industrial City hosts 17 primary, 16 secondary and 100 light and support industries in operation. In addition, there are 32 industries under construction and 74 in the design stage. The primary industries produce 50 products and cover petrochemicals, steel, fertilisers, gases and oil-refining products. The secondary industries, often using primary industry products as feedstocks, produce 3.7 million tons annually of value-added products such as petrochemical intermediates, plastics, steel, copper and aluminium products and agrochemicals (RCJ&Y, Industries, May 1998, pp. 6 and 25).

3.1.3 Yanbu Industrial City

Yanbu Industrial City, on the other hand, is located on the Red Sea in the Western Region of the country and occupies a total area of only 188 square kilometres (RCJ&Y, The Annual Report, 1981, p. 35) with a total population of about 31,000.

At present, Yanbu Industrial City has 5 primary industries and 8 secondary industries in operation. The types of products are to a great extent similar to those being produced in its sister city, Jubail Industrial City (RCJ&Y, Yanbu Industrial City, Facts and Figures, 1994, pp. 1.1, 4.5 and 4.13). For the location of the two cities on the map of Saudi Arabia, please refer to Fig. 2.1 on page No. 9.

3.2 Part Two: An Overview of Jubail Industrial College (JIC)

3.2.1 Introduction

Jubail Industrial College is located in the heart of Jubail Industrial City (Madinat Al-Jubail Al-Sinaiyah) and occupies an area of 1,370,000 square meters, nearly adjacent to the Arabian Gulf shore.

3.2.1.1 Foundation

Jubail Industrial College was founded in 1978 as an interim vocational training centre to offer 9-month vocational training courses in different trades and skills related to construction, building and carpentry, auto-mechanics, heavy equipment operation and sheet metal work. The aim was to graduate semi-skilled Saudis to participate in the laying-down of the infrastructure of Jubail Industrial City.

In 1403 A.H. (1982) the Royal Commission for Jubail and Yanbu decided to develop the programmes on offer in terms of type, content and duration to match the rising needs of manpower for the developing city. Therefore, new skills and trades were also added such as surveying, inventory control, heavy equipment mechanics, residential and industrial electrical works, and process operation.

The duration of some of the courses became 18 months and the name of the centre was changed to the Royal Commission Human Resources Development Institute.

When the basic infrastructure of Jubail Industrial City was completed and the industrial plants were constructed, the era of operation and maintenance started, creating its special requirement of manpower.

Officials in the Manpower Council, the State agency for manpower planning, along with others from the Royal Commission for Jubail and Yanbu responded successfully by issuing Manpower Council Decision No. 3/M 29/1409 in 1409 A.H. (1989) giving official approval for converting the two institutes in Jubail and Yanbu into two industrial colleges offering associate Diploma programmes in the field of technology related to operation and maintenance.

3.2.1.2 Objectives and Mission

According to the College's charter, issued by the Manpower Council, Jubail Industrial College should operate to achieve the following objectives:

1. To open new channels of technical training for Saudi Youth in conformity with the Kingdom's development plans.

2. To meet the requirements of technically trained manpower in accordance with the specified job descriptions and international standards of quality.

3. To attract and develop qualified Saudis to replace foreign manpower.

4. To provide consultancy services for industry.

5. To provide tailor-made courses to meet the specific needs of industry.

6. To provide community service programs which may have cultural, professional or recreational benefits (JIC, Prospectus, 2000, p. 4).

Therefore, Jubail Industrial College developed and adopted the following vision:

> **"JIC exists to provide quality, flexible and responsive technological educational and training programs through partnership with businesses and industry"** (JIC, Presentation Materials, 2000, p. 4).

3.2.1.3 The College's Main Activities

The College's educational and research activities are divided into five main areas. These are:

3.2.1.3.1 The Associate Diploma programme

This is open to secondary school graduates and involves three years of full-time study. The programme is also offered on a part-time basis for employees. The programme covers specific areas of technology and business.

3.2.1.3.2 The Short and Tailor-Made Special Courses Programme

This is designed to cater for the specific needs of the industries and businesses and is offered to a large number of employees and trainees every year.

3.2.1.3.3 English Language Services

The services of this programme comprise the teaching of English as a Foreign Language (EFL) to the College students as well as the local community, and conducting tests in English proficiency to internationally accredited standards.

3.2.1.3.4 The Community Education Programme

This programme is offered annually on a semester-basis for the community and covers a wide range of short courses.

3.2.1.3.5 The Industrial Applied Research Programme

This programme is primarily directed at solving the specific problems of different industries at their request, and other projects such as the exploitation of alternative energy sources for motive power (JIC, Prospectus, 2000, pp. 4-5).

3.2.2 Organisational Structure

Jubail Industrial College operates under the auspices of the Royal Commission for Jubail and Yanbu as an educational and training college.

The bodies and authorities controlling and supervising the operation of the college are the following:

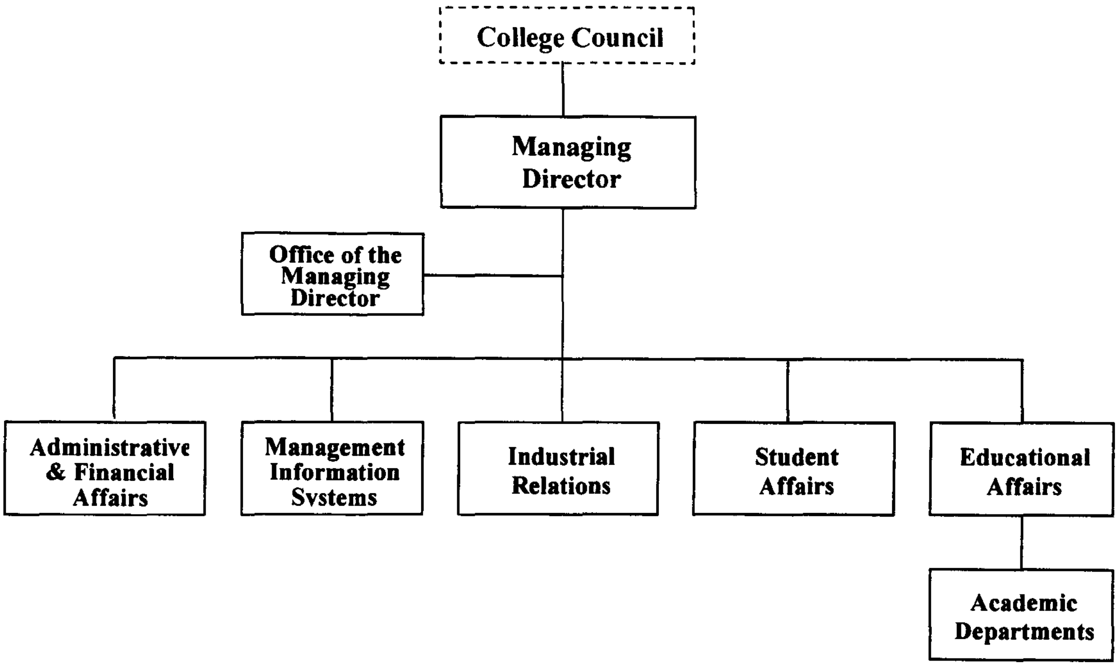
- The Chairman of the Royal Commission for Jubail and Yanbu.
- The Royal Commission Board of Directors
- The Directorate General for Jubail Project.

3.2.2.1 Administrative Chart

The structure of the College consists of six main divisions and departments. These are:

1. The Office of the Managing Director
2. The Educational Affairs Division
3. The Student Affairs Division
4. The Administrative and Financial Affairs Division
5. The Industrial Relations Department
6. The Management Information Systems Department

The chart (Fig. 3.1) illustrates the inter-departmental and hierarchichal relationships of the divisions and departments of the College.



Source: (JIC, Organisational Chart, 1419 A.H., 1998)

(Fig. 3.1) **JIC Organisational Chart**

3.2.2.2 College Councils and Committees

Besides its formal administrative organisation, Jubail Industrial College has established a group of councils and committees to cover other aspects of its work and to provide more flexibility in the execution of the educational and training processes being offered at the College. A description of the membership and authorities of these Councils and Committees pertaining to Academic Affairs is given below.

3.2.2.2.1 The College Council

The College Council represents the highest academic authority in the College, and consists of the following:

1. The Managing Director - Chairman
2. The Deputy for Educational Affairs - A/Chairman and Member
3. Director of Student Affairs - Member
   (Now the Deputy for Student Affairs)
4. Chairmen of the Academic Departments - Members
5. The College Registrar - Member
6. Two faculty staff - Members

The Council is authorized to:

1. Develop a general policy for the college.
2. Approve and monitor the academic plans and programmes.
3. Evaluate scientific, technical and academic activities in the college.
4. Approve regulations for student punctuality, the class and lecture system, academic evaluation, the examination system, graduation requirements and other issues related to student affairs.
5. Recommend out-of-Kingdom training, awards, study release, sabbaticals, secondment, and scientific promotions for staff members.
6. Form various permanent and temporary scientific and technical committees from council members or specialists to study issues within the sphere of the council's authority.
7. Discuss and approve the college annual report.
8. Discuss and approve the College's needs for new staff.
9. Discuss and approve the Academic Calendar of the College.
10. Discuss and recommend the creation of new disciplines or elimination of others.

11. Discuss and propose the expansion of the physical facilities.

12. Approve the graduation of students.

3.2.2.2.2 <u>The Departmental Councils</u>

The Departmental Councils are formed as follows:

1. The Department Chairmen	-	Chair of the Council
2. All Course Directors	-	Members
3. Three Senior Faculty staff with diverse backgrounds	-	Members

The Councils are authorized to:

1. Approve and monitor the internal departmental academic policy, programmes, and related activities.

2. Approve all requests for purchasing of equipment and materials.

3. Determine the courses taught in the department on the basis of areas of specialisation.

4. Propose lecture and workshop hours distribution for the teaching staff.

5. Discuss and recommend all non-teaching printed materials prepared by the department.

6. Discuss the examination results of the department, and develop means to improve the academic and practical performance level of students.

7. Approve all curriculum textbooks and other teaching materials to be purchased or developed by the department.

8. Propose recruitment needs for the College Council's approval.

9. Discuss and propose any new disciplines to be offered by the department.

10. Discuss and propose the operational budget for the department.

11. Discuss, deliberate and approve the Annual Operational Plan for the department.

12. Discuss and implement the departmental arrangements for student registration and examinations.

13. Implement Management and College Council decisions.

3.2.2.2.3 The Academic Assessment Committee

The Academic Assessment Committee is formed as follows:

1. College Deputy for Educational Affairs	-	Chairman
2. Registrar	-	Member
3. Academic Department Chairmen	-	Members
4. One faculty Staff	-	Member

The Role and Responsibilities of the Committee:

1. To study the cases of those students who are placed on academic probation.

2. To submit recommendations about those who have been dismissed due to their poor academic achievement.

3. To study requests for the transfer of students to the college.

4. To consider the re-enrollment of those students who interrupt their studies.

5. To review the students' levels and make appropriate recommendations (JIC, Student Affairs Regulations Manual, 2000, pp. 24-25).

3.2.3 Educational Affairs

The Educational Affairs Division is the largest among the College's organisational divisions and its responsibilities cover all activities pertaining to the planning, implementation and evaluation of the educational and training process.

3.2.3.1 Educational and Training System

The Associate Diploma Programme at Jubail Industrial College, which involves three years of full-time study, is designed in line with the following principles:

- Active learning
- Integrated studies
- Practical hands-on training
- Job-related content

3.2.3.1.1 The Preparatory Year

Since English is the medium of instruction in the specialisation subjects, a preparatory year programme has been designed to achieve the following objectives:

1. To establish a strong basis in the English Language whereby the students will be able to understand and respond to instructions in their classroom and work environment.

2. To bridge the gap between the students' previous educational experience and knowledge, and the specialised programmes in the next two years.

3. To develop the students' ability to work independently as well as under academic supervision.

Throughout this year, students study subjects such as English, Basic Sciences, Mathematics, Physical Education, Introduction to Computer, Engineering Drawing, Workshop Technology and Introduction to Business.

3.2.3.1.2 The Specialised Degree Requirement Plan

A student is required to complete a minimum of 67 credit hours during two years of full-time study, covering all the core courses and other subjects and projects related to the area of specialisation (JIC, Prospectus, 2000, pp. 4, 15, 25, and 26).

3.2.3.2 Educational Departments and Specialisations

The Educational Affairs division consists of four specialised academic departments offering two-year Associate Diploma programmes in specialised areas. These are:

- The Department of Mechanical and Manufacturing Engineering Technology
- The Department of Electrical and Electronics Engineering Technology
- The Department of Chemical and Process Engineering Technology
- The Department of Business Studies

In addition, there are two more academic departments offering mainly English Language courses and other general subjects such as mathematics, sciences, physical education and Islamic culture. These departments are non-degree awarding entities, but, they are meant to provide students with the courses required for the preparatory year and the additional courses to support students during their specialisation years. These are:

- The English Language Centre
- The Department of General Studies

The following text will briefly discuss the role and specialised programmes of each department as well as examples of the career opportunities available to its graduates.

3.2.3.2.1 The Department of Mechanical & Manufacturing Engineering Technology

The role of this department is to provide education and training in the main streams of Mechanical Engineering Technology.

Academic Programmes

To fulfil its role, the department offers the following three specialisations:

- Electromechanical Engineering Technology
- Manufacturing Engineering Technology
- Air-Conditioning and Refrigeration Engineering Technology

Career opportunities available for the graduates of the department include the following:

Electromechanical Engineering Technology:

- Electromechanical Systems Technician
- Mechanical Maintenance Technician
- Plant Service Technician
- Pump/Boiler/Diesel-Engine Technician
- Utility Equipment Operator

Manufacturing Engineering Technology:

- Manufacturing Technician
- Machining Technician

- Plant Service Technician
- Materials Testing Laboratory Technician
- Draughtsman

Air-Conditioning and Refrigeration Engineering Technology:

- Air-Conditioning Technician
- Refrigeration Technician
- Production Technician
- Installation Planner
- Equipment Salesman (JIC, Prospectus, 2000, pp.31-35).

3.2.3.2.2 The Department of Electrical & Electronics Engineering Technology

The role of this department is to provide education and training in the areas relating to Electrical and Electronics Engineering Technology.

Academic Programmes

The department currently offers the following two specialisations:

- Electrical Power Engineering Technology
- Instrumentation & Control Engineering Technology

The two academic programmes are designed to prepare students for employment as follows:

Electrical Power Engineering Technology:

- Electrical Wiring Technician
- Electrical Machines Technician
- Electrical Control and Protection Technician

- Electrical Maintenance Technician
- Electricity Generation and Distribution Technician

Instrumentation and Control Engineering Technology:

- Electronics Control Technician
- General Electronics Technician
- Instrumentation Maintenance Technician
- Electronics Measurement Technician
- Instrumentation and Calibration Technician (JIC, Prospectus, 2000, pp.49-52).

3.2.3.2.3 The Department of Chemical and Process Engineering Technology

This department is dedicated to offering education and training programmes in the field of chemical engineering and applied chemical technology.

Academic Programmes

The department offers two specialisations in the following areas:

- Industrial Laboratories Technology
- Chemical Engineering Technology

The graduates of the two programmes will gain technical competence in the areas of study and the career opportunities likely to be available upon graduation are as follows:

Industrial Laboratory Technology:

- Chemical Laboratory Technician
- Quality Control Supervisor
- Scientific/Research Assistant

- Water Treatment Analyst
- Chemical Laboratory Technologist

Chemical Engineering Technology:

- Process Plant Operator
- Control Room Operator
- Unit Operator
- Environmental Monitoring Technician
- Process Plant Technologist (JIC, Prospectus, 2000, pp. 63 and 66).

3.2.3.2.4 The Department of Business Studies

The role of this department is different from the other departments as this department provides specialisations and courses related to business and commerce.

Academic Programmes

The department has the following three specialisations:

- Accounting
- Marketing
- Office Management

Graduates of the Business Studies department are qualified for the following jobs:

Accounting:

- Accounting Technician
- Budgeting Assistant
- Credit Controller
- Stock Controller

- Internal Audit Assistant
- Cost Accounting Assistant
- Payroll Clerk

Marketing:

- Marketing Assistant
- Advertising Assistant
- Market Research Assistant
- Product Development Assistant
- Sales Planner
- Assistant Sales Manager
- Assistant Product Manager

Office Management:

- Secretary
- Personnel Assistant
- Administrative Assistant
- Office Manager
- Management Trainee
- Data Entry Technician
- Clerical Staff (JIC, Prospectus, 2000, pp. 76 and 78).

3.2.3.3 Graduation Requirements

A student must meet the following requirements to qualify for graduation:

1. Satisfy all the preparatory year requirements.

2. Pass all the required academic units specified by the College Council.

3. Obtain a minimum cumulative GPA of 2.00.

4. Fulfil the relevant regulations of the Co-operative training assigned to him.

5. Satisfy all the requirements for graduation in his Major Area of Specialisation within three scholastic years maximum for full-time students and seven years maximum (including preparatory year) for part-time students (JIC, Student Affairs Regulations Manual, 2000, p. 35).

3.2.3.4 Certification and Accreditation

Upon successful completion of the graduation requirements, a student shall be awarded an Associate Diploma certifying his specialisation.

Academically, Jubail Industrial College follows the guidelines issued by the Higher Education Council and the Ministry of Higher Education.

Since the commencement of its educational and training programmes, the College has been adapting to the criteria of the U.S. Accreditation Board for Engineering and Technology (ABET) when designing its technological programmes.

Therefore, the graduates of Jubail Industrial College wishing to pursue their further education for a Bachelor's degree in the areas of engineering and technology are accepted in local as well as international universities and colleges.

For employment purposes, Jubail Industrial College's Diploma is recognized by all the appropriate government organisations concerned such as:

- The Ministry of Civil Service, and
- The Manpower Council.

3.2.3.5 Curriculum Development

The Academic departments of the College are responsible for the development of the curriculum and coordination with the industry and business sectors for this purpose.

For these departments to do the task in a unified manner, a committee was set-up to spell out the main guidelines and to oversee the development process.

The following pages will survey the role, structure and objectives of the committee.

3.2.3.5.1 Curriculum Development Committee (CDC)

Structure of the Committee

1. The committee will consist of five members each representing an Educational Department. They will be nominated by their respective Chairmen.

2. The chairman of the Committee will be appointed by the JIC Deputy for Educational Affairs subject to the approval of the Managing Director.

3. Each member will sit on the Committee for a period of two years. This may be renewed at the end of that term. If a member leaves during the tenure of his appointment, he will be replaced.

Objectives of the Committee

The main objectives of the Committee are to ensure that:

a) Any course material developed in JIC, either theoretical or for laboratory and workshop practices, meets the defined objectives of the course and agrees with the syllabus previously approved by the Department concerned. In addition:

1. It fulfils the requirements of the Committee for design and layout.

2. Its language is correct and its level is comprehensible to the students.

3. Its approach is simple, user-friendly and easily understood by the students.

4. It can be adequately supported by experimental laboratory work or practical hands-on facilities.

5. It is not in breach of the Copyright Law.

b) All requests for procurement of textbooks by JIC meet the objectives of the courses.

Role of the Committee

1. The CDC's main role is to act as a regulatory body for development of curricula for JIC.

2. It does not take responsibility for developing any curriculum materials. This will remain one of the major activities of the educational departments.

3. It merely ensures that such development activities comply with the Curriculum Development Committee's stated guidelines.

4. It will prepare its guidance document to incorporate the following:

   a. Procedures
   b. Copyright regulations
   c. Criteria for evaluation of curricula

5. The Committee will regularly liaise with industries via the Industrial Relations Department and provide Educational Departments with feedback from them.

3.2.3.6 Examination and Assessment Policy

A student is assessed in the subject of study mainly by a mid-term and a final comprehensive examination. In addition, class activities such as weekly quizzes, research, reports, projects and field assignment are also considered as an integral part of the overall assessment of a student's achievement.

The total marks for each course are divided as follows:

- Class Activities - 30%
- Mid-Term Test - 20%
- Final Examination - 50% (JIC, Student Affairs Regulations Manual, 2000, p. 27)

3.2.3.7 The Co-operative Training Programme

According to Jubail Industrial College's educational policies, a student must attend and pass a 15-week Co-operative training programme to qualify for graduation. This programme offers the student an opportunity to perform in a career area related to his academic specialisation aiming at the integration of theory with practice.

3.2.3.7.1 Benefits of the Programme

(a) For the student:

1. He gains some practical work experience before he graduates.
2. He is exposed to a wide range of work situations.
3. He develops an understanding of the relevance of his training in JIC to what is

needed in the outside world, and may as a result feel more motivated towards his education in the College.

4. He gets an opportunity to market himself to a potential employer.

(b) For the College:

1. It enables the College to maintain close contact with the employment market and gauge the nature of the work force which they may need.

2. It provides valuable information to the College for updating its curricula in order to meet the demand of skills outside.

(c) For the employers:

1. It provides them with an effective means of recruiting a work force who have skills, know-how, and knowledge of company policy and procedures.

2. It enables them to employ an intelligent and motivated group of people who are willing to learn and perform a wide variety of jobs.

3.2.3.7.2 Evaluation of the Training:

The evaluation and assessment of a student's performance in the Co-operative Training Programme comprises the following:

1. Weekly evaluation during On-the-Job Training by his training supervisor.
2. End-of-training evaluation by the company.
3. End-of-training evaluation by the College (JIC, Procedural Guide on Co-operative Training, 1999, pp. 1, 2, 5 and 6)

3.2.3.8 The Annual Operational Plan (AOP)

Jubail Industrial College believes that the effective delivery of its services and its ability to remain in touch with rapidly changing technology, depend on the proper short- and long-term planning of activities, especially in the educational and training affairs division.

Accordingly, the management of JIC has formed the Annual Operational Planning Committee to provide a platform for development activities and to assist the academic departments in identifying and organising their projects of development related to curricula, students, staff, facilities, and services, as well as monitoring the progress of the various plans.

The Committee issued its first Annual Operational Plan in 1992 and has continued to issue plans to date.

Upon the completion of each plan, an End-of-Plan Report is issued, highlighting its major achievements and the constraints identified by the Educational Departments (JIC, 8th Annual Operational Plan, 1999, p. i).

3.2.3.9 Quality of Tuition on Offer

Jubail Industrial College has adopted different procedures to ensure the high quality of its teaching and training activities. These procedures are as follows:

1. The programmes are structured according to the ABET criteria, that is, active learning, integrated studies, hands-on training and job-related contents philosophy.

2. The programmes are designed to meet the requirements of the industries, and benefit from close collaboration with them.

3. The medium of instruction is English.

4. The facilities comprise modern equipment.

5. The faculty is highly qualified to provide education and training in technology, and has a proven track record of success in its graduates' careers.

6. This success is proven by the way in which graduates are gainfully employed, most often in a competitive employment market.

7. The grading policy is based on the continuous assessment of students throughout the semester including its major examinations in the middle and at the end.

3.2.3.10 Student Attendance Policies

Based on known educational standards and measures as well as on the requirements of the host organisations of its graduates, Jubail Industrial College places great emphasis on the students' discipline and attendance, which represent the third dimension of the profile of its graduates.

Therefore, the college has adopted the following class attendance policies:

1. A student will be marked absent when he is more than 5 minutes late for class.

2. If a student shows up to 5 minutes or less late, he should be marked "L" (Late).

3. Three repeated 'Lates' are to be considered as one period absent.

4. A drop notice (Denial or DN) will be assigned to a student whose unexcused absence exceeds 2/15 of the course contact hours.

5. A student whose excused or partly excused and unexcused absence exceeds 5/15 shall have a drop notice of a grade of WP, provided that the unexcused point is not reached first. Otherwise, a grade of DN shall be assigned to the student concerned.

6. A class instructor should warn any student who absents himself from class for 50 per cent of the permitted absence (i.e., 1/15 of the contact hours).

7. The drop notice shall be cancelled when a student presents a valid excuse approved by the Director of Student Affairs.

3.2.3.11 **Academic Advisory**

Each student is assigned an academic advisor. The advisor will be a faculty member in the department in which the student is majoring. The duties of the advisor are as follows:

1. To select programmes.

2. To interpret academic rules and regulations.

3. To sign registration forms.

4. To assist in solving problems related to the students' academic life.

5. To provide information on graduation requirements, and on department and College regulations pertaining to academic matters.

6. To provide supervision and integration of the students' courses of study (JIC, Prospectus, 2000, p. 97).

3.2.4 **Student Affairs**

The Student Affairs Division is responsible for the implementation of the College's policies and procedures related to the registration and admission of students, as well as the services provided to them.

3.2.4.1 **Admission Requirements**

For a student to be admitted to the College, he must meet the following conditions:

1. He must be a Saudi National.

2. He must possess a General Secondary School Certificate or equivalent with a minimum grade of "Good". The certificate should not be more than 3 years old at the time of admission, except for part-time applicants.

3. He should be a full-time student with the exception of employed students.

4. He should be declared medically fit.

5. He should possess a good moral character.

6. He should pass an admission test and a personal interview.

7. He should not exceed 23 years of age except for part-time applicants.

8. He should meet other requirements as decided by the College Council (JIC, Student Affairs Regulations Manual, 2000, p. 11).

3.2.4.2 <u>Benefits and Services to Students</u>

Jubail Industrial College offers the following services to students free, aiming at fostering the students' well-being. These services are:

- Housing and catering
- Medical care
- Safety and security
- Social counselling
- Mail and telephones
- Stipends and incentives
- Recreational and other non-curricular activities
- Student welfare fund charter (JIC, Student Affairs Regulations Manual,1998, pp. 42-49).

3.2.5 Students

Jubail Industrial College had 1,373 students enrolled in the Associate Diploma Programme as of February, 2000, in addition to 144 employed trainees attending special and tailor-made educational and training programmes.

The approved future plan of the College indicates that there will be an increase in the College student population to 2,893 students by the Academic Year 2003/2004 (JIC, Special Report, 28th April, 1999). Table 3.1 below shows the student intakes from 1989/1990 to 1999/2000.

Table 3.1
Students Classified by Annual Intakes
during the Period from 1989/90 to 1999/2000

Annual Intake	No. of Applicants	No. of Admitted Students
1989/1990	1198	248
1990/1991	1603	218
1991/1992	1210	216
1992/1993	2105	294
1993/1994	1712	220
1994/1995	1427	151
1995/1996	2114	245
1996/1997	2401	369
1997/1998	3064	494
1998/1999	5864	527
1999/2000	7492	795
TOTAL	**30190**	**3777**

Source: (JIC, Student Records, February, 2000)

Table 3.2 shows the student enrollment during the second semester 1999/2000 classified by specialisation.

Table 3.2

Students' Enrollment Classified by Specialisation during Second Semester of Academic Year 1999/2000

Specialisation	No. of Students
Preparatory Year	848
Industrial Laboratory Technology	56
Chemical Engineering Technology	40
Electromechanical Engineering Technology	55
Manufacturing Engineering Technology	53
Air-Conditioning and Refrigeration Engineering Technology	36
Instrumentation and Control Engineering Technology	47
Electrical Power Engineering Technology	96
Accounting	36
Marketing	43
Office Management	63
TOTAL	**1373**

Source: (JIC, Student Records, February, 2000)

3.2.6 Graduates

By the end of the year 1999, the total number of graduates from Jubail Industrial College was 844 students, majoring in nine specialisations.

Table 3.3 shows the number of graduates distributed by year of graduation for the period from 1992/1993 to 1999/2000.

Table 3.3

Graduates Distributed by Year of

Graduation For the Period from 1992/1993 to 1999/2000

Academic Year	Number Of Graduates
1992/1993	61
1993/1994	95
1994/1995	86
1995/1996	107
1996/1997	143
1997/1998	134
1998/1999	48
1999/2000	170
TOTAL	**844**

Source: (JIC, Graduate Records, December, 1999)

Table 3.4 below shows the number of graduates classified by area of specialisation for the period from 1992/1993 to 1999/2000.

Table 3.4

Graduates Classified by Specialisation

for the Period from 1992/1993 to 1999/2000

Specialisation	No. of Graduates
Industrial Laboratory Technology	140
Electromechanical Engineering Technology	100
Manufacturing Engineering Technology	66
Air-conditioning and Refrigeration Engineering Technology	11
Instrumentation and Control Engineering Technology	162
Electrical Power Engineering Technology	159
Accounting	83
Marketing	54
Office Management	69
TOTAL	**844**

Source: (JIC, Graduate Records, December, 1999)

Table 3.5 below shows the number of graduates classified by geographical region for the period from 1992/1993 to 1999/2000.

Table 3.5

Graduates Distributed by Geographical Region for the Period from 1992/1993 to 1999/2000

Region	No. of Graduates	Region	No. of Graduates
EASTERN	514	NORTHERN	18
RIYADH	95	ASSIR	17
MEKKAH	41	HAIL	16
AL-BAHA	40	AL-JOUF	12
NAJRAN	37	JIZAN	7
QASSIM	25	TABUK	3
MADINAH	19	**TOTAL**	**844**

Source: (JIC, Graduate Records, December, 1999)

3.2.6.1 Employment Of Graduates

Since the main role of Jubail Industrial College is to provide industry and other business sectors with qualified Saudi manpower to replace foreign workers for the fulfilment of the requirement of Saudi Arabia's development plans, the College has always placed significant emphasis on helping graduates to find jobs in industry and other businesses upon their graduation.

Therefore a Job-Placement Unit was established within the College's organisational structure to facilitate this task.

Table 3.6 shows the number of graduates employed during the period from 1992/1993 to 1999/2000 classified by sector of the economy.

Table 3.6

Graduates Employed Classified

by Sectors of Economy from 1992/1993 to 1999/2000

Sector	Type of Business	No. of Graduates Employed
INDUSTRY	Petrochemicals	237
	Fertiliser	32
	Iron and Steel	100
	Gas	3
	Petroleum	57
	Military	12
	Glass	7
	Paper	4
	Chemical	10
	Food	9
	Electrical/Electronics	2
	Cement	1
	Construction	1
	Air-Conditioning/Refrigeration	1
	Sub-Total - (Industry)	**476**
OTHERS	Transportation	1
	Education and Training	21
	Building	2
	Shipping Agent	2
	Commerce	12
	Storage	3
	Operation and Maintenance	26
	Travel and Tourism	1
	Construction	4
	Computers	2
	Banking	27
	Health	4
	Power and Telecommunications	28
	Government	39
	Sub-Total (Others)	**172**
	GRAND TOTAL	**648**

Source: (JIC, Graduate Employment Report No.1, May, 2000)

By comparing the data given in tables 3.4 and 3.5, it may be noticed that the number of graduates employed in the different sectors of the economy is less than that of those who originally graduated from the College. The number of graduates placed in jobs after graduation was 648 whilst the number of graduates was 844. The difference is due to the following reasons:

1. Some graduates enrolled in universities and other colleges for further education.

2. Graduates who were already employed at the time of joining Jubail Industrial College (i.e., sponsored students) returned to their companies upon graduation.

3. Some graduates preferred self-employment by establishing their own businesses.

4. Recent graduates were still in the process of completing employment formalities.

3.2.7 Staffing

Jubail Industrial College currently has 173 employees. The number of instructional staff dedicated to teaching and research is 98, while the number of administrative staff is 75. Table 3.7 below shows the College staff classified by type of work and Saudi/Non-Saudi status.

Table 3.7

College Staff Classified by Type of Work and Saudi/Non-Saudi Status as of March, 2000

Type / Nationality	Instructional Staff	Administrative Staff
SAUDIS	20	58
NON-SAUDIS	78	17
TOTAL	**98**	**75**

Source: (JIC, Personnel Roster, March, 2000)

In addition, there are 163 employees working in the College but not on its payroll. These are contractors' employees working under two service contracts: the Janitorial and Catering Contract with 95 workers, and the Operation and Maintenance Contract with 68 workers.

JIC is a multi-national working environment as there are 16 nationalities working there. Table 3.8 below shows the College staff as of March, 2000, broken down by nationality.

Table 3.8
College Staff Classified by Nationality
as of March, 2000

Nationality	Number of Staff	Percentage (%)
SAUDI	78	45.1
BRITISH	26	15.0
INDIAN	26	15.0
FILIPINO	9	5.2
EGYPTIAN	7	4.0
JORDANIAN	7	4.0
AMERICAN	5	2.9
PAKISTANI	4	2.3
SUDANESE	4	2.3
IRISH	2	1.2
BANGLADESHI	1	0.6
IRAQI	1	0.6
KENYAN	1	0.6
MOROCCAN	1	0.6
SYRIAN	1	0.6
TOTAL	**173**	**100%**

Source: (JIC, Personnel Roster, March, 2000)

Due to the nature of the courses offered at JIC, where theoretical classes are complemented by practical ones, the educational qualifications of the instructional staff vary and cover degrees ranging from Doctor of Philosophy to Bachelor qualifications. Table 3.9 below shows the instructional staff as of March, 2000, classified according to educational qualifications.

Table 3.9

Instructional Staff Classified According to Educational Qualifications as of March, 2000

Educational Qualification	Number of Staff
DOCTOR OF PHILOSOPHY	32
MASTER'S DEGREE	30
BACHELOR'S DEGREE	27
OTHERS	9
T O T A L	**98**

Source: (JIC, Presentation Material, March, 2000)

3.2.8 Facilities and Resources

The College campus contains all the necessary facilities to provide students with the scholastic atmosphere required to encourage intellectual, social, athletic and cultural activities. It comprises:

- An educational building, with 133 classrooms, workshops and laboratories.
- A dormitory complex of 16 buildings with accommodation for 1,200 students.
- Three cafeterias that seat 1,200.
- A 624-seat auditorium.
- An ample library reflecting the technical, industrial and commercial scope of the College's activities.

- A media resource centre, including a TV studio and a print shop.
- A medical clinic.
- A 1700-sq-metre multi-purpose recreation hall.
- A 1200-sq-metre gymnasium.

The College facilities also include self-contained units of faculty housing which are separated from, but have easy access to, the main campus.

3.2.9 Community and Special Training Courses

In addition to its various degree programmes, the College also offers a diverse range of training courses geared to industry, the business sector and the community. These courses differ in terms of content, objectives and duration.

Table 3.10 below shows the number of special training courses and participants during the period from 1989/1990 to 1999/2000.

Table 3.10
Special Training Courses and Participants during the Period from 1992/1993 to 1999/2000

Year	Number of Courses	Number of Participants
1989/1990	4	75
1990/1991	12	241
1991/1992	7	328
1992/1993	7	267
1993/1994	3	34
1994/1995	1	18
1995/1996	13	175
1996/1997	16	550
1997/1998	15	560
1998/1999	8	934
1999/2000	9	108
TOTAL	**95**	**3290**

Source: (JIC, Industrial Relations, March, 2000)

Table 3.11 below shows the number of community courses offered by the College and the participants enrolled during the period from 1989/1990 to 1999/2000.

Table 3.11
Community Courses and Participants during the Period from 1989/1990 to 1999/2000

Year	Number of Courses	Number of Participants
1989/1990	23	241
1990/1991	7	184
1991/1992	13	183
1992/1993	18	403
1993/1994	17	447
1994/1995	16	417
1995/1996	9	223
1996/1997	5	31
1997/1998	3	17
1998/1999	1	7
1999/2000	1	4
TOTAL	**123**	**2157**

Source: (JIC, Industrial Relations, March, 2000)

3.2.10 Links with Industry

The College always emphasizes the importance of a true partnership with industry, the host organisation of its graduates. In fact, such a concept is a part of the mission of the College.

All the developments occurring in the College, especially those related directly to curricula, workshops and laboratory equipment and technology, and the introduction of new programmes, are subject to the review and comments of industry through written questionnaires, technical committees and visits to the College by technical personnel from industry.

The College also considers the manpower requirement of different industries and their plans in terms of future expansion, manpower and training needs.

Such links would not be easy if JIC were not located in the heart of the largest national industrial complex, that is, Jubail Industrial City. The College has, for example, links with several petroleum and petrochemical companies such as Saudi Aramco, Sadaf and Petrokemya, as well as with metallurgical industries, such as Hadeed. This subject will be covered fully in Chapter Four.

3.2.11 College Finance

The College is financed through two main sources:

1. The Royal Commission annual budget furnished by the Ministry of Finance and National Economy.
2. The fees that the College receives in respect of the services offered to industry and other business sectors.

3.3 Summary

The chapter opens with a brief description of the two industrial complexes, Jubail and Yanbu, set up by the Royal Commission for Jubail and Yanbu to promote industrial development. The remainder of the chapter is devoted to an examination of all major aspects of Jubail Industrial College, beginning with its history, its mission to provide technological education in English in partnership with, and to serve the needs of, business and industry, and its structural organisation, in terms of the decision-making role of its councils and committees. The Associate Diploma Programme is described and the specialisations offered by the departments are listed, along with a description of the Co-operative Training Programme and the College's policies with regard to admission and graduation requirements, curriculum development, examinations, development planning and student affairs. Finally, details are included (supported by tables) of staff members, student enrollment and graduation, and graduate job-placement in different sectors of the economy.

CHAPTER FOUR

AN OVERVIEW OF THE INDUSTRIAL SECTOR IN SAUDI ARABIA

4.1 The Industrial Sector: Policy, Objectives and Development

The diversification of the industrial base of the economy has always been the key element in Saudi Arabian economic strategy, and the primary objectives of this process are:

1. The reduction of the country's dependence on the production and exportation of crude oil as the sole source of national income.

2. The elimination of the need to import many expensive commodities and materials.

3. The utilization of available natural resources, such as crude oil and natural gas, firstly to provide the raw materials for down-stream manufacturers and secondly to protect the environment from possible pollution.

4. The provision of jobs for Saudi nationals.

5. The development of urban, social, educational, scientific and economic institutions in an attempt to raise the standard of living in the country (MOInfo., 1992, pp. 127-133).

4.1.1 Industrial Policy and Development

As Al-Saloom (1995) stated, in the year 1394 A.H. (1974) the Government of Saudi Arabia issued a statement specifying the principles of its industrial policy on the following basis:

1. It aimed to encourage and expand manufacturing industries based on agriculture.

2. It espoused the principle of free competition prevailing among commercial and industrial institutions as the basis of economic activity in the country.

3. It accepted that competition aims at the interests of consumers in that it motivates private industrial establishments to select the projects that realise the highest profits and absorb the purchasing capacity of the market because they recognize the needs of the markets, and are characterized by lowest costs of production.

4. It aimed to ensure that businessmen willing to contribute to industrial development are acquainted with all the figures and data required.

5. It offered various financial incentives to all industrial sectors.

6. It instituted industrial licensing for projects going beyond certain limits.

7. The Government would sponsor and establish industrial projects of great magnitude.

8. It aimed to avoid the imposition of quantitative restrictions or price-fixing as a means of implementing the country's industrial policy.

9. It recognized the right of the private sector to operate in the industrial field, to select, invest and manage the economic resources, including manpower working in this field.

10. It welcomed the entry of foreign capital and the advent of foreign experience to the industrial sector of the country.

11. It aimed to provide all public utilities and the infrastructure requisite to the development of economically viable industries (Al-Saloom, 1995, pp. 78-82).

4.1.2 The Development Plans

Industry has been granted a place of supreme importance in the development plans of Saudi Arabia during the last three decades. The Government supported and encouraged this sector, in order to maximize the opportunities for diversifying income resources and extending the base of production.

4.1.2.1 The First Development Plan (1970 – 1975)

Among its other objectives, this plan aimed at maintaining economic and social stability, which would be achieved by:

> **"Diversifying sources of national income and reducing dependence on oil through increasing the share of other productive sectors in gross domestic product"** (MOP, First Development Plan, 1970, p. 23).

4.1.2.2 The Second Development Plan (1975 – 1980)

The first goal of this plan was high rate of economic growth, through which it continued to foster the diversification of the economy, by encouraging expansion in agriculture, industry and mining, with particular emphasis on petrochemical and mining industries. Also, the Government encouraged the expansion of the private sector in these activities through providing the necessary facilities and incentives (MOP, Second Development Plan, 1975, p. 4).

4.1.2.3 The Third Development Plan (1980-1985)

Diversification of the economic base continued as the first objective of the Third Plan. It thus continued the economic strategy manifest in the Second Plan (MOP, Third Development Plan, 1980, p. 86).

4.1.2.4 The Fourth Development Plan (1985-1990)

This plan included three objectives relating to industrial development. These objectives were as follows:

1. To reduce dependence on the production and export of crude oil as the main source of national income.

2. To continue with real structural changes in the Kingdom's economy in order to produce a diversified economic base with due emphasis on industry and agriculture.

3. To prospect for mineral resources and promote their extraction and utilization (MOP, Fourth Development Plan, 1985, p. 41).

4.1.2.5 The Fifth Development Plan (1990-1995)

This plan reaffirmed the approved objectives of the Fourth Plan but, was to be achieved with a substantially different set of development policy initiatives, in response to the special conditions that had evolved and the constraints that now prevailed on the national economy. Therefore, the established objectives of the plan related to industrial development were:

1. To reduce dependence on the production and export of crude oil as the main source of national income.

2. To continue with real structural changes in the Kingdom's economy so as to establish a diversified economic base with due emphasis on industry and agriculture.

3. To develop mineral resources, further encouraging their discovery and utilization (MOP, Fifth Development Plan, 1990, p. 46).

4.1.2.6 The Sixth Development Plan (1995-2000)

Although this plan attempted to maintain and stabilize the progress achieved towards meeting the objectives of the previous plans, it continued to outline the following objectives related to industrial development, firstly, because much remains to be accomplished and secondly, owing to the fact that development is a continuing process. The objectives are:

1. To reduce dependence on the production and export of crude oil as the main source of national income.

2. To continue restructuring the Kingdom's economy through continuing diversification of the economic base, particularly through laying more emphasis on industry and agriculture.

3. To develop mineral resources and to encourage the discovery and utilization thereof (MOP, The Sixth Development Plan, 1995, pp. 87-88).

4.1.2.7 The Seventh Development Plan (2000-2005)

This plan, according to the Statement issued by the Ministry of Planning in August 2000, includes three general objectives related to the industrial development in the country. These are:

1. To reduce dependence on the production and export of crude oil as the main source of national income, and to increase the value added to crude oil prior to exporting.

2. To diversify the sources of national income and to expand the production base of services, industry and agriculture.

3. To develop mineral resources and to encourage the discovery and utilisation thereof (MOP, August 2000, p. 3).

4.2 The Industrial Organisations (the main employers of Jubail Industrial College graduates)

Upon graduation, the graduates of Jubail Industrial College join different industries throughout the country, and the College usually helps facilitate this process through its Job-Placement Unit.

In this part of the chapter, brief information on some of the main industries hosting Jubail Industrial College graduates will be provided. It should be noted that units of measurements given are as found in the various sources.

4.2.1 PETROLEUM INDUSTRY

1. Organisation : **SAUDI ARABIAN OIL CO. (SAUDI ARAMCO)**

   Location : Dhahran, Saudi Arabia

   Manpower : 55,532

Products:	Annual Capacity:
1. Crude oil	2,922,277,879 barrels

Source: (Saudi Aramco, 1998, pp. 13 and 36)

2. Organisation : **SAUDI ARAMCO SHELL REFINERY CO. (SASREF)**

   Location : Jubail Industrial City, Saudi Arabia

   Manpower : 660

Products:	Annual Capacity:
1. Fuel oil	4,957,000 tons
2. Gasoline	245,000 tons
3. Gas-oils	4,086,500 tons
4. LPG	145,000 tons
5. Sulphur	90,000 tons
6. Kerosene	2,040,000 tons
7. Naphtha	2,435,000 tons

Source: (MOIE, 1998, p. 176)

3. Organisation : **ARAMCO GULF OPERATIONS CO., LTD.**

Location : Al-Khafji, Saudi Arabia

Manpower : 2,130

Product:	Annual Capacity:
1. Crude oil	103,281,876 barrels

Source: (Arabian Oil Company, 1996, pp. 8 and 14)

4.2.2 PETROCHEMICAL INDUSTRY

1. Organisation : **JUBAIL PETROCHEMICAL CO. (KEMYA)**

Location : Jubail Industrial City, Saudi Arabia

Manpower : 699

Products:	Annual Capacity:
1. Polyethylene	800,000 metric tons
2. Ethylene	800,000 metric tons
3. Propylene	250,000 metric tons
4. Low density Polyethylene	200,000 metric tons

Source: (MOIE, 1998, p. 48)

2. Organisation : **EASTERN PETROCHEMICAL CO. (SHARQ)**

Location : Jubail Industrial City, Saudi Arabia

Manpower : 1,092

Products:	Annual Capacity:
1. Ethylene glycol	1,300,000 metric tons
2. Polyethylene	700,000 metric tons

Source: (MOIE, 1998, p. 53)

3. Organisation : **ARABIAN PETROCHEMICAL CO. (PETROKEMYA)**

Location : Jubail Industrial City, Saudi Arabia

Manpower : 2,154

Products:	Annual Capacity:
1. Expandable Polystyrene	20,000 tons
2. Gasoline	260,000 tons
3. Ethylene	2,200,000 tons
4. Propylene	663,000 tons
5. Butane-1	100,000 tons
6. Low & medium density polyethylene	200,000 tons
7. Polystyrene of high solidity	65,000 tons
8. Polystyrene	50,000 tons
9. Butadiene	254,000 tons

Source: (MOIE, 1998, p. 49)

4. Organisation : **SAUDI EUROPEAN PETROCHEMICAL CO. (IBN ZAHR)**

Location : Jubail Industrial City, Saudi Arabia

Manpower : 868

Products:	Annual Capacity:
1. Butane-1	80,000 tons
2. Propylene	325,000 tons
3. Methyl ether butyl	1,440,000 tons
4. Polypropylene	640,000 tons
5. Butadiene	125,000 tons

Source: (MOIE, 1998, p. 50)

5. Organisation : **SAUDI PETROCHEMICAL CO. (SADAF)**

Location : Jubail Industrial City, Saudi Arabia

Manpower : 1,560

Products:	Annual Capacity:
1. Styrene	440,000 metric tons
2. Ethylene bichloride	900,000 metric tons
3. Caustic soda	720,000 metric tons
4. Ethylene	950,000 metric tons
5. Trimethyl ether butyl	800,000 metric tons
6. Orthoxylene	45,000 metric tons
7. M-Xylene	70,000 metric tons
8. Paraxylene	531,000 metric tons
9. Aromatic benzine	398,000 metric tons
10. Industrial pure ethanol	330,000 metric tons

Source: (MOIE, 1998, p. 51)

6. Organisation : **SAUDI METHANOL CO. (AR-RAZI)**

Location : Jubail Industrial City, Saudi Arabia

Manpower : 640

Products:	Annual Capacity:
1. Methanol	3,100,000 tons

Source: (MOIE, 1998, p. 52)

7. Organisation : **NATIONAL METHANOL CO. (IBN SINA)**

Location : Jubail Industrial City, Saudi Arabia

Manpower : 339

Products:	Annual Capacity:
1. Methanol	1,000,000 metric tons
2. Trimethyl ether butyl	700,000 metric tons

Source: (MOIE, 1998, p. 52)

8. Organisation : **SAUDI YANBU PETROCHEMICAL CO. (YANPET)**

Location : Yanbu, Saudi Arabia

Manpower : 1,849

Products:	Annual Capacity:
1. Ethylene glycol	840,000 tons
2. Ethylene	1,652,000 tons
3. High & low density polyethylene	1,060,000 tons
4. Thermal gasoline	116,000 tons
5. Oxygen gas	340,000 tons
6. Nitrogen liquid	20,000 tons
7. Nitrogen gas	200,000 tons
8. Liquid oxygen	20,000 tons
9. Propylene	70,000 tons

Source: (MOIE, 1998, p. 40)

9. Organisation : **IBN-HAYYAN PLASTIC PRODUCTS CO. (TAYF)**

Location : Jubail Industrial City, Saudi Arabia

Manpower : 121

Products:

1. Artificial wood
2. Artificial leather
3. Wall covering
4. Floor covering

Source: (SABIC, Introducing TAYF, n.d.)

10. Organisation : **ARAB FACTORY FOR SYNTHETIC FIBRES (IBN RUSHD)**

Location : Yanbu, Saudi Arabia

Manpower : 423

Products:	Annual Capacity:
1. Polyester granules for textile manufacturing	350,000 tons
2. Polyester fibres for textile manufacturing	48,000 tons
3. Polyester fibres for carpet manufacturing	20,000 tons
4. Pure traphthalic acid	350,000 tons
5. Paraxylene	380,000 tons
6. Orthoxylene	50, 000 tons
7. Gasoline	350,000 tons
8. Synthetic strings made of polyester	32,000 tons

Source: (MOIE, 1998, p. 81)

4.2.3 CHEMICAL INDUSTRY

Organisation : **SAUDI CHEMICAL CO., LTD.**

Location : Riyadh, Saudi Arabia

Manpower : 216

Products:	Annual Capacity:
1. Ampulite	4,000 tons
2. Perlite	4,300 tons
3. Exploding capsules	13,500,000 pieces

Source: (MOIE, 1998, p. 391)

4.2.4 FERTILIZER INDUSTRY

1. Organisation : **AL-JUBAIL FERTILIZER CO. (SAMAD)**

Location : Jubail Industrial City, Saudi Arabia

Manpower : 600

Products:	Annual Capacity:
1. Urea	700,000 metric tons
2. Bi-ethyl hexanol	150,000 metric tons
3. Fethalat ebi-ectyl	50,000 metric tons

Source: (MOIE, 1998, p. 72)

2. Organisation : **NATIONAL CHEMICAL FERTILIZER CO. (IBN AL-BAYTAR)**

Location : Jubail Industrial City, Saudi Arabia

Manpower : 700

Products:	Annual Capacity:
1. Urea	500,000 tons
2. NBK products with various specifications	500,000 tons
3. GTSB	200,000 tons
4. D A P	100,000 tons
5. Liquid fertilizer	10,000 tons
6. Ammonia	500,000 tons

Source: (MOIE, 1998, p. 72)

3. Organisation : **SAUDI ARABIAN FERTILIZER CO. (SAFCO)**

Location : Jubail Industrial City, Saudi Arabia

Manpower : 627

Products:	Annual Capacity:
1. Urea	331,342 metric tons
2. Sulphuric acid	88,326 metric tons
3. Melamine	19,164 metric tons

Source: (MOIE, 1998, p. 70)

4.2.5 METALLURGY INDUSTRY

Organisation : **SAUDI IRON & STEEL CO. (HADEED)**

Location : Jubail Industrial City, Saudi Arabia

Manpower : 1,900

Products:	Annual Capacity:
1. Reinforcement iron rods	971,673 metric tons
2. Iron blocks	124,043 metric tons
3. Reinforcement steel bars	615,341 metric tons

Source: (MOIE, 1998, p. 27)

4.2.6 GAS MANUFACTURING INDUSTRY

Organisation : **NATIONAL INDUSTRIAL GASES CO. (GAS)**

Location : Jubail Industrial City, Saudi Arabia

Manpower : 155

Products:	Annual Capacity:
1. Argon	15,000 tons
2. Oxygen gas	1,528,000 tons
3 Nitrogen gas	942,500 tons
4. Nitrogen liquid	63,000 tons
5. Hydrogen gas	1,000 tons
6. Hydrogen peroxide	10,000 tons
7. Liquid oxygen	52,500 tons

Source: (MOIE, 1998, p. 54)

4.2.7 GLASS MANUFACTURING INDUSTRY

Organisation	:	**INTERNATIONAL GUARDIAN GLASS CO., LTD. (GULFGUARD)**
Location	:	Jubail Industrial City, Saudi Arabia
Manpower	:	265

Products:		Annual Capacity:
1. Flat glass	:	131,400 tons
2. Tempered safety glass	:	29,000 tons

Source: (MOIE, 1998, p. 408)

4.2.8 PAPER MANUFACTURING INDUSTRY

Organisation	:	**NATIONAL PAPER PRODUCTS COMPANY (NAPCO)**
Location	:	Dammam, Saudi Arabia
Manpower	:	123

Products:	Annual Capacity:
1. Multilayered paper bags	9,750 tons
2. Grocery shop paper bags	2,000 tons
3. Pipes made of reinforced paper	600 tons
4. Polyethelene and polypropylene bags	1,500 tons

Source: (MOIE, 1998, p. 486)

4.2.9 CEMENT MANUFACTURING INDUSTRY

Organisation	:	**THE QASIM CEMENT CO.**
Location	:	Buraydah, Saudi Arabia
Manpower	:	717

Products:	Annual Capacity:
1. Regular cement	1,200,000 tons
2. Regular and salt-resistant cement	150,000 tons
3. Pozolana Portland cement “Pozolanic”	150,000 tons

Source: (MOIE, 1998, p. 391)

4.2.10 BUILDING MATERIALS INDUSTRY

Organisation : **ARABIAN FIBERGLASS INSULATION MATERIALS CO., LTD.**

Location : Dammam, Saudi Arabia

Manpower : 170

Products:	Annual Capacity:
1. Fiber glass insulators for central A/C pipes, ceiling and walls	9,000 metric tons

Source: (MOIE, 1998, p. 421)

4.2.11 RUBBER MANUFACTURING INDUSTRY

Organisation : **AMIANTIT RUBBER INDUSTRIES, LTD.**

Location : Dammam, Saudi Arabia

Manpower : 85

Products:	Annual Capacity:
1. Blended rubber materials	100 tons
2. Belts & rubber sheets	25 tons
3. Rubber products	200 tons
4. Rubber tiles	25 tons
5. Rubber gaskets	450 tons

Source: (MOIE, 1998, p. 197)

4.2.12 PAINT MANUFACTURING INDUSTRY

Organisation : **SIGMA PAINTS SAUDI ARABIA LTD.**

Location : Dammam, Saudi Arabia

Manpower : 259

Products:	Annual Capacity:
1. Various paints, primers & solvents	27,950 tons
2. Adhesives	10,000 tons
3. Polishing materials and varnish	1,000 tons
4. Gaskets	1,050 tons

Source: (MOIE, 1998, p. 102)

4.2.13 DAIRY PRODUCTS MANUFACTURING INDUSTRY

1. Organisation : **ALMARAI CO., LTD. FACTORY**

   Location : Al-Kharj, Saudi Arabia

   Manpower : 270

Products:	Annual Capacity:
1. Milk	100,000,000 litres
2. Yoghurt	25,000,000 litres
3. Laban	150,000,000 litres
4. Long-life milk	35,000,000 litres
5. Labaneh	2,000,000 litres
6. Cream	3,000 tons
7. Plastic containers	2,400 tons

Source: (MOIE, 1998, p. 71)

2. Organisation : **AL-SAFI DAIRY ESTABLISHMENT**

   Location : Al-Kharj, Saudi Arabia

   Manpower : 159

Products:	Annual Capacity:
1. Milk	15,000 tons
2. Yoghurt	15,000 tons
3. Labaneh	15,000 tons
4. Long-life milk	22,000 tons
5. Laban	81,000 tons
6. Butter	750 tons
7. Cream	750 tons

Source: (MOIE, 1998, p. 71)

4.2.14 SOAP & DETERGENTS MANUFACTURING INDUSTRY

Organisation : **MODERN INDUSTRIES COMPANY**

Location : Dammam, Saudi Arabia

Manpower : 424

Products:	Annual Capacity:
1. Liquid soap for cleaning utensils	13,000 tons
2. Tide Powder with bleach	15,000 tons
3. Shampoo w/ balsam	3,000 tons
4. Hair shampoo	1,500 tons
5. Clothes cleaner and softener	800 tons
6. Liquids for household cleaning	200 tons
7. Active materials for Fairy liquid and shampoo	14,000 tons
8. Head & Shoulders shampoo	2,400 tons
9. Clothes softener	7,500 tons
10. Washing powder	46,600 tons
11. Liquid soap for cleaning cloths	14,000 tons

Source: (MOIE, 1998, p. 135)

4.2.15 AIR-CONDITIONING & REFRIGERATION INDUSTRY

Organisation : **AL-ZAMIL REFRIGERATION INDUSTRIES**

Location : Jubail Industrial City, Saudi Arabia

Manpower : 65

Products:	Annual Capacity:
1. Air-conditioners	1,306 tons
2. Central air-conditioners	551 tons

Source: (MOIE, 1998, p. 392)

4.2.16 ELECTRICAL PRODUCTS INDUSTRY

Organisation : **A.B.B. ELECTRICAL INDUSTRIES CO.**

Location : Riyadh, Saudi Arabia

Manpower : 620

Products:

1. Electric distribution boards of various sizes
2. Push buttons, Signal lamps, Selector switches

3. Moulded current breakers of low tension 100-3200 amperes
4. Arial current breakers of low tension 1250-6300 amperes
5. Operation switchboard of low tension
6. Operation switchboard of medium tension
7. Electric distribution transformers 25-5000 KVA
8. Lighting switches, Lighting control switches, sockets, 50000 units
9. Internal high tension switches up to 72.5 KV, 50 units
10. Load circuit breakers up to 36 KV, 100 units
11. Power factor rectifiers, 5000 units
12. Power factor rectifier capacitors, 1000 units
13. Magnetic contacts, 35000 units
14. Main ring units up to 24 KV, 5000 units
15. Transformers/substations compact up to 36 KV, 1500 units
16. Electric breakers of medium tension, 1200 units
17. Switchboards of high tension up to 36 KV and automatic control system, 500 units
18. Small breakers for low tension up to 100 ampere, 5000 units

Source: (MOIE, 1998, p. 424)

4.3 Summary

The first part of the chapter describes industrial policy in Saudi Arabia, which aims to stimulate growth through private investment and competition and Government sponsorship. It describes the seven five-year plans, which stress the need for diversification of the industrial base, whereby dependence on oil may be reduced, imports curtailed, oil used to foster domestic manufactures, and employment opportunities for Saudi nationals increased.

The second part of the chapter gives statistical details, in tabular form, of the main manufacturing industries where Jubail Industrial College graduates are employed. These range widely from petroleum, petrochemical and derivative industries to dairy products, air-conditioning and refrigeration, and electrical products.

CHAPTER FIVE

REVIEW OF LITERATURE

This chapter deals with the previous literature written on the different aspects related to technical and vocational education worldwide, including Saudi Arabia.

The analysis of the reviewed literature will play an important part in providing the theoretical framework for the present study. However, the findings and conclusions of the studies may not necessarily be appropriate to the status of technical and vocational education in Saudi Arabia. This is especially the case for those studies conducted in developed countries, because of the cultural, social and economic differences between their societies and Saudi society.

5.1 Educational and Training Programmes of Technical Colleges

Nations wanting to keep up with technological advancement and to create technological capability, must pay great attention to the development of their people. Chatri Sripaipan, Director of the Science and Technology Programme at the Research Institute, Thailand, says **"[a] country's technological capability ... is embodied not in its machines, but in its people"** (Fairclough, 1993, p. 51).

One way to help people develop is to provide young adults with proper technical skills in order to prepare them for useful employment and contribute to their enjoyment of a satisfying and productive life.

Enos (1991) supports this concept by stating that:

> **"In meeting the demand the economy will be creating technological capability, for part of being capable technologically is being able to equip the nation's citizens with the technical skills that are needed to increase output and income"** (pp. 138-139).

The World Employment Programme (WEP) of the International Labour Office (ILO), in a project aiming to help national decision-makers in developing countries to reshape their policies and plans, with the purpose of eradicating mass poverty and promoting productive employment, has recommended that tertiary educational institutions teaching technical subjects in many developing countries **"need to be expanded at a greater rate than faculties teaching arts subjects. As to how much greater, that will depend upon the rate of increase of demand for highly skilled individuals"** (Enos, 1991, p. 126).

For a country like Saudi Arabia, where the percentage of foreign technical workforce is relatively high, and therefore the demand for Saudi technicians is also high, tertiary technical education needs to be expanded and supported by all the available means. Brown (1999) supports this belief when she says that professional speciality and service occupations requiring an associate's degree rather than a bachelor's degree were targeted as the fastest-growing occupations.

In addition, Brown has emphasized the fact that the "reverse transfer" concept, where graduates of four-year colleges return to post-secondary education to obtain more marketable skills, is an increasing trend in community colleges in the United States. This concept is supported by Carlson (1997), who found that 10.16 per cent of the students attending a technical College in the U.S.A. had two-year degrees and 5.88 per cent of them had four-year degrees prior to their enrollment (p. 66).

The term "technical education", as defined by the American Vocational Association, can be understood as:

> **"Education to earn a living in an occupation in which success is dependent largely upon technical information and understanding of the laws of science and technology as applied to modern designs, production and services"** (Alaki, 1972, p. 104).

A graduate of technical education is usually called a 'technician' irrespective of whether he works in the maintenance or operation divisions of industry. Hills (1982) defines the term "technician" as a skilled person with an understanding of general principles in his/her specialisation who holds a position between the engineer or technologist and the skilled craftsman (p. 269). This definition is supported by Emerson (1955) when he explains the term "technician" as:

> **"A person who works at a job which requires applied technical knowledge and applied technical skills. His work in this respect, is somewhat akin to that of the engineer, but usually the scope is narrower. His job also requires some manipulative skills - - those necessary to handle properly the tools and instruments needed to perform the technical tasks"** (Alaki, 1972, p.105).

The principal objective of technical education is to educate and train a student in specialised technical fields. Henninger (1959), as cited by Al-Sahhaf (1978), highlights the basic objective of the technical institutes offering a post-secondary technical education in the following manner:

> **"The basic objective of the technical institute idea in higher education is the development of qualified engineering technicians proficient in a selected field of technology. Thus the technical institute curricular program leads to a specific objective just as any collegiate program does. In general, the technical institute program is designed to accomplish its objective within two academic years"** (p.50).

Murtada (1996) has categorized the causes of the problem of technical and industrial education in Saudi Arabia into external and internal factors. These factors have been explained as follows:

> **"The external factors were: the traditional views of education – especially in general education, the state of incoherence of the training system and the lack of comprehensive planning for economy and education in the country, and finally the attitudes of industry to the graduates of technical/industrial education. The internal factors were: the internal administrative policy of GOTEVT, the attitudes of students to industrial education, and the high rate of drop-outs"** (p. 188).

In the following text of this chapter, the study will briefly review some literature written on the following:

- curricula,
- instructional staff, and
- training equipment.

5.1.1 Curricula

Educational and training programmes offered in technical colleges should be regularly reviewed and examined to ensure their quality and relevance to the needs of the labour market and the economy. In such programmes, designed for preparing technicians and operators geared towards industry, a great deal of emphasis is placed, when designing the curricula, on the process of relating the student's academic programme content to the work. Adams and Stephens (1972) assert that the **"degree of vocational nexus depends primarily upon how well we balance the equation of theory, [and] academic courses, with the practice [and] work"** (p. 4). Furthermore, college specialists should sit down with representatives of industry before a new programme is introduced to discuss and define what skills graduates may need to acquire. Then skills are itemized, and a curriculum is set up to teach such skills (Buckler and Carey, 1992, p. 32). This concept will be elaborated on later when the study reviews the literature related to links between technical colleges and industry as well as college graduates' employment.

Curricula in technical colleges are constantly revised so that students may be adequately prepared for employment, and such colleges can fulfil the requirements of the advancement and development which are occurring in the different technologies. Starrak and Hughes (1948), as cited by Al-Sahhaf (1978), describe the nature of the ideal curriculum designed for technical institutes as follows:

> **"The curriculum of the technical institute is distinctly and avowedly terminal and equivalent in content to not more than two full years' work. The courses are more purely technical and less theoretical than those offered in engineering colleges, but they do usually give substantial instruction in the underlying sciences, drawing, economics, and English"** (p. 51).

While the objectives of technical institutes were terminal as stated by Starrak and Hughes, it should be noted that many students had enrolled in other institutions of higher education upon their graduation from the two-year technical colleges and institutes (Al-Sahhaf, 1978, p. 52).

Lewis (1991), as cited by Carlson (1997), believes that the curricula of technical education must combine the practical, hands-on experience with a liberal education, so that they then lead to **"a certain intellectual balance, a good mechanical judgment, a sort of level-headedness in practical matters"** (p. 39).

Moreover, when part of a curriculum is to be prepared, college staff and curriculum development specialists are very strongly advised to consider the appropriate technical skills and the associated knowledge required to achieve the objectives of the educational and training process of the college. Another related aspect that should be remembered at the time of designing a curriculum is the need for a suitable equation that correctly balances the theoretical and practical subjects in the content of the curriculum. Thus the content of any technical curriculum, according to Khateeb (1985), should **"reflect the structure of knowledge such as the principal concepts of technical education fields as well as the relationships between the theories of the various disciplines"** (p. 296). He adds that the **"curriculum should incorporate the dynamics of the generation of knowledge, such as observation, measurement, classification, induction, deduction, verification and appreciation"** (p. 297).

In addition, Al-Sahhaf (1978) points out that the content of the curriculum of a post-secondary technical institute should be designed to provide students with:

1. Current technical skills and related technical knowledge that will qualify them to become technicians in industry.
2. Social and economic skills that will prepare them for participation in the development of the country's economy (p. 62).

Bartram (1996), as cited by Hillier (1999), describes the knowledge that should be included in the curriculum of technical colleges as **"knowing how, knowing what and knowing why"** (p. 202).

As far as the curricula for technical education in Saudi Arabia are concerned, a study conducted by Al-Ghamdi (1994) found that the training provided was not sufficient to enable the graduates to practice work after graduation (p. 392). Here the present researcher wants to draw the reader's attention to the fact that the study conducted by Al-Ghamdi was mainly concerned with the graduates of vocational training centres and secondary industrial institutes rather than the graduates of technical and industrial colleges.

Al-Jallal (1973) conducted another study on the evaluation of vocational education in secondary technical schools in Saudi Arabia. One of the findings was that the majority of graduates of these schools, viz 55.9 per cent, had jobs related to their training, but the degree of relationship was not very strong. Only 34.7 per cent of the graduates reported that they used the skills in which they had been trained (p. iv).

A further study was conducted by Al Megren (1996) on the private sector's perception of the vocational education system in Saudi Arabia. His study revealed that 87.2 per cent of the employers consulted agreed that the current vocational education programmes were not sufficient to fulfil their workforce needs and 85.2 per cent agreed that these programmes were in need of total reform (pp. 130-131).

5.1.1.1 Technology-Supported Learning

One way to make learning easier, useful and more productive is the integration of technology into formal education and training, especially in technical colleges. Technology-supported learning (TSL), according to Massy (2000), is **"learning supported in some way by technology, including electronic tools for designing, delivering, and managing learning, as well as content in the form of resources and courses"** (p. 26).

This concept of education is widely adopted in various countries, though different terms such as computer-based training, web-based training, and instructional design are commonly used in different parts of the world such as the United States, Canada and Japan. On this point, Massy comments that in certain European countries, there was a heavy demand on this kind of education. He adds:

> **"In Germany, Denmark, Sweden and Finland, there's a strong demand for high-quality TSL to support technical training, and some of the best is being developed as simulations for mechanics, electronics, materials science, industrial processing, GIS, and other technical subjects"**(p. 29).

5.1.2 Instructional Staff

The teaching and training staff in any educational or training institution, regardless of the level or nature of its programmes, represent one of the three pillars, besides the curriculum and the student, that any educational and training process must be built upon. Generally, when the calibre of staff is of a high quality, a well-qualified graduate is likely to be produced.

In order to support the point raised above, Paul Larson, Chairman of the Computer Science Department at the University of Waterloo, Canada, has pointed out that **"[s]hortage of people with certain types of expertise create[s] a vicious circle in the educational system"**. He also adds that in order to produce more graduates, the educational institutions should **"find qualified people to teach the courses - and they must compete with private-sector employers for those scarce people"** (Buckler and Carey, 1992, p.29). Furthermore, Magill et al. (2000) confirm that **"industrial experience can play a role in teaching at the college level"** (p. 36).

Regarding the situation of the instructional staff of the vocational education institutions in Saudi Arabia, Al Megren (1996) indicates that the majority of respondents in his study supported the need for vocational education teachers to have work experience, be highly skilled, possess a university degree, and have a strong knowledge of the private sector requirements for workers (p. 131).

5.1.3 Training Equipment

In order to produce a qualified technician or an operator, technical colleges should endeavour to provide students with an environment that is structured and rich in the latest models of training machinery because **"learning seldom occurs in a poor [and] unstructured environment"** (Doeffert, 1992, p. 2). Such machinery should always match the one used in industry in order to graduate students with an ability to do the job required. To support this concept, Professor Avraan Isayev of the University of Akron, Ohio, United States, as cited by Toensmeier (1991) states that **"one problem colleges have is insufficient access to the latest process machinery and controls".** He also added that college students must be exposed to the latest leading-edge technology. However, he highly recommended that there should be a solid technical base at technical and vocational institutions similar to the one developed by industry (p. 63).

5.2 Qualifications of Technical College Graduates

5.2.1 What is Quality?

Quality as a concept always implies different things to different people and schools of thought. In this brief introduction, some definitions of quality will be discussed.

According to The American Heritage College Dictionary (1997), quality is **"a degree or grade of excellence"** (p. 1118), while it is defined as **"some feature which makes a person special or noticeable"** by Chambers Universal Learners' Dictionary (1980, p. 579).

Moreover, Sinha and Willborn (1985), went further to indicate that quality can be understood in the form of what people think and believe it to be. It is, therefore, their opinion that **"quality is what people think it is, perceive it to be, or experience it to be"** (p. 4).

Brooks (1989), as cited by Arishi (2000), defines quality as **"a process of continuous improvement"** and not just a degree of excellence (p. 61).

The researcher believes, in line with what has been mentioned by Brooks in this respect, that quality is a continuous process of improvement. This opinion is strongly supported by Schroeder (1994) when he describes quality as **"the commitment and approach used continuously to improve every process in every part of an organization with the intent of meeting and exceeding a customer's expectations and outcomes"** (p. 3).

Edgerton (1977) defines the quality of adult education by saying that **"there is no such thing as a quality educational programs for adults. There are only quality educational programs for particular adults, in particular circumstances, with particular needs and interests"** (p. 116).

5.2.2 What is Qualification?

The term "Qualification" is defined by Webster's Ninth Collegiate Dictionary (1984) as **"a condition or standard that must be complied with"** (p. 963). In Collins's English Learners' Dictionary (1974) it is defined as the **"training or examination which makes a person fit to do something"** (p. 412). Moreover, the American Heritage College Dictionary (1997) defines this term as **"a quality, an ability, or an accomplishment that makes a person suitable for a particular position or task"** (p. 1117).

In general, qualification simply means the knowledge, skills and attitudes that one obtains upon the completion of a formal or non-formal educational or vocational programme. In other words, and as listed by Prentice (1976), there are three basic human skills which come into play in every job situation. These are:

- intellectual skills,
- manual skills, and
- social skills (p. 32).

On this point, Prentice (1976) also comments that qualification is **"records of what someone has done rather than what someone is going to do"** (p. 31). Therefore, as Prentice clearly implies, this term should not mean the piece of paper that one normally gets after completing an educational programme. Hence, this researcher would aver that such piece of paper is mere evidence of the qualification that the person has.

5.2.3 Professional Qualifications

The term "professional qualification" differs from academic qualification. Generally speaking, it applies to those qualifications that are awarded by professional bodies and not by universities, polytechnics or colleges.

According to Prentice (1976), the major difference between the two types of qualification is that **"the [professional qualifications] usually insist upon some evidence of practical applications of knowledge"** (p. 25), while, on the other hand, **"the universities and polytechnics cater very well for the intellectual skills"** (p. 32).

5.2.4 Why "Qualification"?

One may ask "Why Qualification?" To answer this question, this study should first and foremost emphasize the role played by qualification in any particular field.

Qualification has various roles to play. One of its major roles, as has been indicated previously, is to qualify someone with the minimum requirements for a career. There is no doubt that the time that a student spends on a course of study, should, in one way or another, help to a great extent in achieving the necessary skills, knowledge and attitudes which are apparently regarded as the essential components of these qualifications.

5.2.5 Placement versus Qualification

Qualification is a passport to employment and it is very often found that the type of qualification is a major factor in determining the job sought and the speed with which it is obtained. It has been said that **"the more professional training the major subject provided, the easier it was for the graduate to find a post matching his qualifications"** (OECD, 1992, vol. III, p. 11).

Although this statement was made about the master's-level qualification, the present researcher believes that it can be applied to all types and levels of qualifications.

5.3 Social Attitudes towards Vocational and Technical Education

The attitudes of people towards all aspects of life play a significant role in determining the achievements and accomplishments of the society. Therefore, social scientists have different perceptions and opinions when defining attitudes. The literature reviewed below seeks to shed some light on these.

Zimbardo and Ebbeson (1969), as reported by Malki (1986), state that

> **"Attitudes have generally been regarded as either mental readiness or implicit predispositions which exert some general and consistent influence on a fairly large class of evaluative responses. These responses are usually directed toward some object, person, or group"** (Malki, 1986, p. 22).

The above definition implies that attitudes are the learned beliefs that someone has towards a person, a group, or an object.

However, other scientists distinguish attitudes from opinions, beliefs, and values. Wagner and Sherwood (1969) stated that the difference among these concepts could be established simply. An opinion, for instance, is the verbal expression of an attitude, whereas the latter is an orientation towards one object, that includes an evaluation of that object. A belief in contrast to an attitude, does not include any evaluation of an object. Finally, a value implies an orientation towards a series or class of related objects (Malki, 1986, p. 24).

In order to enhance and develop technical and vocational education in the different countries, especially in the undeveloped ones, the variables which affect attitudes towards this type of education should be determined and identified closely so that measures for achieving positive attitudes can be taken. Rothenberg (1972) names three factors affecting the attitudes towards vocational education. These were:

1. The father-son occupational relationship.
2. The parental desire for college education for their sons.
3. The image of vocational education (Malki, 1986, pp. 26-27).

It is true that in the past, the work of the son or daughter was often the same as his/her father's. Also, it is a common concept which is held by parents and educationalists that children need to go to colleges and universities in order to be successful. The image of vocational and technical education was always discouraging and frustrating. Only recently have a clearer and more accurate image towards vocational education and consequently more positive attitudes towards this type of education started to become important to young people and their parents in countries like the United States and Saudi Arabia (Malki, 1986, pp. 25-29).

In 1969 a study conducted by Purnell and Lesser at Harvard University, on perceptions of students towards vocational and comprehensive high schools showed that vocational schools were seen as **"a dumping ground for lazy students and slow learners"** (Malki, 1986, p. 35). Moreover, an evaluation report issued by the Colorado State Advisory Council, in the United States, in 1970, stated that **"The image of Vocational Education, while perhaps improving, still has the stigma attached to it of being for 'somebody else's children'** " (Malki, 1986, p. 36).

This attitude of some Americans towards vocational and technical education appears to be quite different from the following one held by the Afro-Americans.

Julie Yearling, Jr., (1974) in a study conducted on attitudes of Afro-Americans towards Vocational Education in the Manual High School community in Denver, Colorado, in the United States, found that **"black students, parents, businessmen, and teachers had a favourable attitude toward vocational education"** (Kisnawi, 1981, p. 111). Thus it is the present researcher's opinion that the attitude of the Afro-American minority in the United States is quite different from the attitude of Saudi society as will be seen in the next pages.

It will be evident from the review of Saudi Arabian sources that follows that the attitudes of the youth and parents towards vocational and technical education in Saudi Arabia, and especially towards manual occupations, have always been negative and unfavourable. Such attitudes usually come as a result of a misconception of vocational and technical education by the society in general, despite the fact that joining a skilled workforce provides **"job security, earning potential, quality of life, and job satisfaction"** (Huey, 2000, p. 54).

In a study of industrial-vocational education in Saudi Arabia, Alaki (1972) found that vocational education in Saudi Arabia was the least desired among Saudi youth. Moreover, Malki (1986), in a similar study, came to the same conclusion that vocational education had not captured the imagination and aspiration of the kingdom's youth (p. 39).

The existing misconception and bias against vocational and technical education, and manual occupations in particular, in Saudi Arabia is related to the **"historical status of manual labor"** (Malki, 1986, p. 39), and comes as a result of other matters, besides supporting the social view which indicates that vocational and manual occupations are for lower-class families who cannot support their sons throughout a period of higher education (Malki, 1986, p. 39).

In a study related to Colleges of Technology in Saudi Arabia, Alnais (1991) reached a conclusion which indicated that **"most of the students enrolled in the Colleges of**

Technology in Saudi Arabia were from low income families and urban cities" (p. 106).

Another reason for this misconception is the belief that vocational and manual work only suits the less intelligent students (Malki, 1986, p. 112). Such problems facing vocational and technical education, which unfortunately still exist in the society of Saudi Arabia, have limited the enrollment of Saudi students in vocational and technical institutions. Therefore, the economic development of the country has been interrupted and could be delayed in some of its aspects. This is supported by Al-Qusibi (1981) when he writes that **"the problem of negative attitudes towards vocational and technical education and manual occupations hinders industrial development in Saudi Arabia".**

In order to attempt to overcome this problem and free the society from such bias, prejudice and misconception directed against vocational and technical education in Saudi Arabia, here are some solutions that were found in this respect.

1. The mass media should play a reasonable role in stressing the value and dignity of manual work (Kisnawi, 1981, p. 230).
2. The agencies responsible for vocational and technical education must plan and initiate a programme to educate parents and Saudi society in general on the role of vocational and technical education in the economic development of the country (Kisnawi, 1981, p. 230).
3. The Ministry of Education and other related agencies should design programmes to awaken industrial attitudes among students and guide them towards the essential requirements of the country (Kisnawi, 1981, p. 229).
4. The government should continue to encourage the enrollment of students in this type of education through the incentives or rewards to be paid during the course of study, such as stipends, free textbooks, uniforms and scholarships. In addition, post-graduation incentives could be given, such as loans for establishing graduates' own businesses, reasonable wages and allowances, and guaranteed employment positions (Malki, 1986, pp. 40 and 125).

5. A "Vocational Education Week" might be held each year to orient and educate the public towards the importance and need of vocational and technical education (Malki, 1986, p. 124).

5.4 Links between Technical Colleges and Industry

5.4.1 Why interaction between employers and colleges?

The link between the higher educational institutions, such as the technical colleges in particular, and industrial employers is a vital element that cannot be ignored in the process of providing industry with the qualified manpower needed, especially in the current trading world.

Darowski (1999), claims that today's technology-based corporations cannot survive the major shortage of qualified talent caused by the current technology explosion, unless they invest in education. He added that **"it's easier if you think locally, not globally. Find a local college or university that offers a major in your company's field and build a relationship with it"** (p. 68).

In Europe, for instance, a programme named COMETT (the Community Action Programme in Education and Training for Technology) was established in 1987 **"to stimulate and develop co-operation between higher education institutions and companies – especially small and medium-sized companies (SMEs) – across the European Community, in education and training for technology"** (Lovesey, 1990, p. vi).

Friedman and Dutka (1980), as cited by Al Megren (1996), comment on this belief by stating that this element has a major effect on such a process. They add that **"Ultimately, the most important external factor in the success of all occupational curricula is a linkage between education, training and employment institutions...Where this relationship is poorly developed, student prospects are uncertain, even when openings may be available in the occupational categories for which they were trained"** (p. 16).

Having stated the importance of the interaction between colleges and employers, the nature of such a relationship has been examined by Sheets and Trott (1991), as the nature that **"must be built on mutual trust, common goals and strategies. Neither education nor the private sector can do it alone"** (Al Megren, 1996, p. 15).

Some attempts in different parts of the world have been made to take education out of the confines of educational institutions, aiming thus to strengthen the link between employers and higher education.

In adult education, for instance, one should appreciate the efforts of Parkersburg Community College in West Virginia in the United States, which started offering individually tailored instruction to the workers from the Walker Parkersburg Plant at the site of the plant.

This vital project was implemented when the faculty of the college and the management of the plant both felt that the workers could not pursue college work because of the weekly changing shifts (Edgerton, 1977, pp. 115-116).

In addition to the above experience one should also view the educational services offered, e.g. by satellite, television, video-tape, and internet services, and even as courses on morning commuter trains etc., as schemes of adult education being offered beyond college campuses (Edgerton, 1977, p. 112).

In Tanzania, as stated by Sanyal and Kinunda (1977), an attempt has been made to make education relevant to the world of work by encouraging the involvement of employers in the process of higher education as part of an overall policy of education for self-reliance. Employers may be involved in the formation of curricula and the design of the content of training. Also, they can participate in defining and identifying new training needs, as well as developing new knowledge and techniques for applying education and training to the real needs of work.

In the same research mentioned above, a study conducted on a sample of Tanzanian employers revealed that 33.7 per cent of employers would like to be consulted by higher educational institutions when research projects related to areas of their own interest are to be carried out, while 29.7 pre cent of the same sample wanted to be consulted in the development of new training programmes (pp. 300-301). Moreover, the above mentioned study has offered suggestions for possible structures of higher education which would involve employers directly in the activities that are normally carried out within the institutions of higher education. These structures include:

1. Sandwich programmes which alternate work with studies.

2. The employment of students in suitable fields during their vacations to give them first-hand experience of the world of work.

3. Education projects for students based on a firm's needs, to be carried out within the firm as part of the students' education.

The said study has also indicated that **"[s]andwich programmes and vacation employment are equally preferred by almost three-quarters of the employers surveyed"** (Sanyal and Kinunda, 1977, p. 302).

Al Megren (1996), in his study on the perception of employers from the Saudi Arabian private sector towards the existing links between their firms and vocational education institutions stated that **"it seems that there is little, if any, cooperation. Very few of the private sector firms actually coordinate with vocational schools in any type of effort"** (p. 133).

When nine types of cooperative activities were suggested in the above mentioned study, the subject employers ranked them in terms of approval from highest to lowest as follows:

1. Firm Tours

2. Cooperative Training/Work Programs
3. Lectures and Presentations
4. Counselling through an Advisory Committee
5. Career Counselling
6. Award Programs
7. Summer Job Programs
8. Exchange of Teachers and Experienced Workers
9. Training of Teachers (Al Megren,1996, pp. 133-134).

5.4.2 Students' Internship

One way to strengthen the partnership between industry and technical colleges is through the internship (co-operative training) programme, which **"as a transitional form of course work: a guided move away from academia and into the workplace[is] valuable as career preparation"** (Rehling, 2000, p.77). Internship is described by Martin (1997) as the co-operative education that:

> **"combines learning in the classroom with learning on the job. Students put their academic knowledge into action through relevant (and, usually, paid) work experiences with real-world employers, then bring their on-the-job challenges and insights back to class for further analysis and reflection"** (p. 2).

Colleges benefit from internships because **"it is a great way to recruit students"** (Darowski, 1999, p. 68). In addition, internships provide colleges with feed-back from students when they return, which helps colleges keep in touch with employers' needs (Buckler and Carey, 1992, p. 32).

Students benefit, too, from being a part of the internship scheme because, firstly, **"internships give the students a chance to apply the skills they have learned in a practical setting"** (Darowski, 1999, p.68); secondly, internships furnish the students with **"a taste of what their chosen jobs are really like"**; and thirdly, they allow students **"to work with equipment the college can't afford"** (Buckler and Carey, 1992 p. 32).

In a study conducted in the U.S.A. by Carlson (1997), respondents representing Hennepin Technical College graduates indicated that internships were important to all college students. In fact, they ranked the internship as No. 3 among 12 college activities (p. 99).

Advantages of the internship programme benefit not only students and colleges. Employers also gain something. Darowski (1999), says that **"internships offer companies a chance to further the education of students through real-world experience while testing out prospective employees without huge expenses"** (p. 68).

Internships also offer companies opportunities to train more people on their products which means that there **"will be more people trained in the use of these products. This adds to [the] company's market share and potential employee pool, and enhances its public image"** (Darowski, 1999, p. 68).

Furthermore, the internship or co-operative training programme is a means of future employment for graduates. A study of University of Waterloo graduates found that two-thirds of the students enrolled in internship programmes got jobs on graduation with companies they had worked for as co-op students (Buckler and Carey, 1992, p. 30).

Though internship is becoming an important component of educational and training programmes, there are still some educational and training institutions falling short in this regard. Al-Ghamdi (1994), states that the overwhelming majority of students graduating from vocational training centres in Saudi Arabia had not been exposed to external training related to their specialisation (p. 393).

5.5 Employers' Perception of College Graduates

Employers of the industrial and business sectors need to be satisfied with the appropriateness of education offered in higher education institutions as a base for further training and the build-up of practical know-how. Hunter (1981), states that **"the employer is looking for an educational foundation which is occupationally relevant"** (p. 35).

According to a study conducted by Lemhour (1988), as cited by Al Megren (1996), to assess Moroccan employers' perception of education and training, it was found that:

> **"Business and industry employers had positive attitudes towards vocational education in general. They had negative attitudes towards vocational education in their community and towards general education and youth problems. Employer cooperation with vocational institutions was limited, and employer information about education and training was insufficient"** (pp. 17-18).

Al Megren (1996), in his attempt to identify the perception of employers in the private sector towards the vocational education system in the city of Riyadh, in Saudi Arabia, stated that employers **"had a positive perception towards vocational education in general. However, the majority of respondents subscribed to the opinion that the vocational education programs have less prestige than general education programs"** (p. 130).

As far as the perception of Saudi employers towards the graduates of the vocational education schools, which may not necessarily mean in this particular case, the graduates of technical colleges, Al Megren (1996), revealed that **"students lack awareness of job requirements, discipline, self-confidence and aspiration [but] respondents were willing to hire vocational school graduates"** (pp. 131-132).

5.5.1 Employers' Satisfaction

The satisfaction of an employer with previous college graduates is really one of the factors that influence his acceptance of other graduates for jobs, and the higher the level of an employer's satisfaction with a certain college graduate the higher is the possibility of employment for future graduates. The opposite is also true.

Franchak and Smiley (1981), as cited by Al Megren (1996), have emphasized the above concept when stating that:

> **"The products of vocational education programs are an integral part of the resources of the enterprises which employ them. Satisfaction with these products can be compared to satisfaction of a consumer with any product placed on the market. In order for vocational education programs to market their products adequately, surveys of the consumer are a necessary part of the total effort"** (p. 16).

5.6 College Graduate Employment

One of the main goals of education is to prepare people for employment, which is always a responsibility shared between the graduate, the college, and the employer. Adams and Stephens (1972), stated that **"a student invests ... in preparation for a career, specific benefits are hopefully foreseen, i.e., an acquisition of a sound foundation for building a future career"** (p. 3). In addition, Carlson (1997) found that the majority of the respondents of the study she conducted (88.77%) indicated that their reasons for attending a technical college were related to employment (p.64). But finding a job is no longer an easy task. In this regard, OECD (1992, vol. I), pointed out that such difficulty varies according to **"the type of degree, the field of study, ... gender [and] ... flexibility and ingenuity [the job seekers had to show] in their search"** (p. 66).

The labour market situation facing the graduate, along with its associated difficulties, is always determined by **"the type of degree... and the kind of job that [the graduates] want to obtain"** (Brennan and McGeevor, 1988, p. 45).

Therefore, it can be concluded that college students consider this relationship carefully when they select the discipline they want to pursue and relate it to the job that they like and think they can handle. Gaps between the two may result in difficulty and a possible period of unemployment. Such a conclusion is supported by Brennan and McGeevor (1988) that **"[g]raduates from courses which are not linked to a particular occupation have more**

difficulty and take longer [in finding worthwhile occupations]. Even after getting a job they are more likely to be actively looking for a different type of job" (p. 43).

A report conducted in 1985/86 on the employment situation in Germany up to the year 2000, projected that the labour force demand for unqualified manpower would fall by 3 million and the demand for highly qualified people would increase by about 1.5 million (OECD, 1992, vol. I, p. 66). Though the two figures were taken from a country where the economy was flourishing and strong, they still indicate that it is becoming almost vital for individuals looking for future jobs to obtain the highest possible marketable educational qualifications.

As far as earning is concerned, college graduates in the United States are usually paid higher than secondary school graduates, which without doubt means that more jobs with competitive wages will be available. Therefore, the relationship between educational attainment and gaining employment will be stronger. Katsinas (1995) reported that in 1992 a male college graduate earned 83 per cent more than a similar man with only a secondary school education.

Another example supporting this conclusion comes from Mulder (1990), who estimates that **"two-thirds of all jobs created in Canada in the 1990s would require more than a secondary school diploma"** (OECD, 1992, vol. II, p. 26).

Hunter (1988), too, emphasized this by claiming that entry-level jobs in Canada require greater cognitive and verbal skills, and advanced levels of education due to the growth in the service sector (OECD, 1992, vol. II, p. 35).

Higher educational institutions in general, and technical colleges in particular, have a great responsibility in facilitating the employment process of their graduates by providing the students with the appropriate instruction which is relevant to the needs of the employers. There is much concern on the part of employers, especially in the industrial sector of the economy, over the fact that educational institutions are not providing industry and business with the right graduates. Larry Samson, Chair of a working group on education for the

Information Technology Association of Nova Scotia in Halifax, Canada, pointed out that **"while some institutions do a good job, others are out of touch with the world beyond the ivory tower."** He also adds that the later institutions **"will teach things that are very appropriate for future academic endeavours in the field, but aren't necessarily appropriate for industry."** Finally, he concludes that **"we need to be graduating people who can be effective appliers of technology as well as people who can do the research"** (Buckler and Carey, 1992, p. 28).

The above-mentioned concerns on meeting the requirements laid down by employers were also recognized by Custer and Claiborne (1995), as cited by Carlson (1997) when they found that:

> **"employers are sending a clear message to the educational community that technological changes are demanding increased levels of basic academic skills...Employment in the technical workforce is increasingly requiring employees who can read, interpret, and prepare technical documentation; those who can compute and comprehend data output; and who can solve complex problems"** (p. 2).

5.6.1 Occupational Destinations of College Graduates

The occupational placement destination of the College graduate is always influenced by different factors. According to the Canadian Labour Market and Productivity Centre (1990), it is often influenced by structural factors such as demographic change and fluctuation in the economy as well as individual factors such as employment contracts, interpersonal skills and aspirations. Based on the same source, for instance, **"those with diplomas in the various Engineering technologies...were primarily employed in Science/Industrial and Fabricating/ Assembling/Repairing Occupations"** (OECD, 1992, vol. II, pp. 41-42).

The present researcher wonders whether or not it is easy for academia to respond to industry's needs. It is the duty of educational institutions to respond positively to the requests of employers for highly-trained graduates; but it is always difficult for academia to provide industry, for instance, with graduates who are educated and trained to suit the special and exact requirement of a certain employer, because of rapid changes in employers' requirements and in technology. Some educators, however, believe that **"employers are asking too much when they expect to find graduates who exactly meet their needs on day one"** (Buckler and Carey,1992, p. 29).

5.6.2 Graduates' Job Satisfaction

Considerable thinking and research have been undertaken in the area of job satisfaction, and it has always been found that job satisfaction, attitudes and morale are used interchangeably in research. Vroom (1964), as presented by Parmaji (1979), defined job satisfaction as **"the positive orientation of an individual towards all aspects of the work situation"** (p. 54). In the case of an employee, these aspects mean company policy and administration, supervision, salary, interpersonal relations and working conditions; or they could mean the psychological needs of a person such as achievement, recognition, work itself, responsibility and advancement (Parmaji, 1979, p. 53).

Another explanation of job satisfaction associated with attitudes of employees towards their jobs was given by Sarveswara (1971) as follows:

> **"Job satisfaction is an inference from the attitude a person holds towards the job. If the attitudes are positive, we infer that a person has job satisfaction; if the attitudes are negative, the person is said to be dissatisfied"** (Parmaji, 1979, p. 52).

5.6.3 Factors related to Job Satisfaction

The classification of job satisfaction has been researched by different social scientists and schools of thought.

On the graduate side, Dash (2000) reported that **"graduating seniors [in U.S. Colleges] say the decision about what job to take often comes down to lifestyle issues such as a**

casual work environment and flexible hours" (p. 1). When students and recent college graduates from these colleges were asked what benefit they desire most, their answers were as follows:

Flexible hours	34%
Stock options	19%
More vacation time	13%
Ability to telecommute	13%
Better health plan	12%
Large signing bonus	9% (Dash, 2000, p. 87).

Another study conducted by Mumford (1972), as reported by Parmaji (1979), included the following major factors related to job satisfaction. These were:

1. Knowledge,
2. Psychology,
3. Effort-Reward,
4. Ethical and Social Values, and
5. Task Structure (pp. 55-56).

In a similar study conducted in Tanzania by Sanyal and Kinunda (1997), fifteen different factors related to job satisfaction were identified and then presented to graduates in order to check their reaction, before being compared with the perceptions of employers.

It was observed from the study findings that the graduates marked the factors according to the following priority sequence:

1. Job security
2. Interesting work
3. Further studies
4. Improvement of competence

5. Working with people
6. Creative work
7. Use of skills learned in formal education
8. Being of value to others and society
9. Better prospects
10. Use of special talents
11. Good income
12. Leisure time
13. Travel
14. No supervision
15. Supervising others

According to the employers' perception of the fifteen factors, the three least important factors were:

1. Improvement of competence
2. Job security
3. Travel

Job security which was assigned as the highest rank by the graduates, was ranked the fifteenth by employers (pp. 304-305). It appears that employers were influenced by what the situation should be rather than what it was (p. 305).

A study conducted in Italy in 1989 on the satisfaction levels of university graduates in relation to three aspects of their jobs, namely correspondence with university studies, stability and salary, suggested that 69.9 per cent of graduates were satisfied with the correspondence of their work to university studies; while 59.7 per cent of graduates were satisfied with the stability of their work. With regard to salary, 52.2 per cent of graduates were satisfied (OECD, 1992, vol. III, pp. 172 and 173).

One may ask, "Can enrollment in elite colleges lead to a successful career?" The debate over whether enrollment in expensive and elite colleges can lead to a successful career and a big salary for the graduate, or in other words whether it is worth the money paid by the student, continues. To answer such a question, the findings of the study conducted by Krueger and Dale (1995) are relevant in noting that:

> **"students who had enrolled in colleges where the average freshman SAT score was 1,200 earned about $76,800. Students who were accepted by the highly selective colleges, but who enrolled in institutions where the average SAT score was 1,000 earned $77,500"** (as cited by Gose, 2000, p. A52).

They clearly emphasized, however, the fact that it is not the school that has the magic touch, but the students.

5.7 Studies related to Saudi Arabia

Although some parts of the different studies related to vocational and technical education in Saudi Arabia were selected and used to support the review of literature in the previous text of this chapter, the researcher finds it useful and quite informative to the reader to include a brief summary of the following studies.

Al Megren (1996) conducted a study on Private Sector Perception of the Vocational Education System in the city of Riyadh, Saudi Arabia. The main purpose of the study was to examine and analyse the perceptions of the private sector about the vocational education system in the city of Riyadh, in order to evaluate those perceptions and opinions with the aim of remedying the weaknesses and enhancing the merits of the system.

The target population of the study consisted of owners and managers of private sector firms located in Riyadh, Saudi Arabia. Only 2,489 firms out of 6,489 were considered, and 331 firms were randomly selected from the population. The data were collected through a questionnaire and 74.53 per cent responded (p. 129).

The major findings of the study were as follows:

1. Respondents had a positive perception of vocational education in general. However, the majority of them subscribed to the opinion that the vocational education programmes had less prestige than general education programmes.

2. 87.2 per cent of the respondents agreed that the current vocational education programmes were not sufficient to fulfil their workforce needs, and that 85.2 per cent of them agreed these programmes needed total reform.

3. More than 62 per cent of the respondents did not think that vocational education teachers have a lower social rank than teachers of general education, but they had to have work experience, be highly skilled, possess a university degree and have a strong knowledge of the private sector requirements for workers.

4. Respondents agreed that students in vocational schools should learn about the work place and the system of work and workers. Generally, the study revealed a negative perception towards students in vocational education.

5. Although less than 53 per cent of respondents agreed with the compulsory policy imposed by the government of hiring vocational education graduates, the other two policies, that is, determining a minimum of Saudi workers in each firm, and increasing government incentives, gained more than 70 and 90 per cent support respectively.

6. Among the ten skills and characteristics of new employees, basic mathematics skills were least desired by the private sector. In fact, 64.4 per cent of respondents claimed that mathematics skills were very unimportant.

7. Although the majority (54.4%) of the private sector were willing to co-operate with the vocational education schools, the study revealed little, if any, co-operation. Also a major number of the respondents admitted that their firms did not take any advantage of vocational schools in training employees.

8. Nearly 61 per cent of the respondents were not willing to support vocational education programmes financially.

9. Finally, the study supported the following changes related to vocational education in Saudi Arabia:

   A. Changes related to training:

      a. Internship training scheme.
      b. Graduate follow-up programmes.
      c. More English language curricula.
      d. Experience transfer from non-Saudi workers to Saudis through apprenticeships.
      e. Non-Saudi firms training Saudis.

   B. Changes related to employment:

      a. Modifying the employment system.
      b. Revising the current wage system.

   C. Other recommended changes:

      a. Joint ventures between the private sector and vocational education institutions.
      b. The development of Cooperation Committees responsible for the enhancement of the relationship between the private sector and vocational educational institutions.
      c. Increasing the involvement of the private sector in policy making, programme planning, and curriculum development for vocational education.
      d. Encouraging universities to play a significant role in raising the quality of vocational education (pp. 130-135).

Murtada (1996) conducted a study on Vocational Education in the Kingdom of Saudi Arabia. The purpose of this study was to throw some light on the weakness of technical/industrial education in the Kingdom of Saudi Arabia.

To achieve this purpose, the researcher designed a structured interview to be conducted with the Directors of the eight Industrial Secondary Institutes. He also designed two types of questionnaires to be distributed to the first and third year students enrolled in these institutes. The total number of students who participated was 1,327 which represented 22.3 per cent of the total student population in the institutes in 1993 (p. 146).

The major common findings of the study in the two groups of students were as follows:

1. 49 per cent of the respondents reported their reason for joining the institutes as being the desire to become skilled technicians.

2. 38 per cent of the respondents preferred Arts subjects to Science subjects.

3. 64 per cent of the respondents had selected their specialisations on the ground that they offered better work opportunities.

4. 73 per cent of the respondents reported that they would select secondary technical education if they were given the choice to pick again.

5. 46 per cent of the respondents thought that the institute was preparing them to find a job in the private industrial sectors.

6. 44 per cent of the respondents claimed that industrial secondary education is better than general secondary education.

Interviews with the Directors of the Industrial Secondary Institutes indicated the following:

1. There were no specific aims, objectives or admission criteria for the institutes except the ones which were put forward by GOTEVOT.

2. Annual admission capacity was mostly determined by the availability of space and equipment and students repeating courses. Expanding capacity was dependent upon one main condition, i.e. more funding.

3. There was no actual participation on the part of industry.

4. If courses did not meet the actual demands of the industry, it was because the directors did not know these needs.

5. It was guessed that 20 to 30 per cent of graduates joined industry.

6. Graduates were not joining industries because they did not favour long working hours, and because the industries were looking for cheap and experienced foreign manpower (pp. 148-159 and 169-174).

Al-Ghamdi (1994) conducted a study on Factors Influencing Advancement of Technical Education and Vocational Training and their Impact on Economic Development in Saudi Arabia. The study aimed at presenting a scientific and objective explanation of the factors which impact positively or negatively upon Saudi youth's attitudes towards enrollment in industrial education and vocational training, and towards the practice of manual occupations.

The major findings of the study can be summarised in the following text:

1. The two major factors influencing students to leave academic education and join industrial education and vocational training were, first, the frequency of failure in academic education and, second, a lack of desire to continue academic education.

2. The overall factors behind students' enrollment in technical and vocational education were personal desire (28.9%), frequency of failure in academic education (26.8%), and family desire (18.7%).

3. A very significant shortage of information concerning technical and vocational education was revealed. Only 13.3 per cent of students claimed to have received their information

through public communication from the organisation responsible for this (GOTEVOT). In fact, the majority of students had not been invited to visit any industrial institute or vocational training centre. 86.7 per cent got information through families, relatives and friends.

4. The programmes of academic and non-academic education were not linked with the economic sectors in society, which resulted in an unbalanced distribution of manpower leaving industry and other production sectors suffering from severe shortages of trained manpower at all levels. As a matter of fact, only 4.6 per cent of interviewees stated that schools organised visits to industry.

5. Other reasons making students reluctant to join technical and vocational education were:

    a. The negative attitudes of fathers towards this type of education. Only 2.8 per cent of fathers practiced vocational work.

    b. The claim by a third of respondents that the training provided was not enough to equip them to practice work after graduation, though 54.5 per cent of the total respondents claimed that the nature of training provided was quite good.

    c. The lack of linkage between the general education curriculum and technical and vocational programmes.

    d. Psychological and sociological barriers (pp. 382-401).

Alnais (1991) conducted a study entitled Factors Influencing Students' Decisions to enroll in the Colleges of Technology in Saudi Arabia. The purpose of this study was to investigate nine pre-determined factors influencing students' decisions to enroll in the Colleges of Technology in Saudi Arabia, with the intention of helping the colleges to improve their academic programmes and increase the student enrollment.

The sample size of the study was 488 respondents, representing a random sample from 4,063 students at the six colleges of technology.

The following were the most important conclusions of the study which were common among the different colleges:

1. Most of the students enrolled in the Colleges of Technology in Saudi Arabia were from low income families and urban areas.

2. Islamic religion was the most influential factor in students' decisions to enroll in technical schools, although students with a high family income were less affected by the religious factor.

3. Students perceived career goals, knowing their own abilities, and self-satisfaction as being more important than monthly stipends and scholarships.

4. Father, mother and spouse had a low influence on students' selection of a technical program.

5. The influence of the media, high school teachers and counsellors, school or personal visits to the colleges, and college representatives ranked the lowest (p. 106).

Khateeb (1985) completed a study on Relating Technical Education to Industrial Manpower Requirements in the Kingdom of Saudi Arabia. The purpose of the study was to assess the technical training programmes offered by the Technical Education Institutes – the public education and training providers – and those of four industrial companies. These were:

- Saudi Arabian Oil Company (SAUDI ARAMCO)
- General Petroleum and Minerals Organisation (PETROMIN)
- Saudi Basic Industries Corporation (SABIC)
- Saudi Arabian Airlines (SAUDIA)

Specifically, the study aimed at assessing the effectiveness of (1) the technical education programmes; (2) the linkages between the technical education programmes and the needs of Saudi industry; (3) the transfer of technical education graduates into industry; and (4) on-the-job training programmes provided by the same agencies and companies (p. 12).

He found that technical education programmes were not sufficient to fulfil the needs of Saudi industry, but that the on-the-job training programmes were sufficient to fulfil its needs (p. 280).

Concerning the linkage between technical training providers and industry, the study revealed that cooperative linkages existed between the providers of technical education programmes in Saudi Arabia and Saudi industry (p. 281).

Moreover, it was found that effective procedures for facilitating the transfer of individuals between technical training or on-the-job training programmes and appropriate jobs in Saudi industry did not exist (p. 282).

On the content of the on-the-job training programmes, it was found that On-the-Job Training programmes did provide sufficient practical education, although the programmes did not provide sufficient theoretical education (p. 283).

Comparing the performance of the four participating companies and the State Organisation responsible for offering public vocational and technical education in Saudi Arabia (GOTEVOT), the study stated that there were no significant differences between GOTEVOT and the four companies in terms of the above four findings as well as in terms of the ways in which GOTEVOT and companies approached the development, implementation, and conduct of technical education programmes (pp. 284-286).

5.8 Studies most relevant to the present study

Based on the surveyed international and local studies related to technical education and training, the researcher found the following four studies to be the most relevant ones which may have an influence on the present study.

The first of these (Al Megren, 1996) is pertinent to the present study in that it discusses the perceptions of employers in the private sector to the vocational education system. After discussing their general perceptions, it focuses upon various aspects of their perceptions. Those aspects of particular significance for the present study are their perceptions towards educational programmes and curricula, teachers, vocational schools and graduates, the skills and characteristics of new employees, and co-operation with vocational education.

The second study (Al-Ghamdi 1994) covers three topics of importance to the present study. It explores the reasons for which students embark upon vocational or technical education; it discusses the lack of sources of information and co-operation between vocational and technical education and other development sectors in society; and it looks at the effect of negative paternal attitudes towards vocational and technical education on student enrollment.

The third study (Khateeb, 1985) investigates four areas which are germane to the present study. It appraises the sufficiency of technical education programmes for the needs of Saudi industry; it examines the linkages between Saudi industry and the providers of technical education programmes; it reviews procedures for facilitating the transfer of individuals between technical or on-the-job training programmes and appropriate jobs; and it weighs the contents and provision of on-the-job training programmes.

The fourth study (Carlson, 1997) is concerned with the extent to which the graduates of a technical college felt they were prepared for the workplace. This investigation was carried out against the background of a technical college in the U.S.A. The present researcher feels that this work is extremely relevant to the current work, primarily for two reasons: it deals with the perceptions of a technical college graduate, and it provides a basis for comparing the findings of a college in Saudi Arabia with those outside it. It therefore provides an international dimension to the scope of this work. Carlson showed that there was a strong congruence between skills needed in the workplace and those a technical college may offer (p. v).

5.9 Summary

The literature reviewed in this chapter includes eight major topics, covering the programmes of technical and vocational education institutions, their qualifications, and linkage with industry, as well as the social attitudes towards this type of education. It covers a survey of employers' perceptions of college graduates and their employment, in addition to some studies related to Saudi Arabia. Finally, the chapter closes by listing the studies found to be the most relevant to the present study.

From the previous presentations, it can be noticed that technical and vocational education in different parts of the world suffers some problems and faces challenges hindering its advancement and development.

According to the literature written on Saudi Arabia, it is obvious that most of the studies indicated that the technical and vocational programmes were not sufficient to fulfil the needs of the workforce, especially in terms of the demands of industry and not enough to equip students to practice work after graduation.

Also, the literature reviewed, whether it is related to developed or undeveloped countries, including Saudi Arabia, indicates that the individual and social negative attitudes about technical and vocational education represent a serious social challenge confronting this type of education.

Another main problem revealed in the literature surveyed is the weak relationship between the institutions providing education and training and the employing organisations, including industry. This problem becomes very clear in undeveloped countries, including Saudi Arabia.

For the studies related to Saudi Arabia, it is obvious that the majority of the studies summarized focussed either on the vocational and technical education provided by institutions below college level, such as vocational training centres and secondary technical institutes, or on some industrial companies. The present researcher believes, however, that these studies provide quite a good background of the vocational and technical education in Saudi Arabia. They are worth mentioning because they contain information related to vocational and technical education as a whole and they cover a wide range of issues related to this type of education. Therefore, most of the studies mentioned are found, in one way or another, to be relevant to post-secondary technical education in Saudi Arabia.

CHAPTER SIX

RESEARCH METHODOLOGY

6.1 Introduction

This chapter is designed to explain the research methodology used to achieve the aims and objectives of the study.

It begins by briefly restating the aims of the study, and outlines the hypotheses derived from the literature and documents reviewed, focusing on the main factors which may be involved in producing a qualified graduate. It continues to discuss the research design, survey location, survey instruments and sampling. Data collection and analysis procedures, as well as the pilot study of the survey instruments, are also discussed.

In order to accomplish the aims and objectives of the study, the researcher has selected a research method that combines both questionnaires and interviews.

6.2 Aims of the Study

The principal aims of the study, as outlined in the introduction to the study (p. 2), are:

1. To assess the status and relevance of the qualifications of graduates of Jubail Industrial College.

2. To formulate procedures leading to more appropriate and relevant college programmes.

6.3 Research Factors and Hypotheses

From the literature reviewed and other documents surveyed in the present study, the researcher formulated twelve null hypotheses, which aim at serving the purpose of the study and its objectives by directing the focus of the data towards the general problem and thus throwing light on the possible reasons for the existence of the problem. In addition these null hypotheses also form the basis upon which the field work will be conducted.

These hypotheses have been extracted from the twelve course-related factors which are included in Part II of the list of factors below. They are the principal elements of the qualifications of a typical qualified technical college graduate, as they are revealed by the personal and work experience of the present researcher and the literature reviewed. There is no doubt that these factors have a great influence upon the qualifications of the JIC graduate in terms of quality of performance, and therefore on the formulation of the college graduate's profile. These factors are primarily related to the course of study and other procedures and services offered by JIC.

The quality of the College's graduates' qualifications is the dependent variable which is going to be measured by the above-mentioned twelve factors, while the three groups consulted - the Employed JIC Graduates, the Work Supervisors and the JIC Students - will play the role of the independent variable.

The remaining background information included in Part I in all of the questionnaires and the associated questions will provide two things:

(1) basic descriptive information about the target population of the study;

(2) some information to support the discussion related to the hypotheses.

6.3.1 Factors Related to JIC Graduates' Qualifications

The factors listed below relate to the three groups of respondents to the questionnaires. The questionnaire for each group is designed specifically to elicit the information according to the particular perspective of those included in the group.

Part I: Background Information

1. Socio-demographic information, etc.

This factor covers personal data and other background information.

Part II: Factors related to the Course of Study

2. Hands-on skills

This factor covers all types of practical experience related to the graduate's profession.

3. Analytical skills

This factor covers knowledge of science, mathematics and related speciality subjects.

4. Proficiency in English

This factor covers the graduate's command of English pertaining to all language skills.

5. Computer literacy

This factor covers computer skills offered by the course of study.

6. Technology awareness

This factor covers the types of technology used in training and the graduate's awareness of other technologies.

7. Safety awareness and practice

This factor covers safety awareness and practice, as encouraged by elements of the course of study.

8. Organisational behaviour and human performance

This factor deals with the attitude, behaviour and self-discipline that the course of study seeks to develop in the students.

9. Job relation to course of study

This factor reviews the relationship between the specialisation that the graduate selected to pursue in the college and the job that he is currently handling.

10. Awareness of job requirements

This factor covers the graduate's awareness of the job requirements, such as duties, responsibilities, skills and knowledge.

11. Physical well-being

This factor covers how the course of study attempts to enhance the physical fitness and well-being of the graduate and how he benefited from it.

12. Links between the College and industry

This factor covers all the various links that exist between the College and industry and the impact that such links have on the graduate's qualification.

13. Selection of course of study

This factor covers whether the graduate selected the appropriate specialisation best suited to his own ability and matching his own interests.

The above mentioned factors were evaluated by submitting them to a panel of expert educationalists and industrial officials, namely, three departmental chairmen from JIC and two representatives from local industry. A self-explanatory letter was sent for this purpose along with the list of factors (Appendix A).

The discussion with the panel of experts suggested adding two more factors to the original list. They are Nos. 1 and 11. It also resulted in changing the titles of factors Nos. 3 and 8 as they appear in the following table:

Table 6.1

Changes related to Titles of Factors

Factor No.	Previous Title	New Title
3	Knowledge of mathematics and sciences	Analytical skills
8	Behavioural and conduct attitude	Organisational behaviour and human performance

6.3.2 Hypotheses

To measure the quality of the JIC graduates' qualifications and the level of satisfaction of the three groups of respondents with such quality, the following null hypotheses were developed to test the twelve factors identified earlier (pp. 123-125), which are important elements of a graduate course in technical education:

1. Employed JIC graduates (EJG), work supervisors (WS) and JIC students (JS) are not satisfied with the hands-on skills offered by the course of study at JIC.

2. The three groups (EJG, WS and JS) are not satisfied with the analytical skills offered by the course of study at JIC.

3 The three groups (EJG, WS and JS) are not satisfied with the proficiency in English offered by the course of study at JIC.

4. The three groups (EJG, WS and JS) are not satisfied with the computer literacy offered by the course of study at JIC.

5. The three groups (EJG, WS and JS) are not satisfied with the technology awareness offered by the course of study at JIC.

6. The three groups (EJG, WS and JS) are not satisfied with the safety awareness and practice offered by the course of study at JIC.

7. The three groups (EJG, WS and JS) are not satisfied with the organisational behaviour and human performance offered by the course of study at JIC.

8. The three groups (EJG, WS and JS) are not satisfied with the relation between the job and the course of study offered at JIC.

9. The three groups (EJG, WS and JS) are not satisfied with the awareness of job requirements offered by the course of study at JIC.

10. The three groups (EJG, WS and JS) are not satisfied with the physical fitness programme offered at JIC.

11. The three groups (EJG, WS and JS) are not satisfied with the College's links to industry.

12. The three groups (EJG, WS and JS) are not satisfied with graduates' selection of their courses of study.

6.4 Research Design

The research design of this study consists of two parts: the theoretical and the empirical. The first part of the research is covered by the literature reviewed and the documents surveyed, which are related to the technical and vocational education with its international and local dimensions, with particular reference to the programme of Jubail Industrial College, the case of the present study.

The second part of the research is the data collection process which is undertaken through a survey of data conducted with the use of self-administered questionnaires and structured interviews.

This survey is carried out for three groups:

1. Jubail Industrial College graduates who are currently employed in industry in the Eastern Region of Saudi Arabia (EJG).

2. Officials in the industrial organisations – work supervisors – (WS).

3. Jubail Industrial College students who have completed the Co-operative Training Programme (JS).

The researcher has chosen to use a questionnaire instrument because it is one of the most common means of collecting data. Oppenheim (1992), as cited by Arishi (1995), points out that the questionnaire is **"an important instrument of research, a tool for data collection".** He also adds that the **"questionnaire has a job to do: its function is measurement"** (p. 176).

Another importance of a questionnaire lies in the fact that it is cheap and easy to administer for a broad and representative sample. Borg and Gall (1979) say:

> **"Questionnaires are a valuable tool for collecting descriptive information from samples spread over a large geographical area"** (p. 26).

Other advantages of administering a questionnaire are the standardisation of its data-gathering procedures and the feeling of privacy it offers to the respondent.

On the other hand, a questionnaire has its disadvantages as well, like any other instrument used in surveying. Its primary disadvantages are the non-returns, misinterpretations and associated validity problems.

As far as the interview technique is concerned, it is a method of data collection that can be conducted either face-to-face or by telephone. Interviews can be used independently or alongside other methods, such as a questionnaire.

In the case of the present study, interviews are used as a supplementary method to support the questionnaires. They are used in order to follow up the questionnaire responses in depth, to provide richness in the responses, and to clear up misconceptions. Borg and Gall (1979) describe the interview as **"a valuable measurement tool for gathering information in areas where a deep understanding is needed and where probing might be required"** (p. 26).

6.5 Survey Location

When deciding where the survey of data would be conducted, the following factors were taken into consideration:

1. Approximately 59 per cent of the total graduates of the College were originally from the Eastern Region (JIC, Graduates Record, 2001).

2. Approximately 95 per cent of those graduates who joined the industrial sector are currently working in the Eastern Region (JIC, Graduates Record, 2001).

Therefore the following six cities in the Eastern Region of Saudi Arabia, all of which have significant industrial development, were chosen as the location for the survey. For the survey location on the map of Saudi Arabia, please refer to Fig. 2.1 on page No. 9.

6.5.1 Jubail Industrial City

Jubail Industrial City is the largest industrial petrochemical complex in the Kingdom of Saudi Arabia. It is located approximately 100 kilometres north of Dammam (see chapter 3).

6.5.2 Dammam

Dammam is the capital city of the Eastern Region and one of the three most industrially developed cities in the Kingdom. It is located on the Arabian Gulf and is considered to be the major commercial city in the area. It has two very large industrial zones and the main commercial port on the east coast.

6.5.3 Dhahran

Dhahran is situated west of Al-Khobar, about 15 kilometres to the south of Dammam. It has the headquarters of Saudi Aramco, one of the world's largest oil producers.

6.5.4 Al-Khafji

Al-Khafji is an oil producing and refining town. It is located in the north-east of Saudi Arabia, on the border with Kuwait. It is 320 kilometres north of Dammam.

6.5.5 Abqaiq

Abqaiq is one of the three oil cities in the east of Saudi Arabia. It is located approximately 80 kilometres to the southwest of Dammam. The growth of Abqaiq was directly linked to the increase in the number of oil installations in the area following the discovery of the second oilfield in 1940 (Al-Ayaf, 1993, p. 85).

6.5.6 Ras Tanura

Ras Tanura, a city and port on the Arabian Gulf, is located 60 kilometres to the north of Dammam. It was developed by the Arabian American oil company, Aramco (now Saudi Aramco), after the discovery of petroleum deposits in the 1930's. Ras Tanura is now the principal Arabian Gulf terminal of the oil pipelines and has a modern port capable of accommodating the largest tankers. The city also has a refinery and storage tanks as well as hydro-formers, producing high-octane gasoline (Arabian American Oil Company, 1980, p. 216).

6.6 Survey Instruments

The survey instruments used in the main study are questionnaires and interviews, as stated earlier in the text.

6.6.1 Questionnaires

These questionnaires were developed to elicit information from three groups of respondents, namely graduates of Jubail Industrial College who are currently employed in industry, officials in the industrial organisations (work wupervisors), and JIC students who have completed the Co-operative Training Programme.

Each questionnaire consists of two parts. Part I contains questions related to the respondents' socio-demographic and other background information, while Part II includes questions related to the skills, knowledge and services offered by the course of study at JIC. This part is measured by a range of five levels of satisfaction, with a medium level named "unsure" which indicates a neutral level of satisfaction falling between the two levels: dissatisfied and satisfied, as if it were a zero value on a numerical scale. This definition was clearly explained to all the respondents of the three groups in Arabic at the time of the distribution of the questionnaires.

A Likert-type scale, which uses only odd categories, is used in this study. **"When there are five or seven possible categories of response, it is obvious that the response variance should be greater than with only two or three categories"** (Kerlinger, 1987, p. 496). The T-test and ANOVA tests which are the main statistical tests used in this study depend on the variance test. Hence, a greater variance is required to give more sensitive results.

An additional open-ended question is added to each of the three questionnaires, and is designed to invite and encourage more comments and suggestions for a better college programme.

6.6.1.1 Questionnaire for Employed JIC Graduates (EJG)

This questionnaire is designed to encourage JIC graduates who are employed by industry to judge their performance on the basis of their own perception, and to assess how far their qualifications meet the requirements of the jobs they are currently handling.

Part I contains 11 questions related to the graduates' socio-demographic and other background information, while Part II includes 36 questions related to the skills, knowledge and services offered by the course of study.

Question No. 5 of Part I was cited from Al-Nais, 1991, p.115, while questions Nos. 23 and 24 of Part II were taken with some minor alterations from Al-Megren, 1996, p.172.

6.6.1.2 Questionnaire for Work Supervisors (WS)

This questionnaire was constructed to encourage industrial employers to assess the quality of the employed JIC graduates upon the basis of their own perception, and to determine the degree of their satisfaction with the competencies of these employees in meeting the job requirements laid down by industry.

The first part consists of 10 questions on the socio-demographic background of the respondents, as well as on the industrial organisations for which they work. Questions Nos. 1, 3, 4, 7, 8 and 10 of this part were extracted, with some changes to suit the purpose of this study, from Al-Megren, 1996, pp. 176-177. The second part consists of 34 questions designed to investigate the degree of satisfaction of work supervisors with the quality of the skills, knowledge and services offered by the JIC course of study. Questions Nos. 23 and 24 of this part were also taken from Al-Megren, 1996, p. 172.

6.6.1.3 Questionnaire for JIC Students who have Completed the Co-operative Training Programme (JS)

This questionnaire is intended to motivate JIC students who have almost completed their course of study and have also undertaken their co-operative training programme to formulate their expectations as to whether the content and depth of their studies will fulfil the needs of their future employment.

The first part of this questionnaire consists of 13 questions requesting background information about the participating students and asking for information from the respondents on their achievement in the College in general and in the Co-operative Training Programme in particular.

The second part consists of 36 questions related to the components of the course of study similar to those questions included in Questionnaire No. 1. Questions Nos. 23 and 24 were taken from Al-Megren, 1996, p.172.

6.6.2 Interviews

Interviews will only be conducted for the first two groups of respondents (Employed JIC Graduates and Work Supervisors), while the expectations of the third group (JIC Students who have undertaken their co-operative training programme) will be ascertained only by questionnaire, as planned in Chapter One.

The researcher intends to conduct face-to-face interviews with a small sample (10%) randomly selected from the two groups. This is explained further on page 154.

In interviews, the same questions as appear in the two questionnaires will be asked, with an additional "Why?" question to be included at the end of each question in Part II. The reason for using the additional question is the desire of the researcher to collect more information from respondents, providing reasons for the replies to questionnaires and supporting the descriptive analysis of the information provided.

6.6.3 Validity of Questionnaires

Since a questionnaire is considered a data source for gathering reliable and valid information for some purposes, it becomes necessary to ensure that it is a valid measurement tool and, therefore, a need for certain procedures to test its validity is required.

Validity, simply refers to the degree to which an instrument measures what it is supposed to measure. Therefore, a prospective questionnaire user should always ask if the instrument to be used is valid for the purpose for which it is to be used, because an invalid test or questionnaire usually leads to erroneous research conclusions (Borg and Gall, 1979, p. 211).

For the purpose of this study, the content validity of the questionnaires needs to be tested. Borg and Gall (1979) describe the content validity as **"the degree to which the sample of test items represents the content that the test is designed to measure"** (p. 212).

Both validity and reliability are vital characteristics for all forms of a data collection process. Best (1981), as cited by Arishi (2000), says that:

> **"Validity and reliability are qualities that are essential to the effectiveness of any data gathering procedures"** (p. 108).

In this study, the content validity of the questionnaires was checked and ascertained by submitting them to a panel of expert judges. These were selected as follows:

a) Four educationalists from JIC.

b) Two educationalists from the Department of Organizational Development, Royal Commission, Jubail.

c) Four representatives from local industries.

It is worth noting that the previously selected panel of experts who reviewed the factors related to the hypotheses was included in this panel because of the familiarity of its members with the present study.

Consulting expert colleagues, staff and others on the validity of instruments such as questionnaires is a well-known method among researchers. Nwana (1982), as cited by Arishi (1995), stated that such a method is an efficient way of eliminating ambiguity in constructing questionnaires and in collecting data (p.182).

The researcher provided the panel with a formal covering letter together with the three questionnaires, explaining the aims and objectives of the present research and the intentions underlying the questionnaires. The judges were asked to look at each item on the questionnaires, and to indicate on the given form, to what extent they found it relevant to the purpose of the investigation, by ticking one of five boxes marked: Not Relevant (NR), Minimally Relevant (MR), Unsure (UN), Relevant (R) and Very Relevant (VR) (Appendix B).

The members of the panel were also asked to give their opinion on whether questions should be retained in their present form, rephrased or deleted. They were also invited to make any other suggestions which might improve the validity of the questionnaires.

After obtaining the feedback of the panel of experts, a statistical analysis of the data collected was administered (Appendix B) and the validity of the three questionnaires was established on the ground of the high percentage given to the categories Relevant (R) and Very Relevant (VR).

In fact, 70 per cent and more of the responses of the panel rated all questions in the three questionnaires in the above two categories, while, only 6 questions in the three questionnaires were categorized as Not Relevant (NR), but with a very small percentage ranging from 10 to 20 per cent.

Concerning the panel's recommendations on the content and structure of the three questionnaires, the following are the important suggestions implemented:

1. Age groups in question No. 1 of Questionnaire No. 1 were redistributed to appear more realistic.

2. The following sentence has been added to the additional question in all the three questionnaires: "Please arrange your ideas in points starting with the most important as you see it".

3. The title of Questionnaire No. 2 is amended to "For Work Supervisors" instead of "For Employers".

6.6.4 Translation of Questionnaires

The three questionnaires were originally written in English, but were then translated into Arabic, the native language of the respondents, by the researcher, in consultation with the English Language Centre at JIC.

Replies to the questionnaires have been translated into English. This, also, is done by the researcher, with the assistance of the same centre.

The translation of the questionnaires into Arabic and the discussion associated with that task suggested that a leading statement preceding each group of questions in Part II of the three questionnaires be added to provide the respondents with a clear instruction for better understanding of the questions.

6.7 The Pilot Study

Before research is carried out, the instruments to be used, especially questionnaires, should always be tested during the stage of their development on a small sample of respondents from the same populations as will be used in the final research. This process is known as a pilot study.

Rowntree (1981) defined the pilot study as:

> **"A preliminary study undertaken prior to some major projects. May be intended as a FEASIBILITY STUDY. Or may be used to practice the proposed methods, or try out alternatives, while there is still an opportunity to make modifications"** (p. 217).

Borg and Gall (1979) describe it as follows:

> **"A pilot study is a small-scale model of the research project, usually involving only a few subjects, which is carried out in order to test and improve the plan before the researcher makes the major investment in time and effort required to carry out the planned research"** (p. 22).

The above mentioned two definitions are supported and acknowledged by Page and Thomas (1977) when they describe the pilot study as an exploratory study conducted before the start of a major project, research study or investigation (p. 265).

The pilot work is the key to ensuring the quality of questionnaires because it is a good opportunity for gathering data on the reliability of the questions. It also aims at exploring possible problems related to the content and format of questionnaires and suggests useful solutions that enable the researcher to draw more accurate conclusions.

Isaac Stephen (1972) pointed out that a pilot study permits a preliminary testing of the hypotheses, provides the researcher with new ideas and allows a thorough check of the statistical and analytical procedures (p. 5).

Therefore the pilot study pertaining to the present research was administered during the month of June 2001, for a sample of three groups randomly selected from the populations. The following text explains the manner in which the pilot study was implemented, and its results.

6.7.1 Location

The pilot research was carried out in Jubail Industrial City in the Eastern Region of Saudi Arabia. This city was chosen because it accommodates the campus of JIC and hosts the major petrochemical industries where the majority of JIC graduates work. As a matter of fact, 80 per cent of the JIC graduates in technical fields who have joined the industrial sector in the Eastern Region are in fact working in Jubail Industrial City (JIC, Graduates Record, 2001). This is due to the availability of all types of industries in the city, which will later be considered in the main study of the present research.

The method and results of the pilot study are discussed in the following sub-sections:

6.7.2 Method of Pilot Study

As has been mentioned earlier, the researcher sent questionnaires to the three selected sample groups as follows:

- Twenty copies of Questionnaire No. 1 were sent to twenty of the College's graduates working in different industries.
- Eleven copies of Questionnaire No. 2 were sent to eleven work supervisors representing different industrial employers.
- Eleven copies of Questionnaire No. 3 were sent to eleven JIC students who had completed their Co-operative Training Programme.

Each questionnaire was accompanied by a letter explaining the aims of the study and giving instructions on how the questionnaire was to be completed.

6.7.3 Results

Data obtained from the pilot study questionnaires were fed into the computer for analysis

(SPSS Program). Reliability was tested using Cronbach's Alpha (see Section 6.7.4).

The pilot study results, in percentages, as shown in Appendix C, were as follows:

6.7.3.1 Results related to questionnaire for Employed JIC Graduates (EJG)

Part I: Background Information

Tables 1 and 2 show that the largest percentage of respondents were 25-29 years of age, and 50 per cent of them are married.

Table 3 indicates that the largest number (45%) came from the Eastern Region, while the next group in terms of size (20%) were those from the Southern Region.

Table 4 shows that 80 per cent of the respondents held a Secondary School Certificate and majored in the Natural Sciences stream. The highest percentage (80%) had a final grade of "Very Good" in the Secondary School Certificate, as indicated in Table 5.

In terms of the method of study at JIC, all the respondents (100%) were enrolled as full-time students at the College (Table 6). Table 7 shows that 30 per cent of the respondents specialised in Instrumentation and Control Engineering Technology, while 20 per cent majored in Electrical Power Engineering Technology and another 20 per cent majored in Industrial Laboratory Technology. 40 per cent of the respondents had obtained a GPA ranging between 3.1 and 3.5 when they completed the course of study (Table 8).

In terms of salary, 57.9 per cent of the respondents claimed to receive a monthly salary of from 5,000 to 6,999 Saudi Riyals, as shown in Table 9. The last table of this part (Table 10) shows that 45 per cent of the respondents were working for firms dealing with petrochemical products, while 20 per cent were working for firms producing chemicals. The smallest percentage (5%) were working for firms producing gases.

Part II: Factors related to the course of study

Table 11 contains all the data collected relating to the 36 questions which investigate the extent of satisfaction of the employed JIC graduates with the relevance of their qualifications to the jobs that they were currently handling.

It shows, with the exceptions to be explained later in the text, that at least 60 per cent of the respondents were satisfied or very satisfied with all the skills, knowledge, procedures and services offered by the JIC course of study.

The exceptions to the above conclusion are related to the following items:

1. Re the use of the computer for data processing, only 27.8 per cent of the respondents were satisfied, while 22.2 per cent of the respondents were dissatisfied.

2. Re the use of the computer for word processing, only 31.3 per cent of the respondents were satisfied, while 18.8 per cent were dissatisfied.

3. Re the use of the computer software related to the profession, only 41.1 per cent of the respondents were satisfied, while 17.6 per cent were dissatisfied.

4. Re lecturing and training conducted by representatives of industry, only 31.3 per cent of respondents were satisfied, while 6.3 per cent were very dissatisfied.

5. Re involvement of industry in the development of curricular and training facilities, only 31.6 per cent of respondents indicated satisfaction.

Part III: Factors related to the graduates' social attitudes and awareness

Table 12 shows that at least 85 per cent of respondents agreed or strongly agreed with the statements included in this part concerning the technical and vocational education, industrialisation and Saudisation programmes. Only the first statement, indicating that "technical and vocational education is necessary to the existence of the society", received at least the agreement of 65 per cent of respondents.

The data obtained show very limited disagreement with the statements made. In fact, only four statements out of eleven show disagreement on the part of some respondents, but with small percentages ranging between 5 and 10 per cent. The only statement that elicited different levels of agreement was that which stated, "I joined Jubail Industrial College to be a skilled technician."

6.7.3.2 Results related to questionnaire for Work Supervisors (WS)

Part I: Background Information

Table 1 and 2 show that the age of the majority of the respondents (54.5%) was from 36 to 45 years, and all the respondents were Saudis. Concerning length of service in the firm, Table 3 indicates that 36.4 per cent of the sample consulted had worked from 6 to 10 years in their firms while 27.3 per cent had worked for 16-20 years and the rest for less than that. In terms of the level of education of the respondents, Table 4 shows that the majority (54.5%) held a college degree.

Table 5 shows that 45.5 per cent of the respondents were supervising from 1 to 10 JIC graduates, while 36.4 per cent supervised from 11 to 20 graduates. Table 6 shows that the majority (63.6%) of respondents had supervised JIC graduates for only two years or less.

With regard to types of firms, the majority (54.5%) indicated that they worked for firms dealing with petrochemical products (Table 7). Table 8 indicates that 30 per cent of respondents worked for firms employing 200 or fewer, while a similar percentage worked for firms employing 201-400 and another 30 per cent work for firms employing 401-600.

In terms of the number of Saudis working in the firms, Table 9 shows 37.5 per cent of respondents worked for firms with 61-80 per cent Saudis, while 25 per cent worked for firms with 20 per cent or fewer Saudis. Concerning the number of years firms have been in operation, Table 10 shows that the majority of respondents (60%) worked for firms in operation for 16-20 years.

Part II: Factors related to the course of study

Table 12 contains all the data related to the 34 questions investigating the extent of satisfaction of the work supervisors with the JIC graduates' qualifications. It shows, with the exceptions to be explained later in the text, that approximately 55 per cent of the respondents were at least satisfied or very satisfied with the skills, knowledge, procedures and services offered by the JIC course of study.

The exceptions to the above conclusion are related to the following items:

1. Re the use of the computer for data processing, only 9.1 per cent of respondents were satisfied, while 81.8 per cent were undecided and 9.1 per cent were dissatisfied.

2. Re the use of the computer for word processing, 9.1 per cent of respondents were dissatisfied, while 90.9 per cent were undecided.

3. Re the use of computer software related to the profession, only 36.4 per cent of respondents were satisfied, 9.1 per cent were dissatisfied and 54.5 per cent were undecided.

4. Re familiarity with available technologies, 36.4 per cent of respondents were satisfied, while 18.2 per cent were dissatisfied.

5. Re the physical fitness, only 36.4 per cent of respondents were satisfied, while 63.6 per cent were undecided.

6. Re lecturing and training conducted by representatives of industry, only 22.2 per cent of respondents were satisfied, 11.1 per cent were dissatisfied and 66.7 per cent were undecided.

7. Re the job placement services, only 20 per cent of respondents were satisfied, 10 per cent were dissatisfied and the majority (70%) were undecided.

8. Re the involvement of industry in the development of curricular and training facilities,

only 30 per cent of the respondents were satisfied, 10 per cent were very satisfied and the majority (60%) were undecided.

6.7.3.3 Results related to questionnaire for JIC Students who have completed their Co-operative Training Programme (JS)

Part I: Background Information

Table 1 shows that the age of the majority (80%) of respondents was from 20 to 24 years, while the rest fell in the range from 25 to 29 years and all the respondents (100%) were single (Table 2). Table 3 indicates that the respondents' places of origin include the five regions of Saudi Arabia, with the largest group (36.4%) coming from the Southern Region and the second largest group (27.3%) coming from the Eastern Region.

In terms of the type of secondary school completed prior to college enrollment, 90.9 per cent of respondents indicated that they had Secondary School Certificates majoring in the Natural Sciences stream (Table 4), and the Secondary School final grade average of 63.6 per cent of the respondents was "Very Good", with 36.4 per cent of respondents achieving "Good" (Table 5).

Concerning the method of study at JIC all respondents indicated that they were full-time students (Table 6). With regard to specialisations, Table 7 shows that the respondents were distributed among the seven technical specialisations, with percentages ranging from 9.1 per cent to 18.2 per cent. Table 8 shows that the GPA of the majority (63.6%) of respondents was between 2 and 2.5. All respondents (100%) indicated that they had completed 61-70 credit hours prior to undertaking the Co-operative Training Programme (Table 9).

As far as the place where the Co-operative Training Programme was undertaken, Table 10 shows that 81.8 per cent of respondents indicated that they were trained in Jubail, and all of them (100%) claimed that they had the opportunity to practice the skills for which they had been trained (Table 11). No respondent indicated a failure in the Co-operative Training Programme. In fact, 36.4 per cent of respondents stated that they had obtained a grade of A, 27.3 per cent a grade of B+ and a similar percentage a grade of B (Table 12). Finally the majority (72.7%), indicated that they were trained in petrochemical firms (Table 13).

Part II: Factors related to the course of study

Table 14 contains all the data related to the 36 questions investigating to what extent the JIC students who have just completed their co-operative training expect that the content and depth of their course of study will meet the needs of their future employment.

It shows, with the exceptions to be explained later in the text, that at least 54.5 per cent of the respondents were satisfied or very satisfied with the skills, knowledge, procedures and services offered by the course of study.

The exceptions to the above conclusion are as follows:

1. Re the use of computer software related to the profession, only 36.4 per cent claimed to be at least satisfied, while 27.3 per cent were dissatisfied and 9.1 per cent were very dissatisfied.

2. Re the physical fitness, 45.5 per cent of respondents indicated that they were at least satisfied, while 36.4 per cent were dissatisfied and 9.1 per cent were very dissatisfied.

3. Re lecturing and training conducted by representatives of industry, 45.5 per cent were satisfied or very satisfied, while 45.5 per cent were dissatisfied.

6.7.4 Reliability Testing

A questionnaire is reliable if it is accurate and consistent in terms of what it measures. In other words, one may ask how well a test or a questionnaire measures whatever it does measure. According to Borg and Gall (1979), reliability is defined as **"the level of internal consistency or stability of the measuring device over time"** (p. 217). This is supported by Jackson (1995), when he describes reliability as **"the extent to which, on repeated measures, an indicator yields similar readings"** (p. 338).

Therefore it is an extremely important characteristic of a data gathering instrument that must be considered carefully in selecting measures for research purposes (Borg and Gall, 1979, p. 217).

The reliability of the three questionnaires designed for the present study either in terms of stability, accuracy or errors of measurement, was tested by means of different procedures.

First of all, the items on the three questionnaires were checked to make sure that they were worded clearly and unambiguously, in order to minimize the likelihood of error variance. Secondly, the pilot study conducted furnished the present researcher with an opportunity to assess the extent to which the questionnaires could be administered under standard, well-controlled and similar conditions. Thirdly, the researcher tested the internal consistency of Part II of the three questionnaires, which includes the factors related to the course of study. Such testing involved the use of the Cronbach's Alpha. Items total correlations for the 36 items of the first questionnaire for the employed JIC graduates (EJG) ranged from .40 to .96. The Alpha value for the 36-item instrument was .91 (Table 6.2). The items correlations for the 34 items of the second questionnaire for the work supervisors (WS) ranged from .52 to 1.00. The Alpha value for the 34-item instrument was .91 (Table 6.3). The items correlations for the 36 items of the third questionnaire for the JIC students who have completed their co-operative training programme (JS) ranged from .54 to 1.00. The Alpha value for the 36-item instrument was .89 (Table 6.4).

A few items in the three questionnaires were excluded from the above-mentioned range of Alpha values because they are considered to be outlier items. They are either single items being correlated to one factor so that its Alpha value becomes 1.00, or they are items with odd Alpha values either too high or too low. These items which require rephrasing or a clarification to make them clear to respondents, will be discussed in Section 6.7.5.

Above all, the Alpha data as stated are useful values which indicate that the three instruments designed were acceptably homogenous and almost all of their items have a high correlation with the factors to which they belong. Therefore, with minor changes, such instruments may be used with confidence to measure the status and relevance of the JIC graduates' qualifications.

Table 6.2

Reliability Of Questionnaire No. 1 (EJG)

(Pilot Study)

NO	ITEMS	ITEM TOTAL CORRELATION	ALPHA IF ITEM DELETED
	Hands-on skills:		
1.	Basic manual skills (craftsmanship skills)	.75	.91
2.	Technician skills (workshop/laboratory experience)	.71	.91
3.	Professional skills (maintenance and troubleshooting procedures)	.57	.91
	Analytical skills:		
4.	Sciences	.04	.91
5.	Mathematics	.40	.91
6.	Related speciality subjects	.64	.90
	Proficiency in English:		
7.	Communication skills	.84	.90
8.	Comprehension skills	.77	.90
9.	Reading skills	.69	.90
10.	Writing skills	.63	.90
	Computer literacy:		
11.	Use of computer for data processing (classification, filing, etc.)	.92	.91
12.	Use of computer for word processing	.96	.91
13.	Use of computer software related to profession	.70	.90
	Technology awareness:		
14.	Similarity between technology used for training and that generally adopted by industry	.57	.91
15.	Awareness of importance of subject technology	.47	.91
16.	Familiarity with other available technologies	.67	.90

Table 6.2 (cont'd)

NO	ITEMS	ITEM TOTAL CORRELATION	ALPHA IF ITEM DELETED
	Safety awareness and practice:		
17.	Safety of individual (personal safety)	.81	.91
18.	Safety of equipment and facilities	.88	.91
19.	Safety of others	.91	.91
20.	Safety of environment	.86	.90
	Organisational behaviour and human performance:		
21.	Discipline	.81	.90
22.	Punctuality and time management	.64	.90
23.	Readiness to learn more	.71	.91
24.	Ability to execute a task with minimal supervision (self-motivation	.78	.90
	Job relation to course of study:		
25.	Job relation to course of study	1.00	.92
	Awareness of job requirements:		
26.	Job duties and responsibilities	.83	.90
27.	Skills and knowledge required for the job	.92	.90
	Physical fitness:		
28.	Physical fitness	1.00	.91
	Links between the College and industry:		
29.	Co-operative Training Programme	.64	.91
30.	Student field visits to industry	.83	.90
31.	Lecturing and training conducted by industry representatives	.63	.90
32.	Job placement services	.58	.91
33.	Involvement of industry in curricular and training facilities development	.61	.90
	Selection of course of study:		
34.	Vocational/career guidance and counselling services	.72	.90
35.	Procedures for selection of specialisation	.76	.91
36.	Your selected area of specialisation	.20	.92

Table 6.3

Reliability Of Questionnaire No. 2 (WS)

(Pilot Study)

NO.	ITEMS	ITEM TOTAL CORRELATION	ALPHA IF ITEM DELETED
	Hands-on skills:		
1.	Basic manual skills (craftsmanship skills)	.54	.92
2.	Technician skills (workshop/laboratory experience)	1.00	.89
3.	Professional skills (maintenance and troubleshooting procedures)	.54	.90
	Analytical skills:		
4.	Sciences	.83	.90
5.	Mathematics	.57	.90
6.	Related speciality subjects	.57	.91
	Proficiency in English:		
7.	Communication skills	.80	.90
8.	Comprehension skills	1.00	.90
9.	Reading skills	1.00	.90
10.	Writing skills	.52	.91
	Computer literacy:		
11.	Use of computer for data processing (classification, filing, etc.)	.74	.91
12.	Use of computer for word processing	1.00	.90
13.	Use of computer software related to profession	.65	.90
	Technology awareness:		
14.	Similarity between technology used for training and that generally adopted by industry	.93	.90
15.	Awareness of importance of subject technology	.92	.90
16.	Familiarity with other available technologies	.80	.91
	Safety awareness and practice:		
17.	Safety of individual (personal safety)	1.00	.90
18.	Safety of equipment and facilities	1.00	.90
19.	Safety of others	1.00	.90
20.	Safety of environment	.70	.90
	Organisational behaviour and human performance:		
21.	Discipline	.00	.90
22.	Punctuality and time management	.70	.91
23.	Readiness to learn more	.79	.91
24.	Ability to execute a task with minimal supervision (self-motivation)	.68	.91
	Job relation to course of study:		
25.	Job relation to course of study	1.00	.90

Table 6.3 (cont'd)

NO.	ITEMS	ITEM TOTAL CORRELATION	ALPHA IF ITEM DELETED
	Awareness of job requirements:		
26.	Job duties and responsibilities	1.00	.90
27.	Skills and knowledge required for the job	.95	.90
	Physical well-being:		
28.	Physical fitness	1.00	.93
	Links between the College and industry:		
29.	Co-operative Training Programme	.56	.90
30.	Student field visits to industry	.84	.90
31.	Lecturing and training conducted by industry representatives	.61	.90
32.	Job placement services	.18	.92
33.	Involvement of industry in curricular and training facilities development	.27	.90
	Selection of course of study:		
34.	Based on your observations, to what extent are you satisfied with the graduate's selection of specialisation?	1.00	.93

Table 6.4
Reliability Of Questionnaire No. 3 (JS)
(Pilot Study)

NO.	ITEMS	ITEM TOTAL CORRELATION	ALPHA IF ITEM DELETED
	Hands-on skills:		
1.	Basic manual skills (craftsmanship skills)	.95	.87
2.	Technician skills (workshop/laboratory experience)	.84	.87
3.	Professional skills (maintenance and troubleshooting procedures)	.84	.88
	Analytical skills:		
4.	Sciences	.80	.88
5.	Mathematics	.89	.87
6.	Related speciality subjects	.27	.88
	Proficiency in English:		
7.	Communication skills	.74	.88
8.	Comprehension skills	.90	.88
9.	Reading skills	.91	.88
10.	Writing skills	.91	.88

Table 6.4 (cont'd)

NO.	ITEMS	ITEM TOTAL CORRELATION	ALPHA IF ITEM DELETED
	Computer literacy:		
11.	Use of computer for data processing (classification, filing, etc.)	.89	.88
12.	Use of computer for word processing	.90	.87
13.	Use of computer software related to profession	.78	.87
	Technology awareness:		
14.	Similarity between technology used for training and that generally adopted by industry	.89	.88
15.	Awareness of importance of subject technology	1.00	.88
16.	Familiarity with other available technologies	.60	.89
	Safety awareness and practice:		
17.	Safety of individual (personal safety)	.54	.88
18.	Safety of equipment and facilities	.82	.88
19.	Safety of others	.82	.87
20.	Safety of environment	.83	.87
	Organisational behaviour and human performance:		
21.	Discipline	.81	.87
22.	Punctuality and time management	.55	.88
23.	Readiness to learn more	.88	.87
24.	Ability to execute a task with minimal supervision (self-motivation)	.66	.87
	Job (Co-operative Training) relation to course of study:		
25.	Co-operative Training relation to course of study	1.00	.88
	Awareness of job requirements:		
26.	Job duties and responsibilities	.82	.88
27.	Skills and knowledge required for the job	1.00	.88
	Physical well-being:		
28.	Physical fitness	1.00	.91
	Links between the College and industry:		
29.	Co-operative Training Programme	.65	.86
30.	Student field visits to industry	.56	.88
31.	Lecturing and training conducted by industry representatives	.91	.88
32.	Job placement services	.84	.89
33.	Involvement of industry in curricular and training facilities development	.83	.88
	Selection of course of study:		
34.	Vocational/career guidance and counselling services	.80	.87
35.	Procedures for selection of specialisation	.87	.88
36.	Your selected area of specialisation	.89	.87

6.7.5 Changes to Instruments as a Result of the Pilot Study

As a result of the pilot study experience, the following detailed changes are suggested:

1. Adding the phrases, "data processing" and "word processing" in English to questions Nos. 11 and 12 in Part II of the Arabic version of all the questionnaires.

2. Changing question No. 32 in Part II of all the questionnaires to read "Graduates' employment in industry".

3. Deleting all of Part III of Questionnaire No.1, for employed JIC graduates (EJG), because the information it provides seems to be not significant, except for question No. 51, which measures the social attitudes of the graduates towards technical and vocational education. This question is expanded and included in Part I (background information) of the same questionnaire, as question No. 11.

4. Deleting question No. 4 of Questionnaire No. 3, for the work supervisors (WS), because the information it provides is not significant and owing to the difficulty in the analysis procedure.

5. Naming the two subjects "Chemistry and Physics" in question No. 4 of Part II (Sciences) of all the questionnaires, so that it becomes clearer to the respondents.

6. Adding the phrase, "obedience to instructions and respect for others" to the end of question No. 21 of the questionnaire, in order to increase its Alpha value and make the question clearer to respondents.

7. Rephrasing question No. 31 in Part II of Questionnaire No. 2 (WS) to read "Your firm's participation in part-time lecturing and training at JIC".

8. Rephrasing question No. 33 in Part II of Questionnaire No. 2 (WS) to read "Your firm's involvement in development of JIC curricular and training facilities".

9. Changing slightly the ranges of the grade-point average of the graduates and students mentioned in question No. 8 in both questionnaires No. 1 (EJG) and No. 3 (JS) to ensure greater accuracy.

10. Assigning one serial number for each part of each questionnaire, and changing the letters used to identify the answers in Part I of the questionnaires to numbers. These two suggestions are implemented to facilitate the analytical procedures of the study.

11. Changing the value points for the answers to questions in Part II in the questionnaires, so that the highest mark (5) is given for the first category "Very Satisfied" and smaller marks are given to the other categories as they move towards the category "Very Dissatisfied".

12. Adding, deleting or changing some words and phrases in some of the questions in the English and Arabic versions of the three questionnaires with the purpose of making them more easily understood by the three groups of respondents.

6.8 The Main Study

The procedures adapted for conducting the present study, which have been briefly stated in the previous sections of the chapter, are explained below.

6.8.1 Survey Sampling and Questionnaire Administration

Definition of Population

The survey population of this study is composed of three non-overlapping groups of people. Hence it consists of three strata.

The first stratum is the College's graduates from the technical specialisations who are currently working in the industrial sector in the Eastern Region of Saudi Arabia. The size of the stratum is 515 graduates. The second stratum is the work supervisors who represent the industrial employers for whom the JIC graduates work. There are approximately 150 supervisors. The third stratum is the JIC students who have completed the Co-operative Training Programme. There are approximately 120 of these students. Hence the total population size (N) is 785.

A stratified sample is used in this study because it includes three groups, and this method of sampling is **"particularly appropriate in studies where the research problem requires comparison between various subgroups"** (Borg and Gall, 1979, p. 187).

The Sample

A non-proportional stratified sample is selected for the following reasons:

1. The employed JIC graduates' stratum is the most important group because it is the target group of the present study. It possesses two different types of information related to the course of study offered by JIC and the work performance of the graduates themselves. The variation among the subject graduates in this stratum is expected to be relatively high because of the differences which exist within the work environments, the graduates' work experiences and the different specialisations of the graduates. Therefore a large sample (70%) of this stratum will be randomly selected, representing 360 graduates.

2. The work supervisors' stratum is an important one too, because it represents the opinion and assessment of the employers, whose satisfaction with the qualifications of the College's graduates is an objective such as is true for all colleges. So 70 per cent of this group, representing 105 supervisors, will also be randomly selected.

3. The last stratum is the JIC students who have just completed their Co-operative Training Programme. A smaller percentage (50%) of this group will be randomly selected due to the limitation in their work experience which results in smaller variability of their

opinions. Only their expectations in the light of their co-operative training are considered. This percentage represents 60 students.

Random sampling within each stratum is based on **"the idea of the equiprobability of each population member being included in the sample"** (Ferguson, 1981, p. 143).

Furthermore, **"random samples yield research data that can be generalized to a larger population within margins of error that can be determined statistically"** (Borg and Gall, 1979, p. 182). The method used to obtain the random samples was to assign three-digit numbers ranging from 001 to 515 for the first stratum (Employed JIC Graduates – EJG), 001 to 150 for the second stratum (Work Supervisors – WS) and 001 to 120 for the third stratum (JIC Students – JS). Then the last three digits of the Table of Random Numbers (Borg and Gall, 1979, pp. 734-736) were used to identify the three samples from the three strata for more convenient procedures.

Accordingly, the total sample size (n) of the study is 525 respondents which is 66.88% of the total population. The diagram in Figure 6.1 shows the sample selection process.

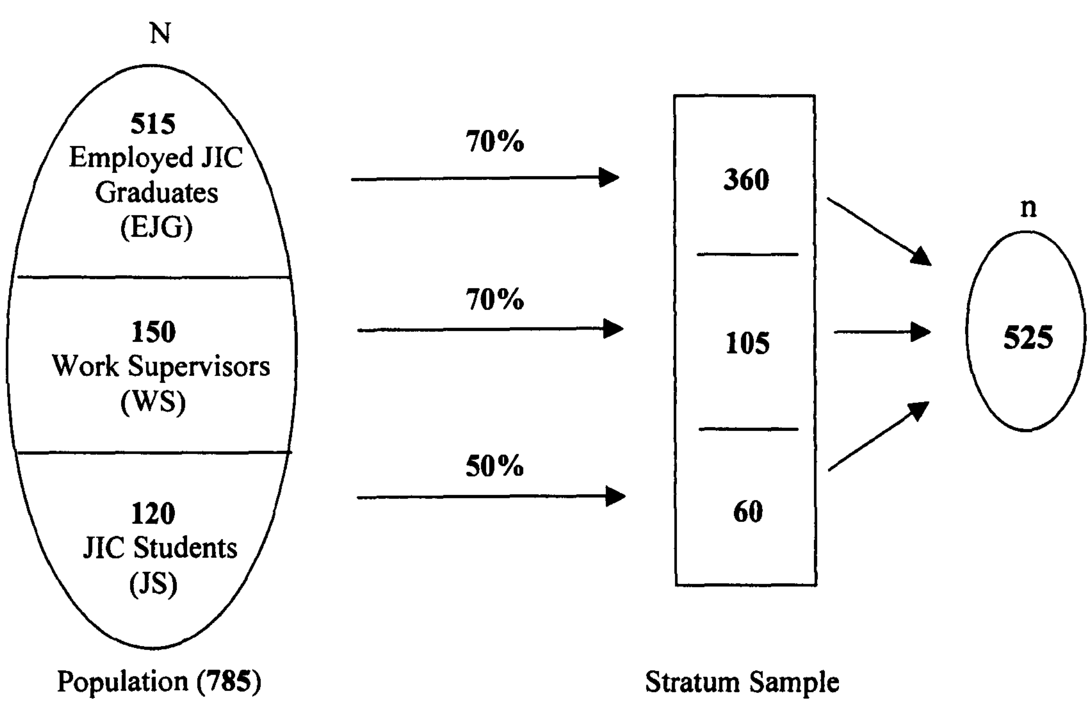


Fig. 6.1 **Target Population and Sample of the Study**

Questionnaire Administration

The three questionnaires were distributed to the respondents of the three groups either by the researcher or by one of his colleagues, along with a letter clearly explaining the purpose of the survey.

The questionnaires were delivered by hand to the person in the company selected to act for this purpose as the contact-person with the graduates and their supervisors. The persons selected were usually those heading or working for the companies' departments responsible either for personnel, training or human resources development.

A full explanation of the purpose, content and format of the questionnaires was also provided to each contact-person. In addition, the researcher and his colleagues involved maintained close contact with the contact-person, either personally or by telephone or by other methods such as e-mail. Thus, misinterpretations or misconceptions were eliminated and the number of non-returned questionnaires was minimized.

6.8.2 Reliability of the Questionnaires Used in the Main Study

To check the reliability of the questionnaire instruments used in the main study, two types of procedures were followed. The first type was applied through a thorough examination of all completed questionnaire forms in order to eliminate those where the manner of completion creates doubts about their reliability.

The second type of procedures involves the use of Cronbach's Alpha, as used for the pilot study, to test the internal consistency of the three questionnaires. Details of these procedures follow.

6.8.2.1 Examination of Response Forms

After checking all the returned questionnaires to ensure their reliability, the researcher excluded the following cases from the analysis:

a. Responses which had more than four uncompleted questions;

b. Responses suspected of being unreliable or which appeared not to have been taken seriously.

The follow-up contacts with the respondents and the contact-person in each company paid off well in increased participation, especially in Questionnaires Nos. 2 and 3, and accordingly in response rates to the three questionnaires. The response rates to the three questionnaires, after discarding the above-mentioned response cases, seem to be quite acceptable for analysis because **"any response rate above 75 percent should be considered excellent"** (Jackson, 1995, p. 115). Table 6.5 below indicates the number of questionnaires distributed, returned and remaining for analysis and the response rate for each of the three questionnaires.

Table 6.5

Number of Questionnaires

Distributed, Returned, Accepted, and Response rate

Questionnaires	**Questionnaires Distributed**	**Questionnaires Returned**	**Questionnaires remaining for analysis**	**Response Rate (%)**
Questionnaire for Employed JIC Graduates (EJG)	360	313	296	82.2
Questionnaire for Work Supervisors (WS)	105	105	105	100
Questionnaire for JIC students who have completed their Co-operative Training Programme (JS)	60	60	60	100
Total	**525**	**478**	**461**	**87.8**

As far as the geographical representation of the first two groups (EJG and WS) is concerned, Table 6.6 shows the number of questionnaires completed classified by location. This table includes only the questionnaires for employed JIC graduates (EJG) and work supervisors (WS), as the third questionnaire is for JIC students who are pursuing their studies at JIC.

Table 6.6

Number of Completed

Questionnaires Nos. 1 and 2 Classified by Location

Location	Completed Responses of Questionnaire No. 1 (EJG)	Completed Responses of Questionnaire No. 2 (WS)
Jubail Industrial City	263	81
Dammam	8	7
Dhahran	2	2
Al-Khafji	10	9
Abqaiq	3	2
RasTanura	10	4
Total	**296**	**105**

Table 6.7 below shows the number of completed questionnaires for the first and second groups (EJG and WS), classified according to the type of industrial sector to which they belong.

Table 6.7

Number of Questionnaires Completed Classified by Industrial Sector

Industrial Sector	Completed Responses of Questionnaire No. 1 (EJG)	Completed Responses of Questionnaire No. 2 (WS)
Petrochemicals	165	56
Chemicals	14	6
Petroleum	54	23
Steel & Iron	56	12
Gas	1	2
Electrical Equipment	4	2
Others	2	4
Total	**296**	**105**

Finally, Table 6.8 shows the number of questionnaires completed by employed JIC graduates (EJG) and JIC students (JS) classified according to specialisation of study.

Table 6.8

Number of Questionnaires Completed

by Employed JIC Graduates and Students Classified by Specialisation

Specialisation	Completed Responses of Questionnaire No. 1 (EJG)	Completed Responses of Questionnaire No. 3 (JS)
Electromechanical Engineering Technology	60	2
Manufacturing Engineering Technology	38	11
Air-Conditioning & Refrigeration Engineering Technology	4	2
Electrical Power Engineering Technology	60	13
Instrumentation & Control Engineering Technology	66	13
Industrial Laboratories Technology	43	4
Chemical Engineering Technology	25	15
Total	**296**	**60**

The researcher wants to draw the attention of the reader to the fact that 10 per cent of the number of completed responses to Questionnaire No. 1 (EJG) and Questionnaire No. 2 (WS) and accepted for analysis have been filled out through personal interviews (see p. 133).

6.8.2.2 Statistical Testing of Reliability

To test the internal consistency of Part II of the three questionnaires which cover the factors related to the course of study, the researcher used the Cronbach's Alpha as it was previously administered in the pilot study of this research.

Items total correlations for the 36 items of the first questionnaire for the employed JIC graduates (EJG) ranged from .3775 to .6778 with the exception of 4 questions. The Alpha value for the 36-item instrument was .9172 (Table 6.9). The items correlations for the 34 items of the second questionnaire for work supervisors (WS) ranged from .3267 to .6519 with the exception of 1 question. The Alpha value for the 34-item instrument was .9123 (Table 6.10). The items correlations for the 36 items of the third questionnaire for the JIC students who have completed their Co-operative Training Programme (JS) ranged from .3288 to .5622 with the exception of 2 questions. The Alpha value for the 36-item instrument was .8998 (Table 6.11).

When all the groups' responses to the common questions of the three questionnaires were consolidated, the items total correlation for the 34 items ranged from .3245 to .6422 with the exception of 2 questions. The Alpha value for the 34 items for all the groups was .9172 (Table 6.12).

Since the overall Alpha values for the three questionnaires ranged from .8998 to .9172 with an overall Alpha value for the three consolidated questionnaires as .9172, which indicate high values, then they are acceptable and useful values to justify confidence in the reliability of the three questionnaires.

Table 6.9

Reliability Of Questionnaire No. 1 (EJG)

(Main Study)

NO.	ITEMS	ITEM TOTAL CORRELATION	ALPHA IF ITEM DELETED
1.	***Hands-on skills:*** Basic manual skills (craftsmanship skills)	.5300	.9144
2.	Technician skills (workshop/laboratory experience)	.5527	.9141
3.	Professional skills (maintenance and troubleshooting procedures)	.4587	.9152
4.	***Analytical skills:*** Sciences	.3632	.9162
5.	Mathematics	.2208	.9180
6.	Related speciality subjects	.4738	.9150
7.	***Proficiency in English:*** Communication skills	.4228	.9156
8.	Comprehension skills	.4984	.9147
9.	Reading skills	.4487	.9153
10.	Writing skills	.4772	.9150
11.	***Computer literacy:*** Use of computer for data processing (classification, filing, etc.)	.4546	.9153
12.	Use of computer for word processing	.4103	.9159
13.	Use of computer software related to profession	.5283	.9142
14.	***Technology awareness:*** Similarity between technology used for training and that generally adopted by industry	.5358	.9141
15.	Awareness of importance of subject technology	.6437	.9129
16.	Familiarity with other available technologies	.6778	.9125
17.	***Safety awareness and practice:*** Safety of individual (personal safety)	.4886	.9148
18.	Safety of equipment and facilities	.4665	.9152
19.	Safety of others	.4839	.9150
20.	Safety of environment	.4435	.9153

Table 6.9 (cont'd)

NO.	ITEMS	ITEM TOTAL CORRELATION	ALPHA IF ITEM DELETED
21.	***Organisational behaviour and human performance:*** Discipline	.3775	.9161
22.	Punctuality and time management	.4094	.9158
23.	Readiness to learn more	.4282	.9155
24.	Ability to execute a task with minimal supervision (self-motivation)	.5406	.9142
25.	***Job relation to course of study:*** Job relation to course of study	.4843	.9148
26.	***Awareness of job requirements:*** Job duties and responsibilities	.6488	.9126
27.	Skills and knowledge required for the job	.6484	.9127
28.	***Physical well-being:*** Physical fitness	.2052	.9186
29.	***Links between the College and industry:*** Co-operative Training Programme	.4378	.9154
30.	Student field visits to industry	.5408	.9140
31.	Lecturing and training conducted by industry representatives	.5693	.9136
32.	Job placement services	.2976	.9172
33.	Involvement of industry in curricular and training facilities development	.4729	.9150
34.	***Selection of course of study:*** Vocational/career guidance and counselling services	.5015	.9146
35.	Procedures for selection of specialisation	.4084	.9161
36.	Your selected area of specialisation	.2788	.9172

Table 6.10

Reliability Of Questionnaire No. 2 (WS)

(Main Study)

NO.	ITEMS	ITEM TOTAL CORRELATION	ALPHA IF ITEM DELETED
1.	***Hands-on skills:*** Basic manual skills (craftsmanship skills)	.3331	.9115
2.	Technician skills (workshop/laboratory experience)	.4543	.9100
3.	Professional skills (maintenance and troubleshooting procedures)	.5293	.9090
4.	***Analytical skills:*** Sciences	.4314	.9103
5.	Mathematics	.3460	.9114
6.	Related speciality subjects	.4875	.9096
7.	***Proficiency in English:*** Communication skills	.4613	.9099
8.	Comprehension skills	.5674	.9088
9.	Reading skills	.5751	.9086
10.	Writing skills	.5365	.9088

Table 6.10 (cont'd)

NO.	ITEMS	ITEM TOTAL CORRELATION	ALPHA IF ITEM DELETED
11.	***Computer literacy:*** Use of computer for data processing (classification, filing, etc.)	.3735	.9115
12.	Use of computer for word processing	.4233	.9105
13.	Use of computer software related to profession	.4457	.9103
14.	***Technology awareness:*** Similarity between technology used for training and that generally adopted by industry	.4683	.9098
15.	Awareness of importance of subject technology	.4588	.9099
16.	Familiarity with other available technologies	.4710	.9097
17.	***Safety awareness and practice:*** Safety of individual (personal safety)	.5707	.9082
18.	Safety of equipment and facilities	.6519	.9073
19.	Safety of others	.6056	.9080
20.	Safety of environment	.5368	.9087
21.	***Organisational behaviour and human performance:*** Discipline	.4477	.9101
22.	Punctuality and time management	.4527	.9100
23.	Readiness to learn more	.4552	.9100
24.	Ability to execute a task with minimal supervision (self-motivation)	.4695	.9100
25.	***Job relation to course of study:*** Job relation to course of study	.5010	.9093
26.	***Awareness of job requirements:*** Job duties and responsibilities	.5802	.9084
27.	Skills and knowledge required for the job	.5374	.9090
28.	***Physical well-being:*** Physical fitness	.3268	.9118
29.	***Links between the College and industry:*** Co-operative Training Programme	.4722	.9097
30.	Student field visits to industry	.4441	.9105
31.	Lecturing and training conducted by industry representatives	.4635	9099
32.	Job placement services	.2453	.9130
33.	Involvement of industry in curricular and training facilities development	.3493	.9121
34.	***Selection of course of study:*** Based on your observations, to what extent are you satisfied with the graduate's selection of specialisation?	.4600	.9099

Table 6.11

Reliability Of Questionnaire No. 3 (JS)

(Main Study)

NO.	ITEMS	ITEM TOTAL CORRELATION	ALPHA IF ITEM DELETED
1.	***Hands-on skills:*** Basic manual skills (craftsmanship skills)	.4808	.8965
2.	Technician skills (workshop/laboratory experience)	.4847	.8970
3.	Professional skills (maintenance and troubleshooting procedures)	.4838	.8963
4.	***Analytical skills:*** Sciences	.4798	.8963
5.	Mathematics	.3960	.8981
6.	Related speciality subjects	.4071	.8975
7.	***Proficiency in English:*** Communication skills	.3748	.8982
8.	Comprehension skills	.4198	.8973
9.	Reading skills	.3706	.8980
10.	Writing skills	.4013	.8977
11.	***Computer literacy:*** Use of computer for data processing (classification, filing, etc.)	.4664	.8966
12.	Use of computer for word processing	.3341	.8986
13.	Use of computer software related to profession	.4196	.8975
14.	***Technology awareness:*** Similarity between technology used for training and that generally adopted by industry	.3669	.8981
15.	Awareness of importance of subject technology	.4393	.8973
16.	Familiarity with other available technologies	.3288	.8987
17.	***Safety awareness and practice:*** Safety of individual (personal safety)	.5086	.8968
18.	Safety of equipment and facilities	.4973	.8964
19.	Safety of others	.5340	.8961
20.	Safety of environment	.2329	.9006
21.	***Organisational behaviour and human performance:*** Discipline	.5373	.8960
22.	Punctuality and time management	.3754	.8980
23.	Readiness to learn more	.5378	.8959
24.	Ability to execute a task with minimal supervision (self-motivation)	.4882	.8962
25.	***Job (Co-operative Training) relation to course of study:*** Co-operative Training relation to course of study	.3740	.8981
26.	***Awareness of job requirements:*** Job duties and responsibilities	.4868	.8963
27.	Skills and knowledge required for the job	.5030	.8962
28.	***Physical well-being:*** Physical fitness	.4524	.8968

Table 6.11 (cont'd)

NO.	ITEMS	ITEM TOTAL CORRELATION	ALPHA IF ITEM DELETED
29.	***Links between the College and industry:*** Co-operative Training Programme	.3977	.8977
30.	Student field visits to industry	.4353	.8972
31.	Lecturing and training conducted by industry representatives	.5239	.8955
32.	Job placement services	.5622	.8953
33.	Involvement of industry in curricular and training facilities development	.3534	.8984
34.	***Selection of course of study:*** Vocational/career guidance and counselling services	.4792	.8965
35.	Procedures for selection of specialisation	.5042	.8962
36.	Your selected area of specialisation	.1023	.9011

Table 6.12
Reliability Of All Groups (EJG-WS-JS)
(Main Study)

NO.	ITEMS	ITEM TOTAL CORRELATION	ALPHA IF ITEM DELETED
1.	***Hands-on skills:*** Basic manual skills (craftsmanship skills)	.4989	.9147
2.	Technician skills (workshop/laboratory experience)	.5403	.9142
3.	Professional skills (maintenance and troubleshooting procedures)	.4720	.9150
4.	***Analytical skills:*** Sciences	.3711	.9162
5.	Mathematics	.2089	.9184
6.	Related speciality subjects	.4655	.9150
7.	***Proficiency in English:*** Communication skills	.4159	.9157
8.	Comprehension skills	.4912	.9148
9.	Reading skills	.4554	.9152
10.	Writing skills	.4716	.9150
11.	***Computer literacy:*** Use of computer for data processing (classification, filing, etc.)	.4885	.9148
12.	Use of computer for word processing	.4574	.9152
13.	Use of computer software related to profession	.5334	.9141
14.	***Technology awareness:*** Similarity between technology used for training and that generally adopted by industry	.5208	.9143
15.	Awareness of importance of subject technology	.6032	.9133
16.	Familiarity with other available technologies	.5926	.9134
17.	***Safety awareness and practice:*** Safety of individual (personal safety)	.5200	.9144
18.	Safety of equipment and facilities	.5141	.9146
19.	Safety of others	.5355	.9143
20.	Safety of environment	.4362	.9154

Table 6.12 (cont'd)

NO.	ITEMS	ITEM TOTAL CORRELATION	ALPHA IF ITEM DELETED
21.	***Organisational behaviour and human performance:*** Discipline	.4260	.9155
22.	Punctuality and time management	.4134	.9157
23.	Readiness to learn more	.4680	.9151
24.	Ability to execute a task with minimal supervision (Self-motivation)	.5270	.9143
25.	***Job relation to course of study:*** Job duties and responsibilities	.4870	.9148
26.	***Awareness of job requirements:*** Job duties and responsibilities	.6422	.9126
27.	Skills and knowledge required for the job	.6359	.9128
28.	***Physical Well-Being:*** Physical fitness	.2620	.9180
29.	***Links between the College and Industry:*** Co-Operative Training Programme	.4551	.9152
30.	Student field visits to industry	.5380	.9136
31.	Lecturing and training conducted by industry representatives	.5671	.9136
32.	Job placement services	.3245	.9170
33.	Involvement of industry in curricular and training facilities development	.4434	.9154
34.	***Selection of course of study:*** Based on Your observations to what extent are you satisfied with the graduate's selection of specialisation?	.4826	.9149

6.8.3 Data Analysis Procedures

1. Descriptive Statistics:

In analysing the collected data, the researcher first obtains the frequencies and percentages of the sample responses to the items in the three questionnaires, regardless of whether they are filled out as a result of a self-administered questionnaire or an interview.

According to Borg and Gall (1979), frequency distribution is often used **"to determine the most frequently occurring score (i.e., the mode) and also the dispersion, or variability, of other scores around this central value"** (p. 418). This definition is supported by Ferguson (1981) when he states that the frequency distribution is **"any arrangement of**

the data that shows the frequency of occurrence of different values of the variable or the frequency of occurrence of values falling within arbitrarily defined ranges of the variable known as class intervals" (p. 20).

Measures of central tendency and dispersion, such as mean, median, mode and standard deviation, will be presented univariately for each group and its most important elements.

The level of respondents' satisfaction with elements within each factor in each group will be ordered by the use of means of these elements. The main objective is to give some idea about the variables before analysis and to help in inferences after analysis by providing reasons and justifications.

2. T-test:

One-sample T-test will be used to test whether the mean of the group factor is equivalent to a specific value (satisfied = 4) or is significantly different from that given value. The Two-tailed T-test at 5% level of significance was used twice to test the hypotheses to determine whether the mean obtained is equal to the satisfaction level or not. First, the test was applied for each group individually (EJG, WS, and JS) and second, for all the three groups consolidated. If the mean was proven to be significantly below the test value (4) then the same test was applied at another specific value (dissatisfied = 2) to determine to what extent the level of satisfaction of each individual group was below the "satisfied" level. The use of such a test of statistical significance is always recommended **"to determine whether two means, proportions, or correlation coefficients differ significantly from each other; also used to determine whether a single mean, proportion, or correlation coefficient differs significantly from a specified population value"** (Borg and Gall, 1979, p. 428).

3. Analysis of Variance Test (ANOVA):

One-way analysis of variance test will be conducted to test for the differences between the means of the three groups. The main difference between this test and the T-test is that in this case we are comparing the three means irrespective of whether they are satisfied or not.

According to Borg and Gall (1979), the Analysis of Variance statistical technique (Anova Test) is used **"to determine whether mean scores on one or more factors differ significantly from each other, and whether the various factors interact significantly with each other; also used to determine whether sample variances differ significantly from each other"** (p. 428).

Therefore the above technique is used in the present study to determine whether the three mean scores of the three groups are significantly different from one another.

4. Pair-wise Comparison Test (Tukey):

Since the Analysis of Variance technique **"does not specify which of the three or more sample means differ significantly from one another"** (Borg and Gall, 1979, p. 427), then the Pair-wise Comparison Test (Tukey HSD) may be used, following the analysis of variance for pair-wise comparison, because such a test, as stated by Borg and Gall (1979), is used **"to test the statistical significance of differences between particular group means or combinations of group means"** (p. 428).

Therefore, this test will only be used if there is a significant difference between the means of the three groups when testing any factor or element of the study.

Computer analysis, using SPSS version 9 facilities (Statistical Package for Social Sciences), will be used to facilitate accurate calculation and create the necessary explanatory tables. SPSS will be utilised in this study because it is claimed that it is a complete tool kit of statistics, graphs and reports and has the ability to represent and analyse data in various ways and by various means, especially in surveys and questionnaire analysis. In addition, this statistical computerised package is widely used within academic institutions and is always undergoing continuous development.

6.9 Summary

This chapter explains the principal aims and objectives of the study and the null-hypotheses along with the associated factors related to JIC graduates' qualifications. The research design as well as the survey location are also discussed, and the construction of the survey instruments, namely three questionnaires and interviews, are briefly described. A pilot study was carried out to test the validity and reliability of the study instruments and try out the data collection procedures. Results of the pilot study which were used to refine the three questionnaires to make them understandable for respondents, are also explained.

Finally, the chapter closes by outlining the procedures for sample selection and data collection of the main fieldwork which was carried out in the six cities in the Eastern Region of Saudi Arabia.

The analysis of data obtained as a result of the main study and its associated findings will be presented in the next chapter.

CHAPTER SEVEN

ANALYSIS AND FINDINGS

7.1 Introduction

As was explained in the previous chapter, this chapter will analyse the data obtained as a result of the survey conducted in the main study and accordingly will present the findings of the survey. In this present chapter, descriptive statistical measures such as frequencies, percentages and means are used besides a number of statistical tests such as T-test, Analysis of Variance Test (ANOVA) and Pair-Wise Comparison Test (Tukey HSD).

Data analysis has been conducted by means of data processing facilities, using the Statistical Package for the Social Sciences (SPSS). The analysis of the data and the findings are presented in three sections. The first section covers the descriptive statistics for the three groups: the Employed JIC Graduates (EJG), the Work Supervisors (WS) and the JIC Students who have completed their Co-operative Training Programme (JS). This section analyses and discusses the socio-demographic and other background information of the respondents, as well as their levels of satisfaction with the elements and factors related to the course of study offered at JIC. The second section focuses on the testing of the levels of satisfaction of these groups individually (EJG, WS and JS), using a certain statistical procedure (T-test) to determine whether their levels of satisfaction are equivalent to the "satisfied" degree or different. The third section presents and analyses data related to the level of satisfaction of all the three groups together (Stratum Sample) in order to determine whether the twelve hypotheses developed for this study are accepted or rejected. Also, it will clarify whether the three consolidated groups are similar or different in their opinions towards the mentioned hypotheses and rank them according to their levels of satisfaction.

7.2 Descriptive Statistics

This section of the chapter embraces the description of the respondents' personal data and background information related to the firms for which they work, especially in the case of the second and third groups (EJG and WS). It also includes each individual group's levels of satisfaction towards the factors and the associated elements which are considered as the principal components of the qualifications of a typical qualified graduate.

7.2.1 Employed JIC Graduates (EJG)

The followings are the items to be investigated for the first group (EJG):

7.2.1.1 Background Information

Data falling within this sub-section cover the answers to the eleven questions forming Part I of the first questionnaire (EJG).

1. Age

Table 7.1 below shows that 37.5 per cent of respondents were 25-29 years old, leaving only 0.3 per cent for the last category (40 or more). It also indicates that the majority of the group (95.9%) were 34 years old or younger.

Table 7.1

Frequencies and Percentages related to Respondents' Age Groups

Age	Frequency	Percentage
20-24	91	30.7
25-29	111	37.5
30-34	82	27.7
35-39	11	3.7
40 or more	1	.3
Total	**296**	**100.0**

2. Marital Status

Table 7.2 below shows that a large percentage of respondents (61.7%) were married while 38.3 per cent were single.

Table 7.2

Frequencies and Percentages related to Respondents' Marital Status

Marital Status	Frequency	Percentage
Single	113	38.3
Married	182	61.7
Total	**295**	**100.0**

3. Place of Origin

Table 7.3 below shows that 45.3 per cent of the respondents were from the Eastern Region and 20.9 per cent were from the Southern Region, while only 8.8 per cent were from the Western Region.

Table 7.3

Frequencies and Percentages related to Respondents' Place of Origin

Place of Origin	Frequency	Percentage
Northern Region	31	10.5
Southern Region	62	20.9
Western Region	26	8.8
Eastern Region	134	45.3
Central Region	43	14.5
Total	**296**	**100.0**

4. Type of Secondary School Completed

Table 7.4 shows that a large percentage of respondents (70.6%) were students in the Natural Sciences Stream at Secondary School. Also, it shows that a small percentage (4.8%) of respondents completed the Technological Sciences Stream at Secondary School. The other types of secondary schools referred to as having been completed by 9.6 per cent of the respondents were either part of the old educational system in Saudi Arabia or belonged to systems in other countries, such as those of the Gulf Co-operation Council (GCC).

Table 7.4

Frequencies and Percentages of

Type of Secondary School Completed by Respondents

Type of Secondary School Completed	Frequency	Percentage
Secondary School (Natural Sciences)	207	70.6
Secondary School (Technological Sciences)	14	4.8
Industrial Secondary Institute	44	15.0
Other	28	9.6
Total	**293**	**100.0**

5. Secondary School Final Grade Average

Table 7.5 below shows that 65.8 per cent of respondents had a grade average of "Very Good" when they completed secondary school, while 10.5 per cent had "Excellent" and 23.7 per cent just had "Good".

Table 7.5

Frequencies and Percentages related to

Respondents' Secondary School Final Grade Average

Secondary School Final Grade Average	Frequency	Percentage
Excellent (90-100%)	31	10.5
Very Good (75-89%)	194	65.8
Good (60-74%)	70	23.7
Total	**295**	**100.0**

6. Students' Status at the College

Table 7.6 below clearly shows that the great majority of respondents (98.0%) were full-time students at JIC.

Table 7.6

Frequencies and Percentages of Respondents' Status at the College

Student Status at the College	Frequency	Percentage
Full-Time	290	98.0
Part-Time	3	1.0
Both of the Above	3	1.0
Total	**296**	**100.0**

7. Specialisation

Table 7.7 below shows that 22.3 per cent of the respondents majored in Instrumentation and Control Engineering Technology. The next largest group (20.9%) majored in the Electrical Power Engineering Technology. The smallest group majored in Air-Conditioning and Refrigeration Engineering Technology, accounting for only 1.4 per cent of the total.

Table 7.7

Frequencies and Percentages of Respondents' Specialisations

Specialisation	Frequency	Percentage
Instrumentation and Control Engineering Technology	66	22.3
Electrical Power Engineering Technology	62	20.9
Industrial Laboratory Technology	43	14.5
Chemical Engineering Technology	25	8.4
Air-Conditioning and Refrigeration Engineering Technology	4	1.4
Manufacturing Engineering Technology	38	12.8
Electromechanical Engineering Technology	58	19.6
Total	**296**	**100.0**

8. Grade Point Average (GPA)

Table 7.8 below shows that 39.2 per cent of the respondents had a grade point average of 2.5 - 2.99 upon graduation, while only 12.5 per cent had a grade point average of 3.5 – 4.0.

Table 7.8

Frequencies and Percentages of Respondents' Grade Point Average (GPA)

Grade Point Average (GPA)	Frequency	Percentage
2.0 – 2.49	56	18.9
2.5 – 2.99	116	39.2
3.0 – 3.49	87	29.4
3.5 – 4.00	37	12.5
Total	**296**	**100.0**

9. Monthly Salary

Table 7.9 below shows that a large percentage of the respondents (55.3%) received a monthly salary ranging from 5000 to 6999 Saudi Riyals, and a small percentage (7.8%) received a salary of from 3000 to 4999 Saudi Riyals.

Table 7.9

Frequencies and Percentages of Respondents' Monthly Salary

Monthly Salary (Saudi Riyals)	Frequency	Percentage
3000 - 4999	23	7.8
5000 – 6999	162	55.3
7000 – 8999	73	24.9
9000 or more	35	11.9
Total	**293**	**100.0**

10. Firms' Types of Product(s)

Table 7.10 below shows that 52.4 per cent of the respondents worked for firms producing petrochemicals. 19.5 per cent worked in the iron and steel industry and 17.7 per cent in the petroleum industry. Only 0.3 per cent worked in the gas industry. 2.0 per cent worked in other industries, such as cement, paper and various other smaller industries.

Table 7.10

Frequencies and Percentages of Firms' Types of Product(s)

Type of Product(s)	Frequency	Percentage
Petroleum	52	17.7
Petrochemicals	154	52.4
Chemicals	21	7.1
Iron and Steel	56	19.0
Electrical/Electronics	4	1.4
Gas	1	.3
Other	6	2.0
Total	**294**	**100.0**

11. Reason for Joining JIC

Table 7.11 shows that 40.9 per cent of the respondents joined JIC because they wanted to become skilled technicians. The percentage of those who just needed jobs is 21.6, and the percentage of those who joined JIC because they were not accepted by universities is 21.3. The smallest percentage (6.2%) represents the respondents who were influenced by others to enroll in JIC.

Table 7.11

Frequencies and Percentages of Respondents' Reasons for Joining JIC

Reason for Joining JIC	Frequency	Percentage
To be a Skilled Technician	119	40.9
Need for a Job	63	21.6
No Place at Universities	62	21.3
Influenced by Others	18	6.2
Other	29	10.0
Total	**291**	**100.0**

7.2.1.2 Level of satisfaction: elements

In this sub-section, the five levels of satisfaction of the first group (EJG) with the elements forming the factors will be surveyed, and their means will then be discussed and ordered.

1. Basic Manual Skills

Table 7.12 shows that 55.2 per cent of the respondents of the first group (EJG) were satisfied with this element and 21.4 per cent indicated that they were very satisfied. Only a small percentage (11.0%) indicated their dissatisfaction. The mean level of satisfaction with this element was 3.83, ranking it second within the factor.

2. Technician Skills

Table 7.12 shows that 52.4 per cent of the respondents indicated their satisfaction with this element and 24.0 per cent said that they were very satisfied. Only 12.3 per cent indicated that they were dissatisfied. The mean level of satisfaction with this element was 3.84, and it therefore ranks first within the factor.

3. **Professional Skills**

Table 7.12 indicates that 40.1 per cent of the respondents were satisfied with this element and 17.0 per cent were very satisfied. Also, it shows that 19.0 per cent were unsure, meaning that they were neutral between the satisfaction and dissatisfaction levels. A percentage of 16.3 showed their dissatisfaction, whilst 7.6 per cent indicated that they were very dissatisfied. The mean level of satisfaction with this element was 3.43, ranking it third within the factor.

4. **Sciences**

Table 7.12 shows that 50.3 per cent of the respondents were satisfied with this element, while only 7.9 per cent were dissatisfied. The mean level of satisfaction with the element was 3.8082, and it occupies the second rank within the factor.

5. **Mathematics**

Table 7.12 indicates that 46.3 per cent of the respondents were satisfied with this element and 31.0 per cent were very satisfied, while only 7.5 per cent were dissatisfied. The mean level of satisfaction with the element was 3.9048, leaving the element in the first rank within the factor.

6. **Related Speciality Subjects**

Table 7.12 shows that 48.1 per cent of the respondents were satisfied and 23.2 per cent were very satisfied, while 11.2 per cent were dissatisfied. The mean level of satisfaction with the element was 3.7404, placing this element in the third rank in terms of the level of satisfaction within the factor.

7. **Communication Skills**

Table 7.12 shows that 42.9 per cent of the respondents were satisfied and 27.5 per cent were very satisfied, while 12.2 per cent were dissatisfied. The mean level of satisfaction with this element was 3.7526, which ranks this element fourth within the factor.

8. Comprehension Skills

Table 7.12 shows that 51.7 per cent of the respondents were satisfied and 27.7 per cent were very satisfied, while 7.4 per cent were dissatisfied. The mean level of satisfaction with the element was 3.9358 and it ranks second within the factor.

9. Reading Skills

Table 7.12 shows that 45.1 per cent of the respondents were satisfied and 33.2 per cent were very satisfied, while 8.5 per cent were dissatisfied. The mean level of satisfaction with the element was 3.9763, and it therefore ranks first within the factor.

10. Writing Skills

Table 7.12 shows that 50.5 per cent of the respondents were satisfied and 28.5 per cent were very satisfied, while 8.1 per cent were dissatisfied. The mean level of satisfaction with the element was 3.9186 and it is third within the factor.

11. Use of Computer for Data Processing

Table 7.12 shows that 29.9 per cent of the respondents were dissatisfied and 16.7 per cent were very dissatisfied, while only 22.6 per cent were satisfied. The table also shows that 20.5 per cent of respondents were unsure. The mean level of satisfaction was 2.8021 and this element ranks second within the factor.

12. Use of Computer for Word Processing

Table 7.12 shows that 26.5 per cent of the respondents were dissatisfied, 24.5 per cent were satisfied and another 24.5 per cent were unsure. The mean level of satisfaction was 2.8435, putting it in the first rank within the factor.

13. Use of Computer Software related to Profession

Table 7.12 shows that 26.8 per cent of the respondents were dissatisfied and 24.7 per cent were very dissatisfied. A percentage of 24.4 of respondents were unsure. Only 17.5 per cent were satisfied and a smaller percentage (6.5%) were very satisfied. The mean level of satisfaction was 2.5430 and this element ranks third within the factor.

14. Similarity between Technology Used for Training and that Generally Adopted by Industry

Table 7.12 shows that 41.2 per cent of the respondents were satisfied while 18.7 per cent were dissatisfied. The mean level of satisfaction with the element was 3.4187 and this element ranks third within the factor.

15. Awareness of Importance of Subject Technology

Table 7.12 shows that 42.7 per cent of the respondents were satisfied while 15.3 per cent were dissatisfied. Also, the table shows that 23.4 per cent were unsure. The mean level of satisfaction was 3.4983, putting this element in the first rank within the factor.

16. Familiarity with Other Available Technologies related to Area of Specialisation

Table 7.12 shows that 44.7 per cent of the respondents were satisfied while 22.7 per cent were unsure and 15.8 per cent were dissatisfied. The mean level of satisfaction was 3.4330, making this element second in the order of elements within the factor.

17. Safety of Individual

Table 7.12 shows that 47.1 per cent of the respondents were satisfied and 31.5 per cent were very satisfied with this element, while only 9.8 per cent were dissatisfied. The mean level of satisfaction with the element was 3.9627 and it ranks second within the factor.

18. Safety of Equipment and Facilities

Table 7.12 shows that a large percentage of the respondents (56.3%) were satisfied and 25.1 per cent were very satisfied, while only a small percentage (6.1%) were dissatisfied. The mean level of satisfaction with the element was 3.9627 and the element ranks first within the factor.

19. Safety of Others

Table 7.12 shows that a large percentage of the respondents (52.7%) were satisfied and 26.4 per cent were very satisfied, while only 8.4 per cent were dissatisfied. The mean level of satisfaction with the element was 3.9358 and the element ranks third within the factor.

20. Safety of Environment

Table 7.12 shows that 45.4 per cent of the respondents were satisfied and 22.7 per cent were very satisfied. Only 10.8 per cent of respondents were dissatisfied. The mean level of satisfaction with the element was 3.6915 and the element ranks fourth within the factor.

21. Discipline

Table 7.12 shows that 51.2 per cent of the respondents were satisfied and 30.7 per cent were very satisfied. Only 7.2 per cent were dissatisfied. The mean level of satisfaction with the element was 4.0205 and the element ranks second within the factor.

22. Punctuality and Time Management

Table 7.12 shows that 47.1 per cent of the respondents were satisfied and 40.7 per cent were very satisfied. Only 4.1 per cent of respondents were dissatisfied. The mean level of satisfaction with the element was 4.2237 and the element ranks first within the factor.

23. Readiness to Learn More

Table 7.12 shows that 47.1 per cent of the respondents were satisfied and 31.9 per cent were very satisfied. Only 6.8 per cent were dissatisfied. The mean level of satisfaction with the element was 4.0136, which makes it rank third within the factor.

24. Ability to Execute a Task with Minimal Supervision

Table 7.12 shows that 48.6 per cent of the respondents were satisfied and 23.5 per cent were very satisfied. Only 8.2 per cent were dissatisfied. The mean level of satisfaction with the element was 3.8197 and it ranks fourth within the factor.

25. Job Relation to Course of Study

Table 7.12 shows that 45.8 per cent of the respondents were satisfied and 15.6 per cent were very satisfied, while 14.9 per cent were dissatisfied and 13.2 per cent were very dissatisfied. The mean level of satisfaction with the element was 3.3559 and it ranks first, as there is no other element within the factor.

26. Job Duties and Responsibilities

Table 7.12 shows that 41.4 per cent of the respondents were satisfied while 18.0 per cent were dissatisfied. The mean level of satisfaction with the element was 3.3017 and it ranks second within the factor.

27. Skills and Knowledge Required for the Job

Table 7.12 shows that 41.0 per cent of the respondents were satisfied while 14.6 per cent were dissatisfied. 22.9 per cent were unsure. The mean level of satisfaction with the element was 3.3472 and it ranks first within the factor.

28. Physical Fitness

Table 7.12 shows that 43.2 per cent of the respondents were satisfied and 24.0 per cent were very satisfied, while only 11.8 per cent were dissatisfied. The mean level of satisfaction with the element was 3.6250 and the element ranks first, as there is no other element within the factor.

29. Co-operative Training Programme

Table 7.12 shows that 45.4 per cent of the respondents were satisfied and 32.5 per cent were very satisfied, while 10.5 per cent were dissatisfied. The mean level of satisfaction with the element was 3.9186 and it ranks first within the factor.

30. Student Field Visits to Industry

Table 7.12 shows that 27.9 per cent of the respondents were satisfied and 20.7 per cent were very satisfied, while 23.8 per cent were dissatisfied. The mean level of satisfaction with the element was 3.1769, placing it in the third rank within the factor.

31. Lecturing and Training Conducted by Industry Representatives

Table 7.12 shows that 27.0 per cent of the respondents were dissatisfied and 23.9 per cent were very dissatisfied, while 18.1 per cent were unsure. Conversely, only 16.0 per cent were satisfied and 15.0 per cent were very satisfied. The mean level of satisfaction with the element was 2.7133 and the element ranks fifth within the factor.

32. Graduates' Employment in Industry

Table 7.12 shows that 44.6 per cent of the respondents were satisfied while 10.1 per cent were dissatisfied. The mean level of satisfaction with the element was 3.6351 and the element ranks second within the factor.

33. Involvement of Industry in Curricular and Training Facilities Development

Table 7.12 shows that the highest percentage (35.9%) of the respondents indicated a neutral level of satisfaction, as unsure. A percentage of 20.3 of them were dissatisfied and 15.3 per cent were very dissatisfied, while only 18.3 per cent expressed their satisfaction. The mean level of satisfaction with the element was 2.8780 and this element ranks fourth within the factor.

34. Vocational / Career Guidance and Counselling Services

Table 7.12 shows that 35.0 per cent of the respondents were satisfied while 23.1 per cent were dissatisfied. The mean level of satisfaction with the element was 3.1122 and it ranks second within the factor.

35. Procedures for Selection of Specialisation

Table 7.12 shows that 37.9 per cent of the respondents were satisfied, while 21.8 per cent were dissatisfied and 18.4 per cent were very dissatisfied. The mean level of satisfaction with the element was 3.0102 and it ranks third within the factor.

36. Selected Area of Specialisation

Table 7.12 shows that 44.7 per cent of the respondents were satisfied and a similar percentage were very satisfied. The mean level of satisfaction with the element was 4.2203 and it ranks first within the factor.

Table 7.12

Level of Satisfaction of Group No. 1 (EJG) with the Elements

FACTOR / ELEMENT	LEVEL OF SATISFACTION										MEAN	ORDER WITHIN FACTOR
	VERY DISSATISFIED		DISSATISFIED		UNSURE		SATISFIED		VERY SATISFIED			
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%		
A. *Hands-on skills*												
1. Basic manual skills	5	1.7	32	11.0	31	10.7	160	55.2	62	21.4	3.83	2
2. Technician skills	6	2.1	36	12.3	27	9.2	153	52.4	70	24.0	3.84	1
3. Professional skills	22	7.6	47	16.3	55	19.0	116	40.1	49	17.0	3.43	3
B. *Analytical skills*												
4. Sciences	8	2.7	23	7.9	50	17.1	147	50.3	64	21.9	3.8082	2
5. Mathematics	15	5.1	22	7.5	30	10.2	136	46.3	91	31.0	3.9048	1
6. Related speciality subjects	13	4.6	32	11.2	37	13.0	137	48.1	66	23.2	3.7404	3
C. *Proficiency in English*												
7. Communication skills	15	5.2	35	12.2	35	12.2	123	42.9	79	27.5	3.7526	4
8. Comprehension skills	9	3.0	22	7.4	30	10.1	153	51.7	82	27.7	3.9358	2
9. Reading skills	8	2.7	25	8.5	31	10.5	133	45.1	98	33.2	3.9763	1
10. Writing skills	11	3.7	24	8.1	27	9.2	149	50.5	84	28.5	3.9186	3
D. *Computer literacy*												
11. Use of computer for data processing	48	16.7	86	29.9	59	20.5	65	22.6	30	10.4	2.8021	2
12. Use of computer for word processing	46	15.6	78	26.5	72	24.5	72	24.5	26	8.8	2.8435	1
13. Use of computer software related to profession	72	24.7	78	26.8	71	24.4	51	17.5	19	6.5	2.5430	3

Table 7.12 (cont'd)

FACTOR / ELEMENT	LEVEL OF SATISFACTION: VERY DISSATISFIED FREQ.	%	DISSATISFIED FREQ.	%	UNSURE FREQ.	%	SATISFIED FREQ.	%	VERY SATISFIED FREQ.	%	MEAN	ORDER WITHIN FACTOR
E. ***Technology awareness*** 14. Similarity between technology used for training and that generally adopted by industry	20	6.9	54	18.7	48	16.6	119	41.2	48	16.6	3.4187	3
15. Awareness of importance of subject technology	11	3.7	45	15.3	69	23.4	126	42.7	44	14.9	3.4983	1
16. Familiarity with other available technologies related to area of specialisation	14	4.8	46	15.8	66	22.7	130	44.7	35	12.0	3.4330	2
F. ***Safety awareness and practice*** 17. Safety of individual	6	2.0	29	9.8	28	9.5	139	47.1	93	31.5	3.9627	2
18. Safety of equipment and facilities	6	2.0	18	6.1	31	10.5	166	56.3	74	25.1	3.9627	1
19. Safety of others	5	1.7	25	8.4	32	10.8	156	52.7	78	26.4	3.9358	3
20. Safety of environment	16	5.4	32	10.8	46	15.6	134	45.4	67	22.7	3.6915	4
G. ***Organisational behaviour and human performance*** 21. Discipline	5	1.7	21	7.2	27	9.2	150	51.2	90	30.7	4.0205	2
22. Punctuality and time management	3	1.0	12	4.1	21	7.1	139	47.1	120	40.7	4.2237	1
23. Readiness to learn more	4	1.4	20	6.8	38	12.9	139	47.1	94	31.9	4.0136	3

Table 7.12 (cont'd)

FACTOR / ELEMENT	LEVEL OF SATISFACTION										MEAN	ORDER WITHIN FACTOR
	VERY DISSATISFIED		DISSATISFIED		UNSURE		SATISFIED		VERY SATISFIED			
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%		
24. Ability to execute a task with minimal supervision	8	2.7	24	8.2	50	17.0	143	48.6	69	23.5	3.8197	4
H. *Job relation to course of study* 25. Job relation to course of study	39	13.2	44	14.9	31	10.5	135	45.8	46	15.6	3.3559	1
I. *Awareness of job requirements* 26. Job duties and responsibilities	26	8.8	53	18.0	58	19.7	122	41.4	36	12.2	3.3017	2
27. Skills and knowledge required for the job	25	8.7	42	14.6	66	22.9	118	41.0	37	12.8	3.3472	1
J. *Physical well-being* 28. Physical fitness	25	8.4	35	11.8	37	12.5	128	43.2	71	24.0	3.6250	1
K. *Links between the College and industry* 29. Co-operative Training Programme	12	4.1	31	10.5	22	7.5	134	45.4	96	32.5	3.9186	1
30. Student field visits to industry	41	13.9	70	23.8	40	13.6	82	27.9	61	20.7	3.1769	3
31. Lecturing and training conducted by industry representatives	70	23.9	79	27.0	53	18.1	47	16.0	44	15.0	2.7133	5
32. Graduates' employment in industry	22	7.4	30	10.1	47	15.9	132	44.6	65	22.0	3.6351	2
33. Involvement of industry in curricular and training facilities development	45	15.3	60	20.3	106	35.9	54	18.3	30	10.2	2.8780	4
L. *Selection of course of study* 34. Vocational/career guidance and counselling services	37	12.6	68	23.1	50	17.0	103	35.0	36	12.2	3.1122	2
35. Procedures for selection of specialisation	54	18.4	64	21.8	32	10.9	111	37.9	32	10.9	3.0102	3
36. Selected area of specialisation	13	4.4	10	3.4	8	2.7	132	44.7	132	44.7	4.2203	1

7.2.1.3 Level of Satisfaction: factors

After surveying the EJG group's levels of satisfaction with the individual elements within the factors, it is now appropriate to detail the group's mean levels of satisfaction with the twelve factors.

Table 7.13 below lists the mean levels of satisfaction of the group with each of the factors. It also shows the order of each factor according to its mean level of satisfaction.

The table indicates that the factor concerned with *Organisational behaviour and human performance* ranks first, with a mean of 4.0200, while *Computer literacy* ranks last with a mean of 2.7297. It also shows that the mean of all factors is 3.5730.

Table 7.13

Means and Order of Factors for the Group's Level of Satisfaction (EJG)

Factor	Mean	Order
Hands-on skills	3.7021	5
Analytical skills	3.8232	4
Proficiency in English	3.8972	2
Computer literacy	2.7297	12
Technology awareness	3.4493	8
Safety awareness and practice	3.8812	3
Organisational behaviour and human performance	4.0200	1
Job relation to course of study	3.3559	9
Awareness of job requirements	3.3226	10
Physical well-being	3.6250	6
Links between the College and industry	3.2639	11
Selection of course of study	3.4503	7
All Factors	**3.5730**	

7.2.2 Work Supervisors (WS)

The followings are the items to be investigated for the second group (WS):

7.2.2.1 Background Information

Data falling within this sub-section cover the answers to the ten questions forming Part I of the second questionnaire (WS).

1. Age

Table 7.14 below shows that 56.2 per cent of the respondents were 36-45 years old, while 30.5 per cent were 26-35 years old.

Table 7.14

Frequencies and Percentages related to Respondents' Age Group

Age	Frequency	Percentage
26-35	32	30.5
36-45	59	56.2
46-55	13	12.4
56 or more	1	1.0
Total	**105**	**100.0**

2. Nationality

Table 7.15 below shows that the majority of the respondents (89.5%) were Saudis, while only 10.5 per cent were non-Saudis.

Table 7.15

Frequencies and Percentages related to the Nationality of the Respondents

Nationality	Frequency	Percentage
Saudi	94	89.5
Non-Saudi	11	10.5
Total	**105**	**100.0**

3. Number of Years in Firm

Table 7.16 below shows that 26.7 per cent of the respondents had worked for 6 to 10 years in the firm and a similar percentage for 16 to 20 years. Only 9.5 per cent of the respondents had worked for 5 years or less while 16.2 per cent had worked for a period exceeding 20 years.

Table 7.16

Frequencies and Percentages of Respondents' Number of Years in Firm

Years in this Firm	Frequency	Percentage
5 years or less	10	9.5
6 – 10	28	26.7
11 - 15	22	21.0
16 – 20	28	26.7
Over 20 years	17	16.2
Total	**105**	**100.0**

4. Level of Education

Table 7.17 below shows that 42.9 per cent of the respondents were College graduates and 34.3 per cent had a Post-secondary Technical/Vocational Certificate or Diploma. It also indicates that 14.3 per cent of respondents held a Secondary School Certificate or below, while only 8.6 per cent had obtained a post-graduate degree.

Table 7.17

Frequencies and Percentages of Respondents' Level of Education

Level of Education	Frequency	Percentage
Secondary School or Below	15	14.3
Post-Secondary Technical / Vocational Certificate or Diploma	36	34.3
College Degree	45	42.9
MA or PhD	9	8.6
Total	**105**	**100.0**

5. Number of Employees Supervised

Table 7.18 below shows that 41.9 per cent of the respondents currently supervised 1 to 10 employees and 31.4 per cent supervised 11 to 20 employees. Only 1.9 per cent supervised 41 to 50 employees and a similar percentage supervised more than 50 employees.

Table 7.18

Frequencies and Percentages of Number of Employees Supervised

Number of Employees Supervised	Frequency	Percentage
1 – 10	44	41.9
11 – 20	33	31.4
21 – 30	19	18.1
31 – 40	5	4.8
41 – 50	2	1.9
More than 50	2	1.9
Total	**105**	**100.0**

6. Number of Years Supervising JIC Graduates

Table 7.19 below shows that 33.7 per cent of the respondents had supervised JIC graduate(s) for 3 to 4 years and 30.8 per cent had supervised JIC graduates for 2 years or less. It also indicates that 28.8 per cent had supervised JIC graduates for 5 to 6 years, while only 1.9 per cent had supervised JIC graduates for 9 to 10 years.

Table 7.19

Frequencies and Percentages of the number Of years Respondents have Supervised JIC Graduates

Years Supervising JIC Graduates	Frequency	Percentage
2 years or less	32	30.8
3 – 4 years	35	33.7
5 – 6 years	30	28.8
7 – 8 years	5	4.8
9 – 10 years	2	1.9
Total	**105**	**100.0**

7. Firms' Types of Product(s)

Table 7.20 below shows that 52.4 per cent of the respondents worked for firms producing petrochemicals, 21.0 per cent for firms producing petroleum products, and 12.4 per cent for firms producing iron and steel.

Table 7.20

Frequencies and Percentages of Firms' Types of Product(s)

Firm's Type of Product(s)	Frequency	Percentage
Petroleum	22	21.0
Cement	1	1.0
Petrochemicals	55	52.4
Chemicals	8	7.6
Iron and Steel	13	12.4
Glass	1	1.0
Electrical/Electronics	2	1.9
Gas	2	1.9
Other	1	1.0
Total	**105**	**100.0**

8. Firms' Total Number of Employees

Table 7.21 shows that 37.1 per cent of the respondents worked for firms employing more than 1000 employees, and 19.0 per cent for firms employing 601 to 800 employees. It also indicates that 17.1 per cent worked for firms employing 401 to 600 employees, while only 13.3 per cent worked for small firms, employing 200 employees or fewer.

Table 7.21

Frequencies and Percentages of Firms' Numbers of Employees

Total Number of Employees	Frequency	Percentage
200 or less	14	13.3
201 – 400	1	1.0
401 – 600	18	17.1
601 – 800	20	19.0
801 – 1000	13	12.4
More than 1000	39	37.1
Total	**105**	**100.0**

9. Percentage of Saudis in Firm

Table 7.22 below shows that 54.3 per cent of the respondents worked for firms with an estimated Saudisation of 81 to 100 per cent. Also, 33.3 per cent worked for firms having 61 to 80 per cent Saudi employees. Only 1.0 per cent of the respondents worked for firms with 20 per cent or fewer Saudis.

Table 7.22

Frequencies and Percentages of Saudis in Firm

Percentage of Saudis	Frequency	Percentage
20% or less	1	1.0
21% - 40%	3	2.9
41% - 60%	9	8.6
61% - 80%	35	33.3
81% - 100%	57	54.3
Total	**105**	**100.0**

10. Firms' Number of Years in Operation

Table 7.23 shows that 40.0 per cent of the respondents worked for firms in operation for 16 to 20 years, and 26.7 per cent of the respondents worked for firms in operation for 26 years or more. Only 2.9 per cent worked for firms in operation for 5 years or less.

Table 7.23

Frequencies and Percentages of Firms' Number of Years in Operation

Years of Operation	Frequency	Percentage
5 years or less	3	2.9
6 – 10 years	4	3.8
11 – 15 years	4	3.8
16 – 20 years	42	40.0
21 – 25 years	24	22.9
26 years or more	28	26.7
Total	**105**	**100.0**

7.2.2.2 Level of satisfaction: elements

In this sub-section, the five levels of satisfaction of the second group (WS) with the elements forming the factors will be surveyed and their means will then be discussed and placed in rank order.

1. Basic Manual Skills

Table 7.24 below shows that 61.9 per cent of the respondents of the second group (WS) were satisfied with the element and 18.1 per cent were very satisfied. Another 18.1 per cent were unsure, while only 1.9 per cent were dissatisfied. The mean level of satisfaction with this element was 3.96, ranking it first within the factor.

2. Technician Skills

Table 7.24 indicates that quite a large percentage of the respondents (60.0%) expressed their satisfaction with this element, in addition to 17.1 per cent who said that they were very satisfied. 19.0 per cent were unsure and only 2.9 per cent were dissatisfied. The mean level of satisfaction with the element was 3.90, making it the second in rank within the factor.

3. Professional Skills

Table 7.24 shows that 51.4 per cent of the respondents were satisfied with the element and 15.2 per cent were very satisfied. 26.7 per cent were unsure, while only a small percentage (6.7%) indicated their dissatisfaction. The mean level of satisfaction with the element is 3.75, putting it in third place within the factor.

4. Sciences

Table 7.24 below shows that 48.1 per cent of the respondents indicated their neutral level of satisfaction, as unsure. The table also shows that 36.5 per cent were satisfied, while only 1.0 per cent said that they were dissatisfied. The mean level of satisfaction with the element was 3.5673, which ranks the element third within the factor.

5. Mathematics

Table 7.24 shows that 41.0 per cent of the respondents were satisfied with the element and a similar percentage of respondents were unsure. Only 3.8 per cent indicated their dissatisfaction. The mean level of satisfaction was 3.6571, which ranks the element second within the factor.

6. Related Speciality Subjects

Table 7.24 indicates that the largest percentage of the respondents (47.6%) were satisfied and 35.2 per cent were unsure. Only 4.8 per cent were dissatisfied. The mean level of satisfaction with the element was 3.6762, ranking the element first within the factor.

7. Communication Skills

Table 7.24 shows that the majority of the respondents (71.4%) were satisfied and 14.3 per cent were very satisfied. Only 7.6 per cent said that they were dissatisfied. The mean level of satisfaction for this element was 3.9238, which ranks it third within the factor.

8. Comprehension Skills

Table 7.24 shows that the majority of the respondents (71.4%) were satisfied and 16.2 per cent were very satisfied, while only 3.8 per cent were dissatisfied. The mean level of satisfaction with the element was 4.0, which ranks it second within the factor.

9. Reading Skills

Table 7.24 shows that the majority of the respondents (70.5%) were satisfied and 21.0 per cent were very satisfied. Only 5.7 per cent were dissatisfied. The mean level of satisfaction with the element was 4.0667, which ranks it first within the factor.

10. Writing Skills

Table 7.24 shows that a large percentage of the respondents (63.8%) were satisfied and 17.1 per cent were very satisfied, while a small percentage (8.6%) were dissatisfied. The mean level of satisfaction with the element was 3.8571, putting it fourth within the factor.

11. Use of Computer for Data Processing

Table 7.24 shows that 47.6 per cent of the respondents were unsure, 25.7 per cent were satisfied and 14.3 per cent were very satisfied. On the other hand, it shows that only 8.6 per cent were dissatisfied. The mean level of satisfaction with the element was 3.3810, and it ranks second within the factor.

12. Use of Computer for Word Processing

Table 7.24 shows that 44.8 per cent of the respondents were unsure and 33.3 per cent were satisfied. Only 10.5 per cent were dissatisfied. The mean level of satisfaction with the element was 3.4190 and it ranks first within the factor.

13. Use of Computer Software related to Profession

Table 7.24 shows that 47.6 per cent of the respondents were unsure, 21.9 per cent were satisfied and 15.2 per cent were very satisfied. It shows that only 11.4 per cent were dissatisfied. The mean level of satisfaction with the element was 3.333 and it ranks third within the factor.

14. Similarity between Technology Used for Training and that Generally Adopted by Industry

Table 7.24 shows that a percentage of 53.3 of the respondents were satisfied, 28.6 per cent were unsure and 10.5 per cent were dissatisfied. The mean level of satisfaction with the element was 3.4667 and it ranks third within the factor.

15. Awareness of Importance of Subject Technology

Table 7.24 shows that 48.1 per cent of the respondents were satisfied and 36.5 per cent were unsure, while 5.8 per cent were dissatisfied. The mean level of satisfaction with the element was 3.5769 and it ranks first within the factor.

16. Familiarity with other Available Technologies related to Area of Specialisation

Table 7.24 shows that 51.4 per cent of the respondents were satisfied and 30.5 per cent were unsure. Only 10.5 per cent were dissatisfied. The mean level of satisfaction with the element was 3.5238 and it ranks second within the factor.

17. Safety of Individual

Table 7.24 shows that 45.7 per cent of the respondents were satisfied with this element and 35.2 per cent were very satisfied. Only 11.4 per cent were dissatisfied. The mean level of satisfaction was 4.0476 and the element ranks second within the factor.

18. Safety of Equipment and Facilities

Table 7.24 shows that 62.9 per cent of the respondents were satisfied with this element and 23.8 per cent were very satisfied. Only 7.6 per cent were dissatisfied. The mean level of satisfaction with this element was 4.0286 and it ranks third within the factor.

19. Safety of Others

Table 7.24 shows that 60.0 per cent of the respondents were satisfied with this element and 26.7 per cent were very satisfied, while only 7.6 per cent were unsure. The mean level of satisfaction was 4.0762 and the element ranks first within the factor.

20. Safety of Environment

Table 7.24 shows that 56.2 per cent of the respondents were satisfied with this element and 21.0 per cent were very satisfied, while 10.5 per cent were dissatisfied. The mean level of satisfaction was 3.8571 and it ranks fourth within the factor.

21. Discipline

Table 7.24 shows that a large percentage of the respondents (57.7%) were very satisfied with this element and 30.8 per cent were satisfied. Only 1.9 per cent were dissatisfied. The mean level of satisfaction was 4.4231 and the element ranks first within the factor.

22. Punctuality and Time Management

Table 7.24 shows that 51.4 per cent of the respondents were satisfied with the element and 40.0 per cent were very satisfied. Only 4.8 per cent were dissatisfied. The mean level of satisfaction was 4.2476 and the element ranks third within the factor.

23. Readiness to Learn More

Table 7.24 shows that 53.3 per cent of the respondents were satisfied with this element and 41.9 per cent were very satisfied. Only 1.9 per cent were dissatisfied. The mean level of satisfaction was 4.3143 and the element ranks second within the factor.

24. Ability to Execute a Task with Minimal Supervision

Table 7.24 shows that a large percentage of the respondents (67.6%) were satisfied with the element and 21.9 per cent were very satisfied. Only 1.9 per cent were dissatisfied. The mean level of satisfaction was 4.0952 and the element ranks fourth within the factor.

25. Job Relation to Course of Study

Table 7.24 shows that 44.8 per cent of the respondents were satisfied with the element and 37.1 per cent were unsure. A percentage of 7.6 of the respondents were dissatisfied. The mean level of satisfaction was 3.5429 and the element ranks first as there is no other element within the factor.

26. Job Duties and Responsibilities

Table 7.24 shows that 45.7 per cent of the respondents were unsure and 41.0 per cent were satisfied. Only 4.8 per cent were dissatisfied. The mean level of satisfaction of the element was 3.5333 and it ranks second within the factor.

27. Skills and Knowledge Required for the Job

Table 7.24 shows that 58.1 per cent of the respondents were satisfied with the element and 28.6 per cent were unsure. Only 3.8 per cent were dissatisfied. The mean level of satisfaction with the element was 3.6952 and it ranks first within the factor.

28. Physical Fitness

Table 7.24 shows that 43.8 per cent of the respondents were satisfied with the element and 39.0 per cent were very satisfied. Only 2.9 per cent were dissatisfied. The mean level of satisfaction with the element was 4.1714 and it ranks first, as there is no other element within the factor.

29. Co-operative Training Programme

Table 7.24 shows that 50.5 per cent of the respondents were satisfied with the element and 32.4 per cent were very satisfied. Only 5.7 per cent were dissatisfied. The mean level of satisfaction with the element was 4.0952 and it ranks second within the factor.

30. Student Field Visits to Industry

Table 7.24 shows that 33.0 per cent of the respondents were satisfied with the element and 26.2 per cent were very satisfied. It also shows that 27.2 per cent were unsure and only 10.7 per cent were dissatisfied. The mean level of satisfaction with the element was 3.6893 and it ranks third within the factor.

31. Firm's Participation in Part-Time Lecturing and Training at JIC

Table 7.24 shows that 55.2 per cent of the respondents were unsure with the element, while 14.3 per cent were satisfied and 13.3 per cent were very satisfied. The table shows also that 14.3 per cent of the respondents were dissatisfied. The mean level of satisfaction with the element was 3.2095 and it ranks fourth within the factor.

32. Graduates' Employment in Industry

Table 7.24 shows that 43.8 per cent of the respondents were satisfied with this element and 41.0 per cent were very satisfied. Only 2.9 per cent were dissatisfied. The mean level of satisfaction with the element was 4.2095 and it ranks first within the factor.

33. Firm's Involvement in Development of JIC Curricula and Training Facilities

Table 7.24 shows that 56.2 per cent of the respondents were unsure with this element and 13.3 per cent were satisfied. The table also indicates that 11.4 per cent of the respondents were dissatisfied and 10.5 per cent were very dissatisfied. The mean level of satisfaction with the element was 2.9810 and it ranks fifth within the factor.

34. Satisfaction with Graduate's Selection of Specialisation

Table 7.24 shows that 61.9 per cent of the respondents were satisfied with this element, and 19.0 per cent were unsure while 13.3 per cent were very satisfied. Only 4.8 per cent were dissatisfied. The mean level of satisfaction with the element was 3.8190 and it ranks first, as there is no other element within the factor.

Table 7.24

Level of Satisfaction of Group No. 2 (WS) with the Elements

FACTOR / ELEMENT	LEVEL OF SATISFACTION										MEAN	ORDER WITHIN FACTOR
	VERY DISSATISFIED		DISSATISFIED		UNSURE		SATISFIED		VERY SATISFIED			
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%		
A. ***Hands-on skills***												
1. Basic manual skills			2	1.9	19	18.1	65	61.9	19	18.1	3.96	1
2. Technician skills	1	1.0	3	2.9	20	19.0	63	60.0	18	17.1	3.90	2
3. Professional skills			7	6.7	28	26.7	54	51.4	16	15.2	3.75	3
B. ***Analytical skills***												
4. Sciences	2	1.9	1	1.0	50	48.1	38	36.5	13	12.5	3.5673	3
5 Mathematics			4	3.8	43	41.0	43	41.0	15	14.3	3.6571	2
6. Related speciality subjects			5	4.8	37	35.2	50	47.6	13	12.4	3.6762	1
C ***Proficiency in English***												
7. Communication skills			8	7.6	7	6.7	75	71.4	15	14.3	3.9238	3
8. Comprehension skills			4	3.8	9	8.6	75	71.4	17	16.2	4.0000	2
9. Reading skills			6	5.7	3	2.9	74	70.5	22	21.0	4.0667	1
10. Writing skills	2	1.9	9	8.6	9	8.6	67	63.8	18	17.1	3.8571	4
D. ***Computer literacy***												
11. Use of computer for data processing	4	3.8	9	8.6	50	47.6	27	25.7	15	14.3	3.3810	2
12. Use of computer for word processing	1	1.0	11	10.5	47	44.8	35	33.3	11	10.5	3.4190	1
13. Use of computer software related to profession	4	3.8	12	11.4	50	47.6	23	21.9	16	15.2	3.3333	3

Table 7.24 (cont'd)

FACTOR / ELEMENT	LEVEL OF SATISFACTION										MEAN	ORDER WITHIN FACTOR
	VERY DISSATISFIED		DISSATISFIED		UNSURE		SATISFIED		VERY SATISFIED			
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%		
E. ***Technology awareness*** 14. Similarity between technology used for training and that generally adopted by industry	3	2.9	11	10.5	30	28.6	56	53.3	5	4.8	3.4667	3
15. Awareness of importance of subject technology	1	1.0	6	5.8	38	36.5	50	48.1	9	8.7	3.5769	1
16. Familiarity with other available technologies related to area of specialisation	1	1.0	11	10.5	32	30.5	54	51.4	7	6.7	3.5238	2
F. ***Safety awareness and practice*** 17. Safety of individual			12	11.4	8	7.6	48	45.7	37	35.2	4.0476	2
18. Safety of equipment and facilities			8	7.6	6	5.7	66	62.9	25	23.8	4.0286	3
19. Safety of others			6	5.7	8	7.6	63	60.0	28	26.7	4.0762	1
20. Safety of environment	1	1.0	11	10.5	12	11.4	59	56.2	22	21.0	3.8571	4
G. ***Organisational behaviour and human performance*** 21. Discipline	1	1.0	2	1.9	9	8.7	32	30.8	60	57.7	4.4231	1
22. Punctuality and time management	1	1.0	5	4.8	3	2.9	54	51.4	42	40.0	4.2476	3
23. Readiness to learn more	2	1.9	2	1.9	1	1.0	56	53.3	44	41.9	4.3143	2
24. Ability to execute a task with minimal supervision			2	1.9	9	8.6	71	67.6	23	21.9	4.0952	4

Table 7.24 (cont'd)

FACTOR / ELEMENT	LEVEL OF SATISFACTION										MEAN	ORDER WITHIN FACTOR
	VERY DISSATISFIED		DISSATISFIED		UNSURE		SATISFIED		VERY SATISFIED			
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%		
H. ***Job relation to course of study*** 25. Job relation to course of study	1	1.0	8	7.6	39	37.1	47	44.8	10	9.5	3.5429	1
I. ***Awareness of job requirements*** 26. Job duties and responsibilities			5	4.8	48	45.7	43	41.0	9	8.6	3.5333	2
27. Skills and knowledge required for the job	1	1.0	4	3.8	30	28.6	61	58.1	9	8.6	3.6952	1
J. ***Physical well-being*** 28. Physical fitness	1	1.0	3	2.9	14	13.3	46	43.8	41	39.0	4.1714	1
K. ***Links between the College and industry*** 29. Co-operative Training Programme			6	5.7	12	11.4	53	50.5	34	32.4	4.0952	2
30. Student field visits to industry	3	2.9	11	10.7	28	27.2	34	33.0	27	26.2	3.6893	3
31. Firm's participation in part-time lecturing and training at JIC	3	2.9	15	14.3	58	55.2	15	14.3	14	13.3	3.2095	4
32. Graduates' employment in industry	1	1.0	3	2.9	12	11.4	46	43.8	43	41.0	4.2095	1
33. Firm's involvement in development of JIC curricula and training facilities	11	10.5	12	11.4	59	56.2	14	13.3	9	8.6	2.9810	5
L. ***Selection of course of study*** 34. Satisfaction with graduate's selection of specialisation	1	1.0	5	4.8	20	19.0	65	61.9	14	13.3	3.8190	1

7.2.2.3 Level of Satisfaction: factors

The WS group's level of satisfaction with the twelve factors is presented in Table 7.25 below.

The Table lists the mean levels of satisfaction of the group with each of the factors. It also shows the order of each factor according to its mean level of satisfaction.

The Table indicates that the factor concerned with *Organisational behaviour and human performance* ranks first with a mean of 4.2714, while the *Computer literacy* factor ranks the last among the factors with a mean of 3.3778. It also shows that the mean of all factors is 3.7971.

Table 7.25

Means and Order of Factors for the Group's Level of Satisfaction (WS)

Factor	Mean	Order
Hands-on skills	3.8698	5
Analytical skills	3.6333	8
Proficiency in English	3.9619	4
Computer literacy	3.3778	12
Technology awareness	3.5222	11
Safety awareness and practice	4.0024	3
Organisational behaviour and human performance	4.2714	1
Job relation to course of study	3.5429	10
Awareness of job requirements	3.6143	9
Physical well-being	4.1714	2
Links between the College and industry	3.6352	7
Selection of course of study	3.8190	6
All Factors	**3.7971**	

7.2.3 JIC Students who have completed their Co-operative Training Programme (JS)

The followings are the items to be investigated for the third group (JS):

7.2.3.1 Background Information

Data falling within this sub-section cover the answers to the thirteen questions forming Part I of the third questionnaire (JS).

1. Age

Table 7.26 below shows that the great majority of the respondents (96.7%) were 20 to 24 years old.

Table 7.26

Frequencies and Percentages related to Respondents' Age Group

Age	Frequency	Percentage
20-24	58	96.7
25-29	2	3.3
Total	**60**	**100.0**

2. Marital Status

Table 7.27 below shows that all of the respondents (100.0%) were single.

Table 7.27

Frequencies and Percentages related to Respondents' Marital Status

Marital Status	Frequency	Percentage
Single	60	100.00
Total	**60**	**100.0**

3. Place of Origin

Table 7.28 below shows that 40.0 per cent of the respondents were from the Eastern Region and 28.3 per cent from the Central Region, while only 8.3 per cent were from the Western Region.

Table 7.28

Frequencies and Percentages related to Respondents' Place of Origin

Place of Origin	Frequency	Percentage
Northern Region	6	10.0
Southern Region	8	13.3
Western Region	5	8.3
Eastern Region	24	40.0
Central Region	17	28.3
Total	**60**	**100.0**

4. Type of Secondary School Completed

Table 7.29 below shows that the great majority of the respondents (95.0%) were graduates of the Natural Sciences Stream in Secondary School.

Table 7.29

Frequencies and Percentages of Respondents' Type of Secondary School Completed

Type of Secondary School Completed	Frequency	Percentage
Secondary School (Natural Sciences)	57	95.0
Secondary School (Technological Sciences)	1	1.7
Industrial Secondary Institute	2	3.3
Total	**60**	**100.0**

5. Secondary School Final Grade Average

Table 7.30 below shows that quite a large percentage of the respondents (68.3%) had a grade average of "Very Good", when they completed Secondary School, while 18.3 per cent had "Excellent" and 13.3 per cent had "Good".

Table 7.30

Frequencies and Percentages related to Respondents' Secondary School Final Grade Average

Secondary School Final Grade Average	Frequency	Percentage
Excellent (90-100%)	11	18.3
Very Good (75-89%)	41	68.3
Good (60-74%)	8	13.3
Total	**60**	**100.0**

6. Student Status at the College

Table 7.31 below shows that all the respondents (100.0%) were full-time students during their course of study at JIC.

Table 7.31

Frequencies and Percentages of Respondents' Status at the College

Student Status at the College	Frequency	Percentage
Full-Time	60	100.00
Total	**296**	**100.0**

7. Specialisation

Table 7.32 shows 25.0 per cent of the respondents to be majoring in Chemical Engineering Technology, 21.7 per cent in Instrumentation and Control Engineering Technology and a similar percentage in Electrical Power Engineering Technology. Manufacturing Engineering Technology accounted for 18.3 per cent and smaller percentages were recorded for Industrial

Laboratory Technology (6.7%), Air-Conditioning and Refrigeration Engineering Technology (3.3%) and Electromechanical Engineering Technology (3.3%).

Table 7.32

Frequencies and Percentages of Respondents' Specialisations

Specialisation	Frequency	Percentage
Instrumentation and Control Engineering Technology	13	21.7
Electrical Power Engineering Technology	13	21.7
Industrial Laboratory Technology	4	6.7
Chemical Engineering Technology	15	25.0
Air-Conditioning and Refrigeration Engineering Technology	2	3.3
Manufacturing Engineering Technology	11	18.3
Electromechanical Engineering Technology	2	3.3
Total	**60**	**100.0**

8. Grade Point Average (GPA)

Table 7.33 below shows that 41.7 per cent of the respondents currently had a GPA of 2.0 to 2.49 at the College, and 33.3 per cent had a GPA of 2.5 to 2.99. Only 6.7 per cent of the respondents had a grade point average of 3.5 to 4.0.

Table 7.33

Frequencies and Percentages of Respondents' Grade Point Average (GPA)

Grade Point Average (GPA)	Frequency	Percentage
2.0 – 2.49	25	41.7
2.5 – 2.99	20	33.3
3.0 – 3.49	11	18.3
3.5 – 4.0	4	6.7
Total	**60**	**100.0**

9. Number of Credit Hours Completed Prior to the Co-operative Training Programme

Table 7.34 below shows that a great majority of the respondents (96.7%) had completed 61 to 70 credit hours prior to undertaking the Co-operative Training Programme. Only 1.7 per cent had less than that and 1.7 per cent had more than 70 credit hours.

Table 7.34

Frequencies and Percentages of Respondents' Number of Credit Hours Prior to Co-operative Training Programme

Number of Credit Hours	Frequency	Percentage
51 – 60	1	1.7
61 - 70	58	96.7
More than 70	1	1.7
Total	**60**	**100.0**

10. Place of Training

Table 7.35 below shows that 66.7 per cent of the respondents completed their Co-operative Training Programme in Jubail, while 20.0 per cent completed it in other cities within the Eastern Region. Only 13.3 per cent undertook the programme outside the Eastern Region.

Table 7.35

Frequencies and Percentages of Respondents' Place of Training

Training Place	Frequency	Percentage
Jubail	40	66.7
Eastern Region (Excluding Jubail)	12	20.0
Other	8	13.3
Total	**60**	**100.0**

11. Opportunity to Practice the Skills Trained For

Table 7.36 below shows that, when asked if they had had the opportunity to practice the skills in which they had been trained, the majority of the respondents (76.7%) replied in the affirmative, while 13.3 per cent replied in the negative and 10.0 per cent were uncertain.

Table 7.36

Frequencies and Percentages

of Respondents' Opportunity to Practice the Skills Trained For

Practice Skills Trained For	Frequency	Percentage
Yes	46	76.7
Uncertain	6	10.0
No	8	13.3
Total	**60**	**100.0**

12. Final Grade in Co-operative Training Programme

Table 7.37 below shows that 28.3 per cent of the respondents obtained a final grade of "A" upon completion of the programme, while 26.7 per cent obtained a "B+" grade. Only 20.0 per cent scored "A+" and a smaller percentage (1.7%) had a grade of a "C". None had grade lower than "C".

Table 7.37

Frequencies and Percentages of Respondents'

Final Grade in Co-operative Training Programme

Final Grade in Co-operative Training Programme	Frequency	Percentage
A+	12	20.0
A	17	28.3
B+	16	26.7
B	6	10.0
C+	8	13.3
C	1	1.7
Total	**60**	**100.0**

13. Firms' Types of Product(s)

Table 7.38 shows that 48.3 per cent of the respondents had been trained in firms producing petrochemicals, and 26.7 per cent had been trained in petroleum industries. Smaller percentages of the respondents had been trained in firms producing other products such as air-conditioning and refrigeration units, chemicals, iron and steel and electrical/electronic equipment.

Table 7.38

Frequencies and Percentages of Firms' Types of Product(s)

Type of Product(s)	Frequency	Percentage
Petroleum	16	26.7
Petrochemicals	29	48.3
Air-Conditioning/Refrigeration	1	1.7
Chemicals	3	5.0
Iron and Steel	4	6.7
Electrical/Electronics	2	3.3
Other	5	8.3
Total	**60**	**100.0**

7.2.3.2 Level of satisfaction: elements

In this sub-section, the five levels of satisfaction of the third group (JS) with the elements forming the factors will be surveyed and their means will then be discussed and ordered.

1. Basic Manual Skills

Table 7.39 shows that 56.7 per cent of the respondents of the third group (JS) were satisfied with this element and 28.3 per cent were very satisfied, while only 8.3 per cent of the respondents were dissatisfied. The mean level of satisfaction with this element was 4.05, which puts it in first place within the factor.

2. Technician Skills

Table 7.39 shows that 66.7 per cent of the respondents were satisfied with this element and 20.0 per cent were very satisfied. Only 3.3 per cent of the respondents were dissatisfied. The mean level of satisfaction with this element was 4.03 and it ranks second within the factor.

3. Professional Skills

Table 7.39 shows that 30.5 per cent of the respondents were satisfied with this element and a similar percentage were unsure. 16.9 per cent were very satisfied, while a similar percentage were dissatisfied. Only 5.1 per cent were very dissatisfied. The mean level of satisfaction of the group with this element was 3.37, which ranks it third within the factor.

4. Sciences

Table 7.39 shows that 48.3 per cent of the respondents were satisfied with this element and 26.7 per cent were very satisfied. Only 11.7 per cent were unsure and another similar percentage were dissatisfied. The mean level of satisfaction with the element was 3.8667, ranking it second within the factor.

5. Mathematics

Table 7.39 shows that 33.3 per cent of the respondents were satisfied with this element and 25.0 per cent were very satisfied. A similar percentage were dissatisfied and 5.0 per cent were very dissatisfied. The mean level of satisfaction with the element was 3.4833 and it ranks third within the factor.

6. Related Speciality Subjects

Table 7.39 shows that 36.7 per cent of the respondents were satisfied and a similar percentage were very satisfied. It also shows that 20.0 per cent were unsure, while only 3.3 per cent were dissatisfied and a similar percentage were very dissatisfied. The mean level of satisfaction of the group with the element was 4.000, which ranks first within the factor.

7. Communication Skills

Table 7.39 shows that 45.0 per cent of the respondents were satisfied with this element and 26.7 per cent were very satisfied. A small percentage of 11.7 were unsure, while a similar percentage were dissatisfied. Only 5.0 per cent were very dissatisfied. The mean level of satisfaction with this element was 3.7667 and it ranks fourth within the factor.

8. Comprehension Skills

Table 7.39 shows that 51.7 per cent of the respondents were satisfied with this element and 35.0 per cent were very satisfied. Only 10.0 per cent were dissatisfied and 1.7 per cent were very dissatisfied. The mean level of satisfaction with the element was 4.0833 and it ranks third within the factor.

9. Reading Skills

Table 7.39 shows that 46.7 per cent of the respondents were satisfied with this element and 40.0 per cent were very satisfied. Only 8.3 per cent were dissatisfied. The mean level of satisfaction with the element was 4.1833 and it ranks second within the factor.

10. Writing Skills

Table 7.39 shows that 48.3 per cent of the respondents were satisfied with this element and 40.0 per cent were very satisfied. Only 5.0 per cent were dissatisfied. The mean level of satisfaction with the element was 4.2333 and it ranks first within the factor.

11. Use of Computer for Data Processing

Table 7.39 shows that 43.3 per cent of the respondents were satisfied with this element and 28.3 per cent were very satisfied. Only 10.0 per cent were dissatisfied and 5.0 per cent were very dissatisfied. The mean level of satisfaction was 3.8000 and the element ranks second within the factor.

12. Use of Computer for Word Processing

Table 7.39 shows that 50.0 per cent of the respondents were satisfied with this element and 23.3 per cent were very satisfied. It also shows that 16.7 per cent of the respondents were unsure and only 10.0 per cent were dissatisfied. The mean level of satisfaction was 3.8667 and the element ranks first within the factor.

13. Use of Computer Software related to Profession

Table 7.39 shows that 40.0 per cent of the respondents were satisfied with this element, 10.0 per cent were very satisfied and 21.7 per cent were unsure. It also indicates that 18.3 per cent were dissatisfied and 10.0 per cent were very dissatisfied. The mean level of satisfaction was 3.2167 and the element ranks third within the factor.

14. Similarity between Technology used for Training and that Generally Adopted by Industry

Table 7.39 shows that 58.3 per cent of the respondents were satisfied with this element and 20.0 per cent were very satisfied. It also indicates that 13.3 per cent of the respondents were dissatisfied. The mean level of satisfaction was 3.8500 and the element ranks second within the factor.

15. Awareness of Importance of Subject Technology

Table 7.39 shows that 55.2 per cent of the respondents were satisfied with this element, 19.0 per cent were very satisfied and 22.4 per cent were unsure. On the other hand, it indicates that only 3.4 per cent of the respondents were dissatisfied. The mean level of satisfaction was 3.8966 and the element ranks first within the factor.

16. Familiarity with Other Available Technologies related to Area of Specialisation

Table 7.39 shows that 46.7 per cent of the respondents were satisfied with this element, 18.3 per cent were very satisfied and 16.7 per cent were unsure. It also indicates that 18.3 per cent of the respondents were dissatisfied. The mean level of satisfaction was 3.6500 and the element ranks third within the factor.

17. Safety of Individual

Table 7.39 shows that 58.3 per cent of the respondents were very satisfied and 38.3 per cent were satisfied, while it shows that only 1.7 per cent of the respondents were dissatisfied. The mean level of satisfaction was 4.5333 and the element ranks first within the factor.

18. Safety of Equipment and Facilities

Table 7.39 shows that 51.7 per cent of the respondents were very satisfied and 40.0 per cent were satisfied. On the other hand, it shows that only 1.7 per cent of the respondents were dissatisfied and a similar percentage were very dissatisfied. The mean level of satisfaction was 4.3833 and the element ranks third within the factor.

19. Safety of Others

Table 7.39 shows that 60.0 per cent of the respondents were very satisfied with this element and 31.7 per cent were satisfied. Only 3.3 per cent of the respondents were dissatisfied. The mean level of satisfaction was 4.4833 and the element ranks second within the factor.

20. Safety of Environment

Table 7.39 shows that 45.0 per cent of the respondents were very satisfied with this element, 26.7 per cent were satisfied and 16.7 per cent were unsure. Only 10.0 per cent were dissatisfied and 1.7 per cent were very dissatisfied. The mean level of satisfaction was 4.0333 and the element ranks fourth within the factor.

21. Discipline

Table 7.39 shows that 48.3 per cent of the respondents were very satisfied with this element and 40.0 per cent were satisfied, while it shows only 3.3 per cent were dissatisfied. The mean level of satisfaction was 4.3333 and the element ranks second within the factor.

22. Punctuality and Time Management

Table 7.39 shows that 56.7 per cent of the respondents were very satisfied and 33.3 per cent were satisfied. Only 3.3 per cent of respondents were dissatisfied. The mean level of satisfaction was 4.4333 and the element ranks first within the factor.

23. Readiness to Learn More

Table 7.39 shows that 53.3 per cent of the respondents were very satisfied with this element and 33.3 per cent were satisfied. Only 3.3 per cent of the respondents were dissatisfied and 1.7 per cent were very dissatisfied. The mean level of satisfaction was 4.3333 and the element ranks third within the factor.

24. Ability to Execute a Task with Minimal Supervision

Table 7.39 shows that 42.4 per cent of the respondents were satisfied with this element, 35.6 per cent were very satisfied and 10.2 per cent were unsure. It shows that 10.2 per cent of the respondents were dissatisfied and 1.7 per cent were very dissatisfied. The mean level of satisfaction was 4.0000 and the element ranks fourth within the factor.

25. Relation of Co-operative Training to Course of Study

Table 7.39 shows that 48.3 per cent of the respondents were satisfied with this element and 28.3 per cent were very satisfied. Only 11.7 per cent of the respondents were dissatisfied and 3.3 per cent were very dissatisfied. The mean level of satisfaction was 3.8667 and the element ranks first as there is no other element within the factor.

26. Job Duties and Responsibilities

Table 7.39 shows that 43.3 per cent of the respondents were satisfied with this element, 33.3 per cent were very satisfied and 16.7 per cent were unsure. Only 5.0 per cent were dissatisfied. The mean level of satisfaction was 4.0167 and the element ranks first within the factor.

27. Skills and Knowledge Required for the Job

Table 7.39 shows that 45.0 per cent of the respondents were satisfied with this element, 25.0 per cent were very satisfied and 23.3 per cent were unsure. It shows a percentage of only 6.7 as dissatisfied respondents. The mean level of satisfaction was 3.8833 and the element ranks second within the factor.

28. Physical Fitness

Table 7.39 shows that 46.7 per cent of the respondents were satisfied with this element, 20.0 per cent were very satisfied and 16.7 per cent were unsure. On the other hand, it shows that 15.0 per cent were dissatisfied. The mean level of satisfaction was 3.6833 and the element ranks first, as there is no other element within the factor.

29. Co-operative Training Programme

Table 7.39 shows that 46.7 per cent of the respondents were very satisfied with this element and 41.7 per cent were satisfied. It shows that only 3.3 per cent were dissatisfied and 1.7 per cent were very dissatisfied. The mean level of satisfaction was 4.2833 and the element ranks first within the factor.

30. Student Field Visits to Industry

Table 7.39 shows that 38.3 per cent of the respondents were satisfied with this element and 35.0 per cent were very satisfied. It shows that only 10.0 per cent were dissatisfied and 8.3 per cent were very dissatisfied. The mean level of satisfaction was 3.8167 and the element ranks second within the factor.

31. Lecturing and Training Conducted by Industry Representatives

Table 7.39 shows that 35.0 per cent of the respondents were satisfied with this element, 21.7 per cent were very satisfied and 15.0 per cent were unsure. It shows that only 20.0 per cent of the respondents were dissatisfied and 8.3 per cent were very dissatisfied. The mean level of satisfaction was 3.4167 and the element ranks fourth within the factor.

32. Graduates' Employment in Industry

Table 7.39 shows that 40.0 per cent of the respondents were satisfied with this element, 21.7 per cent were very satisfied and 31.7 per cent were unsure. It shows that only 5.0 per cent of the respondents were dissatisfied and 1.7 per cent were very dissatisfied. The mean level of satisfaction was 3.7500 and the element ranks third within the factor.

33. Involvement of Industry in Curricular and Training Facilities Development

Table 7.39 shows that 43.3 per cent of the respondents were unsure while 25.0 per cent were satisfied and 16.7 per cent were very satisfied. It indicates that only 8.3 per cent of the respondents were dissatisfied and 6.7 per cent were very dissatisfied. The mean level of satisfaction with the element was 3.3667 and the element ranks fifth within the factor.

34. Vocational / Career Guidance and Counselling Services

Table 7.39 shows that 28.3 per cent of the respondents were very satisfied and a similar percentage were satisfied. It indicates that 15.0 per cent were unsure, while 21.7 per cent were dissatisfied and 6.7 per cent were very dissatisfied. The mean level of satisfaction was 3.5000 and the element ranks second within the factor.

35. Procedures for Selection of Specialisation

Table 7.39 shows that 26.7 per cent of the respondents were very satisfied and a similar percentage were satisfied. It indicates that 10.0 per cent were unsure, while 23.3 per cent of the respondents were dissatisfied and 13.3 per cent were very dissatisfied. The mean level of satisfaction was 3.3000 and the element ranks third within the factor.

36. Selected Area of Specialisation

Table 7.39 shows that 58.3 per cent of the respondents were very satisfied and 35.0 per cent were satisfied, while only 5.0 per cent of the respondents were dissatisfied. The mean level of satisfaction was 4.4667 and the element ranks first within the factor.

Table 7.39

Level of Satisfaction of Group No. 3 (JS) with the Elements

FACTOR / ELEMENT	LEVEL OF SATISFACTION										MEAN	ORDER WITHIN FACTOR
	VERY DISSATISFIED		DISSATISFIED		UNSURE		SATISFIED		VERY SATISFIED			
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%		
A. ***Hands-on skills***												
1. Basic manual skills			5	8.3	4	6.7	34	56.7	17	28.3	4.05	1
2. Technician skills			2	3.3	6	10.0	40	66.7	12	20.0	4.03	2
3. Professional skills	3	5.1	10	16.9	18	30.5	18	30.5	10	16.9	3.37	3
B. ***Analytical skills***												
4. Sciences	1	1.7	7	11.7	7	11.7	29	48.3	16	26.7	3.8667	2
5 Mathematics	3	5.0	15	25.0	7	11.7	20	33.3	15	25.0	3.4833	3
6. Related speciality subjects	2	3.3	2	3.3	12	20.0	22	36.7	22	36.7	4.0000	1
C ***Proficiency in English***												
7. Communication skills	3	5.0	7	11.7	7	11.7	27	45.0	16	26.7	3.7667	4
8. Comprehension skills	1	1.7	6	10.0	1	1.7	31	51.7	21	35.0	4.0833	3
9. Reading skills			5	8.3	3	5.0	28	46.7	24	40.0	4.1833	2
10. Writing skills			3	5.0	4	6.7	29	48.3	24	40.0	4.2333	1
D. ***Computer literacy***												
11. Use of computer for data processing	3	5.0	6	10.0	8	13.3	26	43.3	17	28.3	3.8000	2
12. Use of computer for word processing			6	10.0	10	16.7	30	50.0	14	23.3	3.8667	1
13. Use of computer software related to profession	6	10.0	11	18.3	13	21.7	24	40.0	6	10.0	3.2167	3

Table 7.39 (cont'd)

FACTOR / ELEMENT	LEVEL OF SATISFACTION										MEAN	ORDER WITHIN FACTOR
	VERY DISSATISFIED		DISSATISFIED		UNSURE		SATISFIED		VERY SATISFIED			
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%		
E. *Technology awareness* 14. Similarity between technology used for training and that generally adopted by industry			8	13.3	5	8.3	35	58.3	12	20.0	3.8500	2
15. Awareness of importance of subject technology			2	3.4	13	22.4	32	55.2	11	19.0	3.8966	1
16. Familiarity with other available technologies related to area of specialisation			11	18.3	10	16.7	28	46.7	11	18.3	3.6500	3
F. *Safety awareness and practice* 17. Safety of individual			1	1.7	1	1.7	23	38.3	35	58.3	4.5333	1
18. Safety of equipment and facilities	1	1.7	1	1.7	3	5.0	24	40.0	31	51.7	4.3833	3
19. Safety of others			2	3.3	3	5.0	19	31.7	36	60.0	4.4833	2
20. Safety of environment	1	1.7	6	10.0	10	16.7	16	26.7	27	45.0	4.0333	4
G. *Organisational behaviour and human performance* 21. Discipline			2	3.3	5	8.3	24	40.0	29	48.3	4.3333	2
22. Punctuality and time management			2	3.3	4	6.7	20	33.3	34	56.7	4.4333	1
23. Readiness to learn more	1	1.7	2	3.3	5	8.3	20	33.3	32	53.3	4.3333	3
24. Ability to execute a task with minimal supervision	1	1.7	6	10.2	6	10.2	25	42.4	21	35.6	4.0000	4
H. *Job (Co-operative Training) relation to course of study* 25. Relation of Co-operative training to course of study	2	3.3	7	11.7	5	8.3	29	48.3	17	28.3	3.8667	1

Table 7.39 (cont'd)

FACTOR / ELEMENT	LEVEL OF SATISFACTION										MEAN	ORDER WITHIN FACTOR
	VERY DISSATISFIED		DISSATISFIED		UNSURE		SATISFIED		VERY SATISFIED			
	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%	FREQ.	%		
I. ***Awareness of job requirements*** 26. Job duties and responsibilities	1	1.7	3	5.0	10	16.7	26	43.3	20	33.3	4.0167	1
27. Skills and knowledge required for the job			4	6.7	14	23.3	27	45.0	15	25.0	3.8833	2
J. ***Physical well-being*** 28. Physical fitness	1	1.7	9	15.0	10	16.7	28	46.7	12	20.0	3.6833	1
K. ***Links between the College and industry*** 29. Co-operative Training Programme	1	1.7	2	3.3	4	6.7	25	41.7	28	46.7	4.2833	1
30. Student field visits to industry	5	8.3	6	10.0	5	8.3	23	38.3	21	35.0	3.8167	2
31. Lecturing and training conducted by industry representatives	5	8.3	12	20.0	9	15.0	21	35.0	13	21.7	3.4167	4
32. Graduates' employment in industry	1	1.7	3	5.0	19	31.7	24	40.0	13	21.7	3.7500	3
33. Involvement of industry in curricular and training facilities development	4	6.7	5	8.3	26	43.3	15	25.0	10	16.7	3.3667	5
L. ***Selection of course of study*** 34. Vocational/career guidance and counselling services	4	6.7	13	21.7	9	15.0	17	28.3	17	28.3	3.5000	2
35. Procedures for selection of specialisation	8	13.3	14	23.3	6	10.0	16	26.7	16	26.7	3.3000	3
36. Selected area of specialisation			3	5.0	1	1.7	21	35.0	35	58.3	4.4667	1

7.2.3.3 Level of Satisfaction: factors

The JS group's level of satisfaction with the twelve factors is presented in Table 7.40 below.

The table lists the mean levels of satisfaction of the group with each of the factors. It also shows the order of each factor according to its mean level of satisfaction.

The table indicates that the factor concerned with *Safety awareness and practice* ranks first, with a mean of 4.3583, while the *Computer literacy* factor ranks the last among factors, with a mean of 3.6278. The table also shows that the mean of all factors was 3.9232.

Table 7.40

Means and Order of Factors for the Group's Level of Satisfaction (JS)

Factor	Mean	Order
Hands-on skills	3.8222	6
Analytical skills	3.7833	8
Proficiency in English	4.0667	3
Computer literacy	3.6278	12
Technology awareness	3.7972	7
Safety awareness and practice	4.3583	1
Organisational behaviour and human performance	4.2792	2
Job relation to course of study	3.8667	5
Awareness of job requirements	3.9500	4
Physical well-being	3.6833	11
Links between the College and industry	3.7267	10
Selection of course of study	3.7556	9
All Factors	**3.9232**	

7.3 <u>Level of Satisfaction of Individual Groups</u>

In this section of the chapter, a One-Sample T-Test at 5% level of significance is used for each group individually (EJG, WS and JS) to determine whether the mean obtained is equal to the satisfaction level (satisfied = 4) or not. If the mean is proven to be below this value, the same test is applied once again at another given value (dissatisfied = 2) to determine to what extent the level of satisfaction of each individual group is below the satisfaction level.

7.3.1 <u>Testing of Level of Satisfaction: Employed JIC Graduates (EJG)</u>

Tables 7.41 and 7.42 show the results of the One-Sample T-Test, when applied at two different values (satisfied = 4 and dissatisfied = 2) to test the level of satisfaction of the first group (EJG). The following findings have been generated:

1. The group's mean level of satisfaction with the following two elements is equal to a value above 4 (satisfied) on the five-point scale:

    a. Punctuality and time management *(Organisational behaviour and human performance)*.

    b. Selected area of specialisation *(Selection of course of study)*.

2. The group's mean level of satisfaction with the following two factors is equal to the value of 4 (satisfied) on the five-point scale:

    a. Proficiency in English

    b. Organisational behaviour and human performance

3. The group's mean level of satisfaction with the following ten elements is equal to the value of 4 (satisfied) on the five-point scale:

    a. Mathematics *(Analytical skills)*

    b. Comprehension skills *(Proficiency in English)*

c. Reading skills *(Proficiency in English)*

d. Writing skills *(Proficiency in English)*

e. Safety of individual *(Safety awareness and practice)*

f. Safety of equipment and facilities *(Safety awareness and practice)*

g. Safety of others *(Safety awareness and practice)*

h. Discipline *(Organisational behaviour and human performance)*

i. Readiness to learn more *(Organisational behaviour and human performance)*

j. Co-operative Training Programme *(Links between the College and industry)*

4. The group's mean level of satisfaction with the remaining ten factors and twenty four elements is equal to a value below 4 (satisfied) and above 2 (dissatisfied) on the five-point scale.

Table 7.41

One-Sample T-Test for the First Group (EJG)

(Satisfied = 4)

FACTOR / ELEMENT	T-VALUE	DEGREES OF FREEDOM (D.F.)	LEVEL OF SIGNIFICANCE (S.G.)	MEAN DIFFERENCE
A. *Hands-on skills*	-6.035	295	.000	-.2979
1. Basic manual skills	-2.983	289	.003	-.17
2. Technician skills	-2.767	291	.006	-.28
3. Professional skills	-8.342	288	.000	-.57
B. *Analytical skills*	-3.937	295	.000	-.1768
4. Sciences	-3.420	291	.001	-.1918
5. Mathematics	-1.513	293	.131	-9.5238E-02
6. Related speciality subjects	-4.074	284	.000	-.2596
C. *Proficiency in English*	-1.963	295	.051	-.1028
7. Communication skills	-3.678	286	.000	-.2474
8. Comprehension skills	-1.134	295	.258	-6.4189E-02
9. Reading skills	-.403	294	.687	-2.3729E-02
10. Writing skills	-1.374	294	.170	-8.1356E-02
D. *Computer literacy*	-19.998	295	.000	-1.2703
11. Use of computer for data processing	-16.204	287	.000	-1.1979
12. Use of computer for word processing	-16.353	293	.000	-1.1565

Table 7.41 (cont'd)

FACTOR / ELEMENT	T-VALUE	DEGREES OF FREEDOM (D.F.)	LEVEL OF SIGNIFICANCE (S.G.)	MEAN DIFFERENCE
13. Use of computer software related to profession	-20.360	290	.000	-1.4570
E. *Technology awareness*	-10.090	295	.000	-.5507
14. Similarity between technology used for training and that generally adopted by industry	-8.445	288	.000	-.5813
15.Awareness of importance of subject technology	-8.289	294	.000	-.5017
16.Familiarity with other available technologies related to area of specialisation	-9.245	290	.000	-.6877
F. *Safety Awareness and practice*	-2.451	295	.015	-.1188
17. Safety of individual	-.644	294	.520	-3.7288E-02
18. Safety of equipment and facilities	-.723	294	.470	-3.7288E-02
19. Safety of others	-1.191	295	.235	-6.4189E-02
20. Safety of environment	-4.809	294	.000	-6.4189E-02
G. *Organisational behaviour and human performance*	.476	295	.634	1.999E-02
21. Discipline	.382	292	.703	2.048E-02
22. Punctuality and time management	4.645	294	.000	.2237
23. Readiness to learn more	.254	294	.800	1.356E-02
24. Ability to execute a task with minimal supervision	-3.176	293	.002	-.1803
H. *Job relation to course of study*	-8.643	294	.000	-.6441
25. Job relation to course of study	-8.643	294	.000	-.6441
I. *Awareness of job requirements*	-10.762	295	.000	-6.774
26. Job duties and responsibilities	-10.332	294	.000	-.6983
27. Skills and knowledge required for the job	-9.714	287	.000	-.6528
J. *Physical well-being*	-5.335	295	.000	-.3750
28. Physical fitness	-5.335	295	.000	-.3750
K. *Links between the College and industry*	-14.715	295	.000	-.7361
29. Co-operative Training Programme	-1.284	294	.200	-8.1356E-02
30. Student field visits to industry	-10.294	293	.000	-.8231
31. Lecturing and training conducted by industry representatives	-15.934	292	.000	-1.2867
32. Graduates' employment in industry	-5455	295	.000	-.4965

Table 7.41 (cont'd)

FACTOR / ELEMENT	T-VALUE	DEGREES OF FREEDOM (D.F.)	LEVEL OF SIGNIFICANCE (S.G.)	MEAN DIFFERENCE
33. Involvement of industry in curricular and training facilities development	-16.327	294	.000	-1.1220
L. ***Selection of course of study***	-10.123	294	.000	-.5497
34. Vocational/career guidance and counselling services	-12.158	293	.000	-.8878
35. Procedures for selection of specialisation	-12.708	292	.000	-.9898
36. Your selected area of specialisation	3.859	294	.000	.2203

Table 7.42

One-Sample T-Test for the First Group (EJG)

(Dissatisfied = 2)

FACTOR / ELEMENT	T-VALUE	DEGREES OF FREEDOM (D.F.)	LEVEL OF SIGNIFICANCE (S.G.)	MEAN DIFFERENCE
A. ***Hands-on skills***	34.487	295	.000	1.7021
1. Basic manual skills	33.060	289	.003	1.83
2. Technician skills	31.620	291	.006	1.84
3. Professional skills	20.703	288	.000	1.43
B. ***Analytical skills***	40.601	295	.000	1.8232
4. Sciences	32.242	291	.000	1.8082
5. Mathematics	30.259	293	.000	1.9048
6. Related speciality subjects	27.306	284	.000	1.7404
C. ***Proficiency in English***	36.240	295	.000	1.8972
7. Communication skills	26.054	286	.000	1.7526
8. Comprehension skills	34.199	295	.000	1.9358
9. Reading skills	33.556	294	.000	1.9763
10. Writing skills	32.405	294	.000	1.9186
D. ***Computer literacy***	11.488	295	.000	.7297
11. Use of computer for data processing	10.850	287	.000	.8021
12. Use of computer for word processing	11.928	293	.000	.8435
13. Use of computer software related to profession	7.587	290	.000	.5430

Table 7.42 (cont'd)

FACTOR / ELEMENT	T-VALUE	DEGREES OF FREEDOM (D.F.)	LEVEL OF SIGNIFICANCE (S.G.)	MEAN DIFFERENCE
E. *Technology awareness*	26.557	295	.000	1.4493
14. Similarity between technology used for training and that generally adopted by industry	20.611	288	.000	1.4187
15. Awareness of importance of subject technology	24.754	294	.000	1.4983
16. Familiarity with other available technologies related to area of specialisation	23.364	290	.000	1.4330
F. *Safety Awareness and practice*	38.808	295	.000	1.8812
17. Safety of individual	33.908	294	.000	1.9627
18. Safety of equipment and facilities	38.065	294	.000	1.9627
19. Safety of others	35.908	295	.000	1.9358
20. Safety of environment	26.368	294	.000	1.5653
G. *Organisational behaviour and Human performance*	48.148	295	.000	2.0200
21. Discipline	37.689	292	.000	2.0205
22. Punctuality and time management	46.165	294	.000	2.2237
23. Readiness to learn more	37.659	294	.000	2.0136
24. Ability to execute a task with minimal supervision	32.065	293	.000	1.8197
H. *Job relation to course of study*	18.196	294	.000	1.3559
25. Job relation to course of study	18.196	294	.000	1.3559
I. *Awareness of job requirements*	21.013	295	.000	1.3226
26. Job duties and responsibilities	19.260	294	.000	1.3017
27. Skills and knowledge required for the job	20.048	287	.000	1.3472
J. *Physical well-being*	23.120	295	.000	1.6250
28. Physical fitness	23.120	295	.000	1.6250
K. *Links between the College and industry*	25.264	295	.000	1.2639
29. Co-operative Training Programme	30.287	294	.000	1.9186
30. Student field visits to industry	14.718	293	.000	1.1769
31. Lecturing and training conducted by industry representatives	8.833	292	.000	.7133
32. Graduates' employment in industry	24.448	295	.000	1.6351

Table 7.42 (cont'd)

FACTOR / ELEMENT	T-VALUE	DEGREES OF FREEDOM (D.F.)	LEVEL OF SIGNIFICANCE (S.G.)	MEAN DIFFERENCE
33. Involvement of industry in curricular and training facilities development	12.776	294	.000	.8780
L. ***Selection of course of study***	26.706	294	.000	1.4503
34. Vocational/career guidance and counselling services	15.232	293	.000	1.1122
35. Procedures for selection of specialisation	12.971	292	.000	1.0102
36. Your selected area of specialisation	38.892	294	.000	2.2203

7.3.2 Testing of Level of Satisfaction: Work Supervisors (WS)

Tables 7.43 and 7.44 show the results of the One-Sample T-Test when applied at two different values (satisfied = 4 and dissatisfied = 2) to test the level of satisfaction of the second group (WS). The following findings have been generated:

1. The group's mean level of satisfaction with the following two factors is equal to a value above 4 (satisfied) on the five-point scale:

   a. Organisational behaviour and human performance

   b. Physical well-being

2. The group's mean level of satisfaction with the following five elements is equal to a value above 4 (satisfied) on the five-point scale:

   a. Discipline *(Organisational behaviour and human performance)*

   b. Punctuality and time management *(Organisational behaviour and human performance)*

   c. Readiness to learn more *(Organisational behaviour and human performance)*

d. Physical fitness *(Physical well-being)*

e. Graduates' employment in industry *(Links between the College and industry)*

3. The group's mean level of satisfaction with the following two factors is equal to a value of 4 (satisfied) on the five-point scale:

    a. Proficiency in English

    b. Safety awareness and practice

4. The group's mean level of satisfaction with the following twelve elements is equal to a value of 4 (satisfied) on the five-point scale:

    a. Basic manual skills *(Hands-on skills)*

    b. Technician skills *(Hands-on skills)*

    c. Communication skills *(Proficiency in English)*

    d. Comprehension skills *(Proficiency in English)*

    e. Reading skills *(Proficiency in English)*

    f. Writing skills *(Proficiency in English)*

    g. Safety of individual *(Safety awareness and practice)*

    h. Safety of equipment and facilities *(Safety awareness and practice)*

    i. Safety of others *(Safety awareness and practice)*

    j. Safety of environment *(Safety awareness and practice)*

    k. Ability to execute a task with minimal supervision *(Organisational behaviour and human performance)*

    l. Co-operative Training Programme *(Links between the College and industry)*

5. The group's mean level of satisfaction with the remaining eight factors and seventeen elements is equal to a value below 4 (satisfied) and above 2 (dissatisfied) on the five-point scale.

Table 7.43

One-Sample T-Test for the Second Group (WS)

(Satisfied = 4)

FACTOR / ELEMENT	T-VALUE	DEGREES OF FREEDOM (D.F.)	LEVEL OF SIGNIFICANCE (S.G.)	MEAN DIFFERENCE
A. *Hands-on skills*	-2.278	104	.025	-.1302
1. Basic manual skills	-.558	104	.558	-3.81E-02
2. Technician skills	-1.439	104	.153	-.10
3. Professional skills	-3.196	104	.002	-.25
B. *Analytical skills*	-6.015	104	.000	-.3667
4. Sciences	-5.532	103	.000	-.4327
5. Mathematics	-4.563	104	.000	-.3429
6. Related speciality subjects	-4.406	104	.000	-.3238
C. *Proficiency in English*	-.684	104	.495	-3.8095E-02
7. Communication skills	-1.090	104	.278	-7.6190E-2
8. Comprehension skills	.000	104	1.000	.0000
9. Reading skills	1.000	104	.320	6.667E-02
10. Writing skills	-1.681	104	.096	-.1429
D. *Computer literacy*	-7.936	104	.000	-.6222
11. Use of computer for data processing	-6.576	104	.000	-.6190
12. Use of computer for word processing	-6.984	104	.000	-.5810
13. Use of computer software related to profession	-6.853	104	.000	.-.6667
E. *Technology awareness*	-7.456	104	.000	-.4778
14. Similarity between technology used for training and that generally adopted by industry	-6.387	104	.000	-.5333
15. Awareness of importance of subject technology	-5.589	103	.000	-.4231
16. Familiarity with other available technologies related to area of specialisation	-6.026	104	.000	-.4762
F. *Safety Awareness and practice*	.032	104	.974	2.381E-03
17. Safety of individual	.517	104	.606	4.762E-02
18. Safety of equipment and facilities	.376	104	.707	2.857E-02
19. Safety of others	1.033	104	.304	7.619E-02
20. Safety of environment	-1.621	104	.108	-.1429

Table 7.43 (cont'd)

FACTOR / ELEMENT	T-VALUE	DEGREES OF FREEDOM (D.F.)	LEVEL OF SIGNIFICANCE (S.G.)	MEAN DIFFERENCE
G. ***Organisational behaviour and human performance***	4.743	104	.000	.2714
21. Discipline	5.334	103	.000	.4231
22. Punctuality and time management	3.148	104	.002	.2476
23. Readiness to learn more	4.218	104	.000	.3143
24. Ability to execute a task with minimal supervision	1.593	104	.114	9.524E-02
H. ***Job relation to course of study***	-5.791	104	.000	-.4571
25. Job relation to course of study	-5.791	104	.000	-.4571
I. ***Awareness of job requirements***	-6.138	104	.000	-.3857
26. Job duties and responsibilities	-6.628	104	.000	-.4667
27. Skills and knowledge required for the job	-4.324	104	.000	-.3048
J. ***Physical well-being***	2.098	104	.038	.1714
28. Physical fitness	2.098	104	.038	.1714
K. ***Links between the College and industry***	-6.311	104	.000	-.3648
29. Co-operative Training Programme	1.198	104	.234	9.524E-02
30. Student field visits to industry	-2.956	102	.004	-.3107
31. Your firm's participation in part-time lecturing and training at JIC	-8.548	104	.000	-.7905
32. Graduates' employment in industry	2.591	104	.011	.2095
33. Your firm's involvement in development of JIC curricula and training facilities	-10.345	104	.000	-1.0190
L. ***Selection of course of study*** 34. Satisfaction with graduate's selection of specialisation	-2.450	104	.016	-.1810

Table 7.44

One-Sample T-Test for the Second Group (WS)

(Dissatisfied = 2)

FACTOR / ELEMENT	T-VALUE	DEGREES OF FREEDOM (D.F.)	LEVEL OF SIGNIFICANCE (S.G.)	MEAN DIFFERENCE
A. *Hands-on skills*	32.718	104	.000	1.8698
1. Basic manual skills	30.278	104	.000	1.96
2. Technician skills	26.039	104	.000	1.90
3. Professional skills	22.616	104	.000	1.75
B. *Analytical skills*	26.794	104	.000	1.6333
4. Sciences	20.039	103	.000	1.5673
5. Mathematics	22.054	104	.000	1.6571
6. Related speciality subjects	22.806	104	.000	1.6762
C *Proficiency in English*	35.239	104	.000	1.9619
7. Communication skills	27.513	104	.000	1.9238
8. Comprehension skills	32.249	104	.000	2.0000
9. Reading skills	31.000	104	.000	2.0667
10. Writing skills	21.854	104	.000	1.8571
D. *Computer literacy*	17.573	104	.000	1.3778
11. Use of computer for data processing	14.670	104	.000	1.3810
12. Use of computer for word processing	17.059	104	.000	1.4190
13. Use of computer software related to profession	13.707	104	.000	31.333
E. *Technology awareness*	23..756	104	.000	1.5222
14. Similarity between technology used for training and that generally adopted by industry	17.565	104	.000	1.4667
15. Awareness of importance of subject technology	20.831	103	.000	1.5769
16. Familiarity with other available technologies related to area of specialisation	19.283	104	.000	1.5238
F. *Safety Awareness and practice*	27.199	104	.000	2.0024
17. Safety of individual	22.217	104	.000	2.0476
18. Safety of equipment and facilities	26.726	104	.000	2.0286
19. Safety of others	28.153	104	.000	2.0762
20. Safety of environment	21.067	104	.000	1.8571

Table 7.44 (cont'd)

FACTOR / ELEMENT	T-VALUE	DEGREES OF FREEDOM (D.F.)	LEVEL OF SIGNIFICANCE (S.G.)	MEAN DIFFERENCE
G. ***Organisational behaviour and human performance***	39.690	104	.000	2.2714
21. Discipline	30.551	103	.000	2.4231
22. Punctuality and time management	28.575	104	.000	2.2476
23. Readiness to learn more	31.059	104	.000	2.3143
24. Ability to execute a task with minimal supervision	35.039	104	.000	2.0952
H. ***Job relation to course of study***	19.543	104	.000	1.5429
25. Job relation to course of study	19.543	104	.000	1.5429
I. ***Awareness of job requirements***	25.687	104	.000	1.6143
26. Job duties and responsibilities	21.778	104	.000	1.5333
27. Skills and knowledge required for the job	24.052	104	.000	1.6952
J. ***Physical well-being***	26.574	104	.000	2.1714
28. Physical fitness	26.574	104	.000	2.1714
K. ***Links between the College and industry***	28.292	104	.000	1.6352
29. Co-operative Training Programme	26.349	104	.000	2.0952
30. Student field visits to industry	16.073	102	.000	1.6893
31. Firm's participation in part-time lecturing and training at JIC	13.079	104	.000	1.2095
32. Graduates' employment in industry	27.327	104	.000	2.2095
33. Your firm's involvement in development of JIC curricula and training facilities	9.958	104	.000	.9810
L. ***Selection of course of study*** 34. Satisfaction with graduate's selection of specialisation	24.630	104	.000	1.8190

7.3.3 Testing of level of satisfaction: JIC Students who have completed their Co-operative Training Programme (JS)

Tables 7.45 and 7.46 show the results of the One-Sample T-Test, when applied at two different values (satisfied = 4 and dissatisfied = 2) to test the level of satisfaction of the third group (JS). The following findings have been generated:

1. The group's mean level of satisfaction with the following two factors is equal to a value above 4 (satisfied) on the five-point scale:

   a. Safety awareness and practice

   b. Organisational behaviour and human performance

2. The group's mean level of satisfaction with the following nine elements is equal to a value above 4 (satisfied) on the five-point scale:

   a. Writing skills *(Proficiency in English)*

   b. Safety of individual *(Safety awareness and practice)*

   c. Safety of equipment and facilities *(Safety awareness and practice)*

   d. Safety of others *(Safety awareness and practice)*

   e. Discipline *(Organisational behaviour and human performance)*

   f. Punctuality and time management *(Organisational behaviour and human performance)*

   g. Readiness to learn more *(Organisational behaviour and human performance)*

   h. Selected area of specialisation *(Selection of course of study)*

3. The group's mean level of satisfaction with the following five factors is equal to a value of 4 (satisfied) on the five-point scale:

   a. Hands-on skills

   b. Analytical skills

   c. Proficiency in English

   d. Job (Co-operative Training) relation to course of study

   e. Awareness of job requirements

4. The group's mean level of satisfaction with the following seventeen elements is equal to a value of 4 (satisfied) on the five-point scale:

   a. Basic manual skills *(Hands-on skills)*

   b. Technician skills *(Hands-on skills)*

   c. Sciences *(Analytical skills)*

   d. Related speciality subjects *(Analytical skills)*

   e. Communication skills *(Proficiency in English)*

   f. Comprehension skills *(Proficiency in English)*

   g. Reading skills *(Proficiency in English)*

   h. Use of computer for data processing *(Computer literacy)*

   i. Use of computer for word processing *(Computer literacy)*

   j. Similarity between technology used for training and that generally adopted by industry *(Technology awareness)*

   k. Awareness of importance of subject technology *(Technology awareness)*

   l. Safety of environment *(Safety awareness and practice)*

   m. Ability to execute a task with minimal supervision *(Organisational behaviour and human performance)*

   n. Co-operative Training relation to course of study *(Job-Co-operative Training relation to course of study)*

   o. Job duties and responsibilities *(Awareness of job requirements)*

   p. Skills and knowledge required for the job *(Awareness of job requirements)*

   q. Student field visits to industry *(Links between the College and industry)*

5. The group's mean level of satisfaction with the remaining five factors and ten elements is equal to a value below 4 (satisfied) and above 2 (dissatisfied) on the five-point scale.

Table 7.45

One-Sample T-Test for the Third Group (JS)

(Satisfied = 4)

FACTOR / ELEMENT	T-VALUE	DEGREES OF FREEDOM (D.F.)	LEVEL OF SIGNIFICANCE (S.G.)	MEAN DIFFERENCE
A. *Hands-on skills*	-2.003	59	.050	-.1778
1. Basic manual skills	.465	59	.643	5.00E-02
2. Technician skills	.389	59	.698	3.33E-02
3. Professional skills	-4.330	58	.000	-.63
B. *Analytical skills*	-1.974	59	.053	-.2167
4. Sciences	-1.033	59	.306	-.1333
5 Mathematics	-3.188	59	.002	-.5167
6. Related speciality subjects	.000	59	1.000	.0000
C *Proficiency in English*	.735	59	.465	6.667E-02
7. Communication skills	-1.606	59	.114	-.2333
8. Comprehension skills	.671	59	.505	8.333E-02
9. Reading skills	1.626	59	.109	.1833
10. Writing skills	2.291	59	.026	.2333
D. *Computer literacy*	-3.435	59	.001	-.3722
11. Use of computer for data processing	-1.387	59	.171	-.2000
12. Use of computer for word processing	-1.158	59	.252	-.1333
13. Use of computer software related to profession	-5.205	59	.000	-.7833
E. *Technology awareness*	-2.262	59	.027	-.2028
14. Similarity between technology used for training and that generally adopted by industry	-1.293	59	.201	-.1500
15. Awareness of importance of subject technology	-1.062	57	.293	-.1034
16. Familiarity with other available technologies related to area of specialisation	-2.743	59	.008	-.3500
F. *Safety Awareness and practice*	4.100	59	.000	.3583
17. Safety of individual	6.626	59	.000	.5333
18. Safety of equipment and facilities	3.691	59	.000	.3833

Table 7.45 (cont'd)

FACTOR / ELEMENT	T-VALUE	DEGREES OF FREEDOM (D.F.)	LEVEL OF SIGNIFICANCE (S.G.)	MEAN DIFFERENCE
19. Safety of others	5.007	59	.000	.4833
20. Safety of environment	.237	59	.813	3.333E-02
G. *Organisational behaviour and human performance*	3.390	59	.001	.2792
21. Discipline	3.336	59	.001	.3333
22. Punctuality and time management	4.375	59	.000	.4333
23. Readiness to learn more	2.883	59	.005	.3333
24. Ability to execute a task with minimal supervision	.000	58	1.000	.0000
H. *Job (Co-operative Training) relation to course of study*	-.970	59	.336	-.1333
25. Co-operative Training relation to course of study	-.970	59	.336	-.1333
I. *Awareness of job requirements*	-.468	59	.641	-5.0000E-02
26. Job duties and responsibilities	.139	59	.890	1.667E-02
27. Skills and knowledge required for the job	-1.044	59	.301	-.1167
J. *Physical well-being*	-2.413	59	.019	-.3167
28. Physical fitness	-2.413	59	.019	-.3167
K. *Links between the College and industry*	-2.946	.59	.005	-.2733
29. Co-operative Training Programme	2.536	59	.014	.2833
30. Student field visits to industry	-1.131	59	.263	-.1833
31. Lecturing and training conducted by industry representatives	-3.569	59	.001	-.5833
32. Graduates' employment in industry	-2.120	59	.038	-.2500
33. Involvement of industry in curricular and training facilities development	-4.572	59	.000	-.6333
L. *Selection of course of study*	-2.100	59	.040	-.2444
34. Vocational/career guidance and counselling services	-2.990	59	.004	-.5000
35. Procedures for selection of specialisation	-3.793	59	.000	-.7000
36. Your selected area of specialisation	4.698	59	.000	.4667

Table 7.46

One-Sample T-Test for the Third Group (JS)

(Dissatisfied = 2)

FACTOR / ELEMENT	T-VALUE	DEGREES OF FREEDOM (D.F.)	LEVEL OF SIGNIFICANCE (S.G.)	MEAN DIFFERENCE
A. *Hands-on skills*	20.533	59	.000	1.8222
1. Basic manual skills	19.084	59	.000	2.05
2. Technician skills	23.756	59	.000	2.03
3. Professional skills	9.478	58	.000	1.37
B. *Analytical skills*	16.251	59	.000	1.7833
4. Sciences	14.467	59	.000	1.8667
5. Mathematics	9.152	59	.000	1.4833
6. Related speciality subjects	15.362	59	.000	2.0000
C *Proficiency in English*	22.791	59	.000	2.0667
7. Communication skills	12.159	59	.000	1.7667
8. Comprehension skills	16.778	59	.000	2.0833
9. Reading skills	19.368	59	.000	2.1833
10. Writing skills	21.924	59	.000	2.2333
D. *Computer literacy*	15.020	59	.000	1.6278
11. Use of computer for data processing	12.483	59	.000	1.8000
12. Use of computer for word processing	16.212	59	.000	1.8667
13. Use of computer software related to profession	8.084	59	.000	1.2167
E. *Technology awareness*	20.048	59	.000	1.7972
14. Similarity between technology used for training and that generally adopted by industry	15.946	59	.000	1.8500
15. Awareness of importance of subject technology	19.467	57	.000	1.8966
16. Familiarity with other available technologies related to area of specialisation	12.930	59	.000	1.6500
F. *Safety awareness and practice*	26.981	59	.000	2.3583
17. Safety of individual	31.475	59	.000	2.5333
18. Safety of equipment and facilities	22.948	59	.000	2.3833
19. Safety of others	25.727	59	.000	2.4833
20. Safety of environment	14.467	59	.000	2.0333

Table 7.46 (cont'd)

FACTOR / ELEMENT	T-VALUE	DEGREES OF FREEDOM (D.F.)	LEVEL OF SIGNIFICANCE (S.G.)	MEAN DIFFERENCE
G. ***Organisational behaviour and Human performance***	27.674	59	.000	2.2792
21. Discipline	23.355	59	.000	2.3333
22. Punctuality and time management	24.566	59	.000	2.4333
23. Readiness to learn more	20.179	59	.000	2.3333
24. Ability to execute a task with minimal supervision	15.104	58	.000	2.0000
H. ***Job (Co-operative Training) relation to course of study***	13.575	59	.000	1.8667
25. Co-operative Training relation to course of study	13.575	59	.000	1.8667
I. ***Awareness of job requirements***	18.265	59	.000	1.9500
26. Job duties and responsibilities	16.804	59	.000	2.0167
27. Skills and knowledge required for the job	16.858	59	.000	1.8833
J. ***Physical well-being***	12.825	59	.000	1.6833
28. Physical fitness	12.825	59	.000	1.6833
K. ***Links between the College and industry***	18.609	59	.000	1.7267
29. Co-operative Training Programme	20.438	59	.000	2.2833
30. Student field visits to industry	11.209	59	.000	1.8167
31. Lecturing and training conducted by industry representatives	8.667	59	.000	1.4167
32. Graduates' employment in industry	14.837	59	.000	1.7500
33. Involvement of industry in curricular and training facilities development	9.866	59	.000	1.3667
L. ***Selection of course of study***	15.081	59	.000	1.7556
34. Vocational/career guidance and counselling services	8.970	59	.000	1.50000
35. Procedures for selection of specialisation	7.043	59	.000	1.3000
36. Your selected area of specialisation	24.831	59	.000	2.4667

7.4 Testing of Hypotheses

In this section of the chapter, the results of the test on the twelve hypotheses will be presented. The One-Sample T-Test at 5% level of significance was used at a given value (satisfied=4) to determine whether the mean obtained was equal to the satisfaction level or not. The hypotheses were tested by the level of satisfaction of the three groups consolidated (the Stratum Sample).

Upon the completion of the T-Test, the Analysis of Variance Test (ANOVA) was conducted to test the differences between the means of the three groups. If there was a significant difference between the means of the three groups when testing elements and factors, then the Pair-Wise Comparison Test (Tukey HSD) was used to test the statistical significance of differences between the groups' means.

It is worth mentioning that only 34 common elements among the three groups were considered for the testing of the hypotheses.

Table 7.47 below shows the sample size considered for statistical testing. It shows the number of respondents in each group and their percentages of the total number.

Table 7.47

Frequency and Percentage of Each Group

Group	Frequency	Percentage
Employed JIC Graduates (EJG)	296	64.2
Work Supervisor (WS)	105	22.8
JIC Students (JS)	60	13.0
Total	**461**	**100.0**

7.4.1 Hands-on Skills

HO: Employed JIC graduates (EJG), work supervisors (WS) and JIC students (JS) are not satisfied with the hands-on skills offered by the course of study at JIC.

The result of the T-test, as shown in Table 7.90, indicates that the mean levels of satisfaction of the three groups with the elements within the factor are below a value of 4 (satisfied). Therefore, the mean level of satisfaction of the groups with the factor *Hands-on skills* is below the given value.

The Analysis of Variance Test (ANOVA), as shown in Table 7.48 below, demonstrates that there are no significant differences between the mean levels of satisfaction of the groups with the factor and its elements except for *Professional skills*, where the level of significance is 0.021.

Table 7.48

The Analysis of Variance Test (ANOVA) for Hands-on Skills

FACTOR/ ELEMENT	SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F-VALUE	SIGN. LEVEL
Hands-on skills	Between Groups	2.483	2	1.241	2.058	.129
	Within Groups	276.258	458	.603		
	Total	**278.741**	**460**			
Basic Manual skills	Between Groups	2.970	2	1.485	1.947	.144
	Within Groups	344.753	452	.763		
	Total	**347.723**	**454**			
Technician skills	Between Groups	1.922	2	.961	1.175	.310
	Within Groups	371.216	454	.818		
	Total	**373.138**	**456**			
Professional skills	Between Groups	9.227	2	4.614	3.902	.021
	Within Groups	532.009	450	1.182		
	Total	541.236	452			

With respect to the *Professional skills* element, Table 7.49 shows the mean level of satisfaction of Group No. 2 (WS) as the highest (3.75) and Group No. 3 (JS) as the lowest (3.37).

Table 7.49

Pair-Wise Comparison Test (Tukey) for Professional Skills

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC students (JS)	59	3.37	
JIC graduates (EJG)	289	3.43	3.43
Work supervisors (WS)	105		3.75
Sig.		.937	.084

7.4.2 Analytical Skills

HO: The three groups (EJG, WS and JS) are not satisfied with the analytical skills offered by the course of study at JIC.

The result of the T-Test, as shown in Table 7.90, indicates that the mean levels of satisfaction of the three groups with the elements within the factor are below a value of 4 (satisfied). Therefore, the mean level of satisfaction of the groups with the factor *Analytical skills* is below the given value.

The ANOVA test (Table 7.50) demonstrates that there are no significant differences between the mean levels of satisfaction of the groups with the factor and its elements except for the element *Mathematics* where the level of significance is 0.006.

Table 7.50

The Analysis of Variance Test (ANOVA) for Analytical Skills

FACTOR/ ELEMENT	SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F-VALUE	SIGN. LEVEL
Analytical Skills	Between Groups	2.799	2	1.400	2.472	.086
	Within Groups	259.286	458	.566		
	Total	**262.085**	**460**			
Sciences	Between Groups	5.223	2	2.611	3.020	.050
	Within Groups	391.722	453	.865		
	Total	**396.945**	**455**			
Mathematics	Between Groups	11.364	2	5.682	5.224	.006
	Within Groups	495.974	456	1.088		
	Total	**507.338**	**458**			
Related Speciality subjects	Between Groups	4.304	2	2.152	2.148	.118
	Within Groups	447.776	447	1.002		
	Total	**452.080**	**449**			

With respect to the *Mathematics* element, Table 7.51 below shows the mean level of satisfaction of Group No. 1 (EJG) as the highest (3.9048) and Group No. 3 (JS) as the lowest (3.4833).

Table 7.51

Pair-Wise Comparison Test (Tukey) for Mathematics

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC students (JS)	60	3.4833	
Work supervisors (WS)	105	3.6571	3.6571
JIC graduates (EJG)	294		3.9048
Sig.		.461	.209

7.4.3 Proficiency in English

HO: The three groups (EJG, WS and JS) are not satisfied with the proficiency in English offered by the course of study at JIC.

The result of the T-test, as shown in Table 7.90, indicates that the mean levels of satisfaction of the three groups with the elements within the factor are equal to a value of 4 (satisfied) except for the first element, *Communication skills*, where the mean is below the given value. Accordingly, the mean level of satisfaction of the groups with the factor, *Proficiency in English*, is equal to a value of 4.

The ANOVA test (Table 7.52) demonstrates that there are no significant differences between the mean levels of satisfaction of the groups with the factor and its elements, except for *Writing skills*, where the level of significance is 0.039.

Table 7.52

The Analysis of Variance Test (ANOVA) for Proficiency in English

FACTOR/ ELEMENT	SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F-VALUE	SIGN. LEVEL
Proficiency in English	Between Groups	1.538	2	.769	1.165	.313
	Within Groups	302.282	458	.660		
	Total	**303.820**	**460**			
Communication skills	Between Groups	2.306	2	1.153	1.036	.356
	Within Groups	499.559	449	1.113		
	Total	**501.865**	**451**			
Comprehension skills	Between Groups	1.211	2	.606	.737	.479
	Within Groups	376.364	458	.822		
	Total	**377.575**	**460**			
Reading skills	Between Groups	2.386	2	1.193	1.383	.252
	Within Groups	394.351	457	.863		
	Total	**396.737**	**459**			
Writing skills	Between Groups	6.003	2	3.002	3.269	.039
	Within Groups	419.638	457	.918		
	Total	**425.641**	**459**			

With respect to the *Writing skills* element, Table 7.53 below shows the mean level of satisfaction of Group No. 3 (JS) as the highest (4.2333) and Group No. 2 (WS) as the lowest (3.8571).

Table 7.53

Pair-Wise Comparison Test (Tukey) for Writing Skills

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
Work supervisors (WS)	105	3.8571	
JIC graduates (EJG)	295	3.9186	3.9186
JIC students (JS)	60		4.2333
Sig.		.891	.051

7.4.4 Computer Literacy

HO: The three groups (EJG, WS and JS) are not satisfied with the computer literacy offered by the course of study at JIC.

The result of the T-test, as shown in Table 7.90 indicates that the mean levels of satisfaction of the three groups with the elements within the factor are below a value of 4 (satisfied). Therefore, the mean level of satisfaction of the groups with the factor *Computer literacy* is below the given value.

The ANOVA test (Table 7.54) demonstrates that there are significant differences between the mean levels of satisfaction of the groups with the factor and its elements.

Table 7.54

The Analysis of Variance Test (ANOVA) for Computer Literacy

FACTOR/ ELEMENT	SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F-VALUE	SIGN. LEVEL
Computer literacy	Between Groups	60.238	2	30.119	29.921	.000
	Within Groups	461.025	458	1.007		
	Total	**521.262**	**460**			
Use of computer for data processing	Between Groups	62.798	2	31.399	22.713	.000
	Within Groups	622.081	450	1.382		
	Total	**684.879**	**452**			
Use of computer for word processing	Between Groups	65.255	2	32.628	26.890	.000
	Within Groups	553.298	456	1.213		
	Total	**618.553**	**458**			
Use of computer software related to profession	Between Groups	59.426	2	29.713	21.860	.000
	Within Groups	615.730	453	1.359		
	Total	**675.156**	**455**			

For the *Computer literacy* factor, Table 7.55 below shows the mean level of satisfaction of Group No. 3 (JS) as the highest (3.6278) and Group No. 1 (EJG) as the lowest (2.7297).

Table 7.55

Pair-Wise Comparison Test (Tukey) for Computer Literacy

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	296	2.7297	
Work supervisors (WS)	105		3.3778
JIC students (JS)	60		3.6278
Sig.		1.000	.178

With respect to the *Use of computer for data processing* element, Table 7.56 shows the mean level of satisfaction of Group No. 3 (JS) as the highest (3.8000) and Group No. 1 (EJG) as the lowest (2.8021).

Table 7.56

Pair-Wise Comparison Test (Tukey)

for Use of Computer for Data Processing

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05		
		1	2	3
JIC graduates (EJG)	288	2.8021		
Work supervisors (WS)	105		3.3810	
JIC students	60			3.8000
Sig.		1.000	1.000	1.000

For the *Use of computer for word processing* element, Table 7.57 below shows the mean level of satisfaction of Group No. 3 (JS) as the highest (3.8667) and Group No. 1 (EJG) as the lowest (2.8435).

Table 7.57

Pair-Wise Comparison Test (Tukey)

for Use of Computer for Word Processing

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05		
		1	2	3
JIC graduates (EJG)	294	2.8435		
Work supervisors (WS)	105		3.4190	
JIC students (JS)	60			3.8667
Sig.		1.000	1.000	1.000

Concerning the element the *Use of computer software related to profession,* Table 7.58 shows the mean level of satisfaction of Group No. 2 (WS) as the highest (3.3333) and Group No. 1 (EJG) as the lowest (2.5430).

Table 7.58

Pair-Wise Comparison Test (Tukey)

for Use of Computer Software related to Profession

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	291	2.5430	
JIC students (JS)	60		3.2167
Work supervisors (WS)	105		3.3333
Sig.		1.000	.756

7.4.5 Technology Awareness

HO: The Three groups (EJG, WS and JS) are not satisfied with the technology awareness offered by the course of study at JIC.

The result of the T-test, as shown in Table 7.90, indicates that the mean levels of satisfaction of the three groups with the elements within the factor are below a value of 4 (satisfied). Therefore, the mean level of satisfaction of the groups with the factor *Technology awareness* is below the given value.

The ANOVA test (Table 7.59) demonstrates that there are significant differences between the mean levels of satisfaction of the groups. They are different with respect to the factor and the first two elements, but similar with respect to the third element, *Familiarity with other available technologies related to area of specialisation (*sig. Level = 0.269).

Table 7.59

The Analysis of Variance Test (ANOVA) for Technology Awareness

FACTOR/ ELEMENT	SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F-VALUE	SIGN. LEVEL
Technology awareness	Between Groups	6.055	2	3.027	4.159	.016
	Within Groups	333.360	458	.728		
	Total	**339.414**	**460**			
Similarity between technology used for training and that generally adopted by industry	Between Groups	9.298	2	4.649	4.047	.018
	Within Groups	518.122	451	1.149		
	Total	**527.421**	**453**			
Awareness of importance of subject technology	Between Groups	7.701	2	3.851	4.259	.015
	Within Groups	410.513	454	.904		
	Total	**418.214**	**456**			
Familiarity with other available technologies related to area of specialisation	Between Groups	2.576	2	1.288	1.316	.269
	Within Groups	443.284	453	.979		
	Total	**445.860**	**455**			

For the *Technology awareness* factor, Table 7.60 below shows the mean level of satisfaction of Group No. 3 (JS) as the highest (3.7972) and Group No. 1 (EJG) as the lowest (3.4493).

Table 7.60

Pair-Wise Comparison Test (Tukey) for Technology Awareness

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	296	3.4493	
Work supervisors (WS)	105	3.5222	3.5222
JIC students (JS)	60		3.7972
Sig.		.815	.056

With respect to the element *Similarity between technology used for training and that generally adopted by industry*, Table 7.61 shows the mean level of satisfaction of Group No. 3 (JS) as the highest (3.8500) and Group No. 1 (EJG) as the lowest (3.4187).

Table 7.61

Pair-Wise Comparison Test (Tukey) for Similarity Between Technology Used for Training and that Generally Adopted by Industry

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	289	3.4187	
Work supervisors (WS)	105	3.4667	
JIC students (JS)	60		3.8500
Sig.		.946	1.000

Concerning the element *Awareness of importance of subject technology*, Table 7.62 below shows the mean level of satisfaction of Group No. 3 (JS) as the highest (3.8966) and Group No. 1 (EJG) as the lowest (3.4983).

Table 7.62

Pair-Wise Comparison Test (Tukey) for Awareness of Importance of Subject Technology

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates	295	3.4983	
Work supervisors	104	3.5769	
JIC students	58		3.8966
Sig.		.830	1.000

7.4.6 Safety Awareness and Practice

HO: The three groups (EJG, WS and JS) are not satisfied with the safety awareness and practice offered by the course of study at JIC.

The result of the T-test, as shown in Table 7.90, indicates that the mean levels of satisfaction of the three groups with the elements within the factor are equal to a value of 4 (satisfied) except for the element *Safety of environment* where the mean is below the given value.

Accordingly, the mean level of satisfaction of the groups with the factor *Safety awareness and practice* is equal to the above-mentioned value.

The ANOVA test (Table 7.63) demonstrates that there are significant differences between the mean levels of satisfaction of the groups. They are different with respect to the factor and the first three elements, while they are similar in connection with the last element, *Safety of environment* (sig. level = 0.050).

Table 7.63

The Analysis of Variance Test (ANOVA) for Safety Awareness and Practice

FACTOR/ ELEMENT	SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F-VALUE	SIGN. LEVEL
Safety awareness and practice	Between Groups	11.492	2	5.746	9.031	.000
	Within Groups	291.416	458	.636		
	Total	**302.908**	**460**			
Safety of individual	Between Groups	16.245	2	8.123	9.137	.000
	Within Groups	406.285	457	.889		
	Total	**422.530**	**459**			
Safety of equipment and facilities	Between Groups	8.823	2	4.412	6.078	.002
	Within Groups	331.687	457	.726		
	Total	**340.511**	**459**			
Safety of others	Between Groups	15.143	2	7.571	10.018	.000
	Within Groups	346.154	458	.756		
	Total	**361.297**	**460**			
Safety of environment	Between Groups	6.768	2	3.384	3.022	.050
	Within Groups	511.719	457	1.120		
	Total	**518.487**	**459**			

For the *Safety awareness and practice* factor, Table 7.64 shows the mean level of satisfaction of Group No. 3 (JS) as the highest (4.3583) and Group No. 1 (EJG) as the lowest (3.8812).

Table 7.64

Pair-Wise Comparison Test

(Tukey) for Safety Awareness and Practice

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	296	3.8812	
Work supervisors (WS)	105	4.0024	
JIC students (JS)	60		4.3583
Sig.		.525	1.000

With regard to the *Safety of individual* element, Table 7.65 below shows the mean level of satisfaction of Group No. 3 (JS) as the highest (4.5333) and Group No. 1 (EJG) as the lowest (3.9627).

Table 7.65

Pair-Wise Comparison Test (Tukey) for Safety of Individual

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	295	3.9627	
Work supervisors (WS)	105	4.0476	
JIC students (JS)	60		4.5333
Sig.		.797	1.000

Concerning the element *Safety of equipment and facilities*, Table 7.66 below shows the mean level of satisfaction of Group No. 3 (JS) as the highest (4.3833) and Group No. 1 as the lowest (3.9627).

Table 7.66

Pair-Wise Comparison Test (Tukey)

for Safety of Equipment and Facilities

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	295	3.9627	
Work supervisors (WS)	105	4.0286	
JIC students (JS)	60		4.3833
Sig.		.846	1.000

With respect to *Safety of others*, Table 7.67 below shows the mean level of satisfaction of Group No. 3 (JS) as the highest (4.4833) and Group No. 1 (EJG) as the lowest (3.9358).

Table 7.67

Pair-Wise Comparison Test (Tukey) for Safety of Others

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	296	3.9358	
Work supervisors (WS)	105	4.0762	
JIC students (JS)	60		4.4833
Sig.		.483	1.000

7.4.7 Organisational Behaviour and Human Performance

HO: The three groups (EJG, WS and JS) are not satisfied with organisational behaviour and human performance offered by the course of study at JIC.

The result of the T-test, as shown in Table 7.90, indicates that the mean levels of satisfaction of the three groups with the elements within the factor are equal to a value above 4 (satisfied) except for the element *Ability to execute a task with minimal supervision*, where the mean level of satisfaction is below the above-mentioned value. Therefore, the mean level of satisfaction of the groups with the factor *Organisational behaviour and human performance* is equal to a value above 4 (satisfied).

The ANOVA test (Table 7.68) demonstrates that there are significant differences between the mean levels of satisfaction of the groups with the factor as well as three of its elements. It also shows that there are no significant differences between the means only with regard to the *Punctuality and time management* element where the level of significance is 0.192.

Table 7.68

The Analysis of Variance Test (ANOVA)

for Organisational Behaviour and Human Performance

FACTOR/ ELEMENT	SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F-VALUE	SIGN. LEVEL
Organisational behaviour and human performance	Between Groups	6.851	2	3.426	7.349	.001
	Within Groups	213.470	458	.466		
	Total	**220.321**	**460**			
Discipline	Between Groups	14.683	2	7.341	9.561	.000
	Within Groups	348.595	454	.768		
	Total	363.278	456			
Punctuality and time management	Between Groups	2.201	2	1.101	1.657	.192
	Within Groups	303.529	457	.664		
	Total	**305.730**	**459**			
Readiness to learn more	Between Groups	10.029	2	5.015	6.439	.002
	Within Groups	355.908	457	.779		
	Total	**365.937**	**459**			
Ability to execute a task with minimal supervision	Between Groups	6.470	2	3.235	3.909	.021
	Within Groups	376.493	455	.827		
	Total	**382.963**	**457**			

With regard to the factor *Organisational behaviour and human performance*, Table 7.69 below shows the mean level of satisfaction of Group No. 3 (JS) as the highest (4.2792) and Group No. 1 (EJG) as the lowest (4.0200).

Table 7.69

Pair-Wise Comparison Test (Tukey)

for Organisational Behaviour and Human Performance

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	296	4.0200	
Work supervisors (WS)	105		4.2714
JIC students (JS)	60		4.2792
Sig.		1.000	.996

For the *Discipline* element, Table 7.70 below shows the mean level of satisfaction of Group No. 2 (WS) as the highest (4.4231) and Group No. 1 (EJG) as the lowest (4.0205).

Table 7.70

Pair-Wise Comparison Test (Tukey) for Discipline

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	293	4.0205	
JIC students (JS)	60		4.3333
Work supervisors (WS)	104		4.4231
Sig.		1.000	.747

In terms of the element *Readiness to learn more*, Table 7.71 below shows the mean level of satisfaction of Group No. 3 (JS) as the highest (4.3333) and Group No. 1 (EJG) as the lowest (4.0136).

Table 7.71

Pair-Wise Comparison Test (Tukey) for Readiness to Learn More

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	295	4.0136	
Work supervisors (WS)	105		4.3143
JIC students (JS)	60		4.3333
Sig.		1.000	.987

For the element *Ability to execute a task with minimal supervision*, it is found that the mean level of satisfaction of Group No.2 (WS) is the highest (4.0952), while Group No. 1 (EJG) is the lowest (3.8197) although the Tukey test in Table 7.72 does not indicate that.

Table 7.72

Pair-Wise Comparison Test (Tukey)

for Ability to Execute a Task with Minimal Supervision

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05
		1
JIC graduates (EJG)	295	3.8197
JIC students (JS)	59	4.0000
Work supervisors (WS)	105	4.0952
Sig.		.081

7.4.8 Job Relation to Course of Study

HO: The three groups (EJG, WS and JS) are not satisfied with the relation between the job and the course of study offered at JIC.

The result of the T-test, as shown in Table 7.90, indicates that the mean level of satisfaction of the three groups with the element is below a value of 4 (satisfied). Therefore, the mean level of satisfaction of the groups with the factor *Job relation to course of study* is also below the given value as there is only one element within this factor.

The ANOVA test (Table 7.73) demonstrates that there are significant differences between the mean levels of satisfaction of the groups with the factor and its element.

Table 7.73

The Analysis of Variance Test (ANOVA) for Job Relation to Course of Study

FACTOR/ ELEMENT	SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F-VALUE	SIGN. LEVEL
Job relation to course of study	Between Groups	13.826	2	6.913	5.123	.006
	Within Groups	616.618	457	1.349		
	Total	**630.443**	**459**			

As for the factor and its element, Table 7.74 below shows the mean level of satisfaction of Group No. 3 (JS) as the highest (3.8667) and Group No. 1 (EJG) as the lowest (3.3559)

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Table 7.74

Pair-Wise Comparison Test (Tukey)

for Job Relation to Course of Study

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	295	3.3559	
Work supervisors (WS)	105	3.5429	3.5429
JIC students (JS)	60		3.8667
Sig.		.486	.116

7.4.9 Awareness of Job Requirements

HO: The three groups (EJG, WS and JS) are not satisfied with the awareness of job requirements offered by the course of study at JIC.

The result of the T-test, as shown in Table 7.90, indicates that the mean levels of satisfaction of the three groups with the elements within the factor are below a value of 4 (satisfied). Therefore, the mean level of satisfaction of the groups with the factor *Awareness of job requirements* is below the given value.

The ANOVA test (Table 7.75) demonstrates that there are significant differences between the mean levels of satisfaction of the groups with the factor and its two elements.

Table 7.75

The Analysis of Variance Test

(ANOVA) for Awareness of Job Requirements

FACTOR/ ELEMENT	SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F-VALUE	SIGN. LEVEL
Awareness of job require-ments	Between Groups	22.438	2	11.219	11.966	.000
	Within Groups	429.417	458	.938		
	Total	**451.855**	**460**			
Job duties and responsibi-lities	Between Groups	26.482	2	13.241	12.072	.000
	Within Groups	501.266	457	1.097		
	Total	**527.748**	**459**			
Skills and knowledge required for the job	Between Groups	19.541	2	9.770	9.321	.000
	Within Groups	471.709	450	1.048		
	Total	**491.249**	**452**			

As for the factor *Awareness of job requirements*, Table 7.76 below shows the mean level of satisfaction of Group No. 3 (JS) as the highest (3.9500) and Group No. 1 (EJG) as the lowest (3.3226).

Table 7.76

Pair-Wise Comparison Test (Tukey)

for Awareness of Job Requirements

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	296	3.3226	
Work supervisors (WS)	105	3.6143	
JIC students (JS)	60		3.9500
Sig.		.081	1.000

With regard to the element *Job duties and responsibilities*, Table 7.77 shows the mean level of satisfaction of Group No. 3 (JS) as the highest (4.0167) and Group No. 1 (EJG) as the lowest (3.3017).

Table 7.77

Pair-Wise Comparison Test (Tukey)

for Job Duties and Responsibilities

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	295	3.3017	
Work supervisors (WS)	105	3.5333	
JIC students (JS)	60		4.0167
Sig.		.256	1.000

As far as the element *Skills and knowledge required for the job* is concerned, Table 7.78 below shows the mean level of satisfaction of Group No. 3 (JS) as the highest (3.8833) and Group No. 1 (EJG) as the lowest (3.3472).

Table 7.78

Pair-Wise Comparison Test (Tukey)

for Skills and Knowledge Required for the Job

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	288	3.3472	
Work supervisors (WS)	105		3.6952
JIC students (JS)	60		3.8833
Sig.		1.000	.392

7.4.10 Physical Well-Being

HO: The three groups (EJG, WS and JS) are not satisfied with the physical fitness programme offered at JIC.

The result of the T-test, as shown in Table 7.90, indicates that the mean level of satisfaction of the three groups with the element in this factor is below a value of 4 (satisfied). Therefore, the mean level of satisfaction of the groups with the factor *Physical well-being* is below the given value as there is only one element within this factor.

The ANOVA test (Table 7.79) below demonstrates that there are significant differences between the mean levels of satisfaction of the groups with the factor and its element.

Table 7.79

The Analysis of Variance Test (ANOVA) for Physical Well-being

FACTOR/ ELEMENT	SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F-VALUE	SIGN. LEVEL
Physical well-being	Between Groups	23.517	2	11.758	9.527	.000
	Within Groups	565.273	458	1.234		
	Total	**588.790**	**460**			

As for the factor and its element, Table 7.80 below shows the mean level of satisfaction of Group No. 2 (WS) as the highest (4.1714) and Group No. 1 (EJG) as the lowest (3.6250).

Table 7.80

Pair-Wise Comparison Test (Tukey) for Physical Well-Being

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	296	3.6250	
JIC students (JS)	60	3.6833	
Work supervisors (WS)	105		4.1714
Sig.		.926	1.000

7.4.11 <u>Links Between the College and Industry</u>

HO: The three groups (EJG, WS and JS) are not satisfied with the College's links to industry.

The result of the T-test, as shown in Table 7.90, indicates that the mean levels of satisfaction of the three groups with the elements within the factor are below a value of 4 (satisfied), except for the element *Co-operative training programme*, where the mean level of satisfaction of the groups is equal to the given value. Therefore, the mean level of the groups with the factor *Links between the College and industry* is below the above value.

The ANOVA test (Table 7.81) below demonstrates that there are significant differences between the mean levels of satisfaction of the groups with the factor and all its elements.

Table 7.81

The Analysis of Variance Test (ANOVA)

for Links Between the College and Industry

FACTOR/ ELEMENT	SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F-VALUE	SIGN. LEVEL
Links between the College and industry	Between Groups	17.665	2	8.833	14.170	.000
	Within Groups	285.490	458	.623		
	Total	303.155	460			
Co-operative training programme	Between Groups	7.702	2	3.851	3.815	.023
	Within Groups	461.278	457	1.009		
	Total	**468.980**	**459**			
Student field visits to industry	Between Groups	33.420	2	16.710	9.984	.000
	Within Groups	759.844	454	1.674		
	Total	**793.265**	**456**			
Lecturing and training conducted by industry representatives	Between Groups	36.119	2	18.060	11.016	.000
	Within Groups	745.892	455	1.639		
	Total	**782.011**	**457**			
Graduate employment in industry	Between Groups	25.637	2	12.818	11.484	.000
	Within Groups	511.235	458	1.116		
	Total	**536.872**	**460**			
Involvement of industry in curricular and training facilities development	Between Groups	11.941	2	5.971	4.676	.010
	Within Groups	583.502	457	1.277		
	Total	**595.443**	**459**			

As far as the factor *Links between the College and industry* is concerned, Table 7.82 shows the mean level of satisfaction of Group No. 3 (JS) as the highest (3.7267) and Group No. 1 (EJG) as the lowest (3.2639).

Table 7.82

Pair-Wise Comparison Test (Tukey)

for Links Between the College and Industry

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	296	3.2639	
Work supervisors (WS)	105		3.6352
JIC students (JS)	60		3.7267
Sig.		1.000	.688

With regard to the *Co-operative training programme* element, Table 7.83 below shows the mean level of satisfaction of Group No. 3 (JS) as the highest (4.2833) and Group No. 1 (EJG) as the lowest (3.9186).

Table 7.83

Pair-Wise Comparison Test (Tukey)

for Co-operative Training Programme

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	295	3.9186	
Work supervisors (WS)	105	4.0952	4.0952
JIC students (JS)	60		4.2833
Sig.		.423	.377

For the *Student field visits to industry* element, Table 7.84 shows the mean level of satisfaction of Group No. 3 (JS) as the highest (3.8167) and Group No. 1 (EJG) as the lowest (3.1769).

Table 7.84

Pair-Wise Comparison Test (Tukey)

for Student Field Visits to Industry

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	294	3.1769	
Work supervisors (WS)	103		3.6893
JIC students (JS)	60		3.8167
Sig.		1.000	.764

Regarding the element *Lecturing and training conducted by industry representatives*, Table 7.85 below shows the mean level of satisfaction of Group No. 3 (JS) as the highest (3.4167) and Group No. 1 (EJG) as the lowest (2.7133).

Table 7.85

Pair-Wise Comparison Test (Tukey)

for Lecturing and Training Conducted by Industry Representatives

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	293	2.7133	
Work supervisors (WS)	105		3.2095
JIC students (JS)	60		3.4167
Sig.		1.000	.482

As for the *Graduates' employment in industry* element, Table 7.86 shows the mean level of satisfaction of Group No. 2 (WS) as the highest (4.2095) and Group No. 1 (EJG) as the lowest (3.6351).

Table 7.86

Pair-Wise Comparison Test (Tukey)

for Graduates' Employment in Industry

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	296	3.6351	
JIC students (JS)	60	3.7500	
Work supervisors (WS)	105		4.2095
Sig.		.719	1.000

Concerning the element *Involvement of industry in curricular and training facilities development*, Table 7.87 below shows the mean level of satisfaction of Group No. 3 (JS) as the highest (3.3667) and Group No. 1 (EJG) as the lowest (2.8780).

Table 7.87

Pair-Wise Comparison Test (Tukey) for Involvement

of Industry in Curricular and Training Facilities Development

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	295	2.8780	
Work supervisors (WS)	105	2.9810	
JIC students (JS)	60		3.3667
Sig.		.793	1.000

7.4.12 Selection of Course of Study

HO: The three groups (EJG, WS and JS) are not satisfied with the graduates' selection of their courses of study.

The result of the T-test, as shown in Table 7.90, indicates that the mean level of satisfaction of the three groups with the element within the factor is below a value of 4 (satisfied). Therefore, the mean level of satisfaction of the groups with the factor *Selection of course of study* is below the given value as there is only one element within this factor.

The ANOVA test (Table 7.88) below demonstrates that there are significant differences between the mean levels of satisfaction of the groups with the factor.

Table 7.88

The Analysis of Variance Test (ANOVA) for Selection of Course of Study

FACTOR/ ELEMENT	SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F-VALUE	SIGN. LEVEL
Selection of course of study	Between Groups	12.798	2	6.399	8.049	.000
	Within Groups	363.303	457	.795		
	Total	**376.101**	**459**			

For the factor, Table 7.89 below shows the mean level of satisfaction of Group No. 2 (WS) as the highest (3.8190) and Group No. 1 (EJG) as the lowest (3.4503).

Table 7.89

Pair-Wise Comparison Test (Tukey) for Selection of Course of Study

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	295	3.4503	
JIC students (JS)	60		3.7556
Work supervisors (WS)	105		3.8190
Sig.		1.000	.868

Table 7.90 presents the data related to the One-Sample T-Test, which is administered to test the level of satisfaction of the three groups consolidated at a given value of 4 (satisfied).

Table 7.90

One-Sample T-Test for All Factors and Elements

(Satisfied = 4)

ELEMENT / FACTOR	T-VALUE	DEGREES OF FREEDOM (D.F.)	LEVEL OF SIGNIFICANCE (S.G.)	MEAN DIFFERENCE
A. *Hands-on skills*	-6.731	460	.000	-.2440
1. Basic manual skills	-2.625	454	.009	-.11
2. Technician skills	-2.896	456	.004	-.12
3. Professional skills	-9.832	452	.000	-.51
B. *Analytical skills*	-6.407	460	.000	-.2252
4. Sciences	-5.465	455	.000	-.2390
5. Mathematics	-4.213	458	.000	-.2070
6. Related speciality subjects	-5.074	449	.000	-.2400
C. *Proficiency in English*	-1.743	460	.082	-6.5980E-02
7. Communication skills	-4.147	451	.000	-.2058
8. Comprehension skills	-.720	460	.472	-3.0369E-02
9. Reading skills	.552	459	.581	2.391E-02
10. Writing skills	-1.210	459	.227	-5.4348E-02
D. *Computer literacy*	-20.286	460	.000	-1.0058
11. Use of computer for data processing	-16.107	452	.000	-.9316
12. Use of computer for word Processing	-16.427	458	.000	-.8911
13. Use of computer software related to profession	-20.798	455	.000	-1.1864
E. *Technology awareness*	-12.218	460	.000	-.4888
14. Similarity between technology used for training and that generally adopted by industry	-10.134	453	.000	-.5132
15. Awareness of importance of subject technology	-9.671	456	.000	-.4333
16. Familiarity with other available technologies related to area of specialisation	-11.164	455	.000	175-.5
F. *Safety awareness and practice*	-.770	460	.442	-2.9103E-02
17. Safety of individual	1.263	459	.207	5.652E-02
18. Safety of equipment and facilities	.812	459	.417	3.261E-02

Table 7.90 (cont'd)

ELEMENT / FACTOR	T-VALUE	DEGREES OF FREEDOM (D.F.)	LEVEL OF SIGNIFICANCE (S.G.)	MEAN DIFFERENCE
19. Safety of others	.946	460	.345	3.905E-02
20. Safety of environment	-4.562	459	.000	-.2261
G. *Organisational behaviour and Human performance*	3.443	460	.001	.1110
21. Discipline	3.669	456	.000	.1532
22. Punctuality and time management	6.741	459	.000	.2565
23. Readiness to learn more	2.976	459	.003	.1239
24. Ability to execute a task with minimal supervision	-2.195	457	.029	-9.3886E-02
H. *Job relation to course of study*	-9.787	459	.000	-.5348
25. Job relation to course of study	-9.787	459	.000	-.5348
I. *Awareness of job requirements*	-11.466	460	.000	-.5293
26. Job duties and responsibilities	-11.045	459	.000	-.5522
27. Skills and knowledge required for the job	-10.230	452	.000	-.5011
J. *Physical well-being*	-4.611	460	.000	-.2430
28. Physical fitness	-4.611	460	.000	-.2430
K. *Links between the College and industry*	-15.639	460	.000	-.5913
29. Co-operative training programme	.138	459	.890	6.522E-03
30. Student field visits to industry	-10.108	456	.000	-.6236
31. Lecturing and training conducted by industry representatives	-17.682	457	.000	-1.0808
32. Graduates' employment in industry	-4.354	460	.000	-.2191
33. Involvement of industry in curricula and training facilities development	-19.486	459	.000	-1.0348
L. *Selection of course of study*	-10.087	459	.000	-.4257
34. Selection of course of study	-10.087	459	.000	-.4257

7.4.13 All Factors

Finally, the result of the T-test, as shown in Table 7.91 below, indicates that the three groups' overall mean level of satisfaction with all the factors related to the course of study, services and procedures at JIC is below a value of 4 (satisfied).

Table 7.91

One-Sample T-Test for all Factors related to Course of Study

FACTOR	T-VALUE	DEGREES OF FREEDOM (D.F.)	LEVEL OF SIGNIFICANCE (S.G.)	MEAN DIFFERENCE
All factors related to course of study	-13.329	460	.000	-.3304

The ANOVA test (Table 7.92) demonstrates that there are significant differences between the mean levels of satisfaction of the three groups with all the factors.

Table 7.92

The Analysis of Variance Test (ANOVA)

for all Factors related to Course of Study

FACTOR	SOURCE	SUM OF SQUARES	DEGREES OF FREEDOM	MEAN SQUARE	F-VALUE	SIGN. LEVEL
All factors related to course of study	Between Groups	8.329	2	4.164	15.638	.000
	Within Groups	121.961	458	.266		
	Total	**130.290**	**460**			

To show how significant the difference is between the mean levels of satisfaction of the groups with all the factors, Table 7.93 indicates that Group No. 3 (JS) has the highest overall mean (3.9232), while Group No. 1 (EJG) has the lowest (3.5730).

Table 7.93

Pair-Wise Comparison Test (Tukey) for all Factors

Tukey HSD[a,b]

TYPE	N	Subset for alpha = .05	
		1	2
JIC graduates (EJG)	296	3.5730	
Work supervisors (WS)	105		3.7971
JIC students (JS)	60		3.9232
Sig.		1.000	.190

7.5 Summary of Findings

In this part of the chapter, the findings will be summarized according to the socio-demographic information and the twelve factors related to the course of study, service and procedures offered at JIC.

1. Socio-demographic information, etc.

The main findings of this factor can be summarized as follows:

a) Employed JIC Graduates (EJG)

A large percentage (37.5%) of respondents were 25-29 years old and 61.7 per cent were married. The largest percentage (45.3%) of them were originally from the Eastern Region. The majority (70.6%) completed the Natural Sciences stream in Secondary School, where 65.8 per cent of the respondents had a "Very Good" final grade average. When the respondents were at the College, the great majority of them (98.0%) were full-timers, and the largest percentage (22.3%) majored in Instrumentation and Control Engineering Technology while the second largest percentage (20.9%) majored in Electrical Power Engineering Technology. 39.2 per cent of respondents completed the College course of study with a grade point average (GPA) of 2.5 to 3.49. A large percentage (52.4%) worked for firms producing petrochemicals, receiving a monthly salary ranging from 5000 to 6999 Saudi

Riyals (55.3%). Finally, 40.9 per cent of respondents joined JIC because they wanted to be skilled technicians.

b) Work Supervisors (WS)

The largest percentage of respondents (56.2%) were 36-45 years old and the great majority (89.5%) were Saudis. 26.7 per cent had worked for 6 to 10 years in the same firm and a similar percentage had worked for 16 to 20 years. The level of education of respondents varied; 42.9 per cent were College graduates and 34.3 per cent held a Post-Secondary Technical/Vocational Certificate or Diploma. 41.9 per cent of respondents currently supervised 1 to 10 employees and 33.7 per cent supervised JIC graduate(s) for 3 to 4 years. Quite a large percentage (52.4%) worked for firms producing petrochemicals, where 37.1 per cent of those firms employed more than 1000 employees each. The percentage of Saudis reached 81-100 per cent in 54.3 per cent of the firms. Finally, 40.0 per cent of respondents worked for firms which had been in operation for 16 to 20 years.

c) JIC Students (JS)

The findings indicate that the great majority of respondents (96.7%) were 20 to 24 years old and all of them (100.0%) were single. A large percentage (40.0%) of respondents were originally from the Eastern Region, where 95.0 per cent of them completed the Natural Sciences stream in Secondary School and 68.3 per cent obtained a "Very Good" final grade average. All respondents (100.0%) were full-timers at the College, where 25.0 per cent of them were majoring in Chemical Engineering Technology, 21.7 per cent were in Instrumentation and Control Engineering Technology and a similar percentage were in Electrical Power Engineering Technology. 41.7 per cent of respondents obtained a GPA of 2.00 to 2.49. The majority of respondents (96.7%) completed from 61 to 70 credit hours prior to joining the Co-operative training programme. A large percentage of respondents (66.7%) undertook their Co-operative training in Jubail, mainly in firms producing petrochemicals (48.3%). The majority of respondents (76.7%) claimed to have had the opportunity to practice the skills they were trained for at the College. Finally, 28.3 per cent of respondents obtained a final grade of "A" upon the completion of the Co-operative training programme.

2. Hands-on Skills

The mean level of satisfaction of all the groups with the *Hands-on skills* equals the unsure level, which is below the satisfied and above the dissatisfied levels. Elements within the factor have the same level of satisfaction.

3. Analytical Skills

The mean level of satisfaction of all the groups with the *Analytical skills* equals the unsure level which is below the satisfied and above the dissatisfied levels. Elements within the factor have the same level of satisfaction.

4. Proficiency in English

The mean level of satisfaction of all the groups with their *Proficiency in English* equals the satisfied level. Elements within the factor have the same level of satisfaction with the exception of the *Communication skills* element where the level of satisfaction equals the unsure level which is below the satisfied and above the dissatisfied levels.

5. Computer Literacy

The mean level of satisfaction of all the groups with the degree of *Computer literacy* equals the unsure level, which is below the satisfied and above the dissatisfied levels. Elements within the factor have the same level of satisfaction.

6. Technology Awareness

The mean level of satisfaction of all the groups with the *Technology awareness* equals the unsure level which is below the satisfied and above the dissatisfied levels. Elements within the factor have the same level of satisfaction.

7. Safety Awareness and Practice

The mean level of satisfaction of all the groups with the *Safety awareness and practice* equals the satisfied level. Elements within the factor have the same level of satisfaction with the exception of the *Safety of environment* element, where the level of satisfaction equals the unsure level, which is below the satisfied and above the dissatisfied levels.

8. Organisational Behaviour and Human Performance

The mean level of satisfaction of all the groups with the *Organisational behaviour and human performance* equals a value above 4 (satisfied). Elements within the factor have the same level of satisfaction, with the exception of the element *Ability to execute a task with minimal supervision*, where the level of satisfaction equals the unsure level, which is below the satisfied and above the dissatisfied levels.

9. Job Relation to Course of Study

The mean level of satisfaction of all the groups with the *Job relation to course of study* equals the unsure level, which is below the satisfied and above the dissatisfied levels. The element within the factor has the same level of satisfaction.

10. Awareness of Job Requirements

The mean level of satisfaction of all the groups with the *Awareness of job requirements* equals the unsure level, which is below the satisfied and above the dissatisfied levels. Elements within the factor have the same level of satisfaction.

11. Physical Well-Being

The mean level of satisfaction of all the groups with the *Physical well-being* equals the unsure level, which is below the satisfied and above the dissatisfied levels. The element within the factor has the same level of satisfaction.

12. Links Between the College and Industry

The mean level of satisfaction of all the groups with the *Links between the College and industry* equals the unsure level, which is below the satisfied and above the dissatisfied levels. Elements within the factor have the same level of satisfaction, with the exception of the *Co-operative training programme* element where the level of satisfaction equals the satisfied level.

13. Selection of Course of Study

The mean level of satisfaction of all the groups with the *Selection of course of study* equals the unsure level, which is below the satisfied and above the dissatisfied levels. The element within the factor has the same level of satisfaction.

Based on the above findings related to the twelve factors of the study, it can be concluded that the overall mean level of satisfaction of all the groups with all the factors equals the unsure level which is below the satisfied and above the dissatisfied levels.

Table 7.94 summarizes in tabular form the findings related to the course of study, services and procedures offered at JIC. These findings are organized around the twelve factors and their associated elements.

Table 7.94

Tabulated Summary of the Findings

related to JIC Course of Study, Services and Procedures

Factor / Element	Very Satisfied 5	Satisfied 4	Unsure 3	Dissatisfied 2	Very Dissatisfied 1
A. Hands-on skills			✓		
1. Basic manual skills			✓		
2. Technician skills			✓		
3. Professional skills			✓		
B. Analytical skills			✓		
4. Sciences			✓		
5. Mathematics			✓		
6. Related speciality subjects			✓		
C. Proficiency in English		✓			
7. Communication skills			✓		
8. Comprehension skills		✓			
9. Reading skills		✓			
10. Writing skills		✓			
D. Computer literacy			✓		
11. Use of computer for data processing			✓		
12. Use of computer for word processing			✓		
13. Use of computer software related to profession			✓		
E. Technology awareness			✓		
14. Similarity between technology used for training and that generally adopted by industry			✓		
15. Awareness of importance of subject technology			✓		
16. Familiarity with other available technologies related to area of specialisation			✓		
F. Safety awareness and practice		✓			
17. Safety of individual		✓			
18. Safety of equipment and facilities		✓			
19. Safety of others		✓			
20. Safety of environment			✓		

Table 7.94 (cont'd)

Factor / Element	Very Satisfied	Satisfied	Unsure	Dissatisfied	Very Dissatisfied
	5	4	3	2	1
G. Organisational behaviour and human performance	✓				
21. Discipline	✓				
22. Punctuality and time management	✓				
23. Readiness to learn more	✓				
24. Ability to execute a task with minimal supervision			✓		
H. Job relation to course of study			✓		
25. Job relation to course of study			✓		
I. Awareness of job requirements			✓		
26. Job duties and responsibilities			✓		
27. Skills and knowledge required for the job			✓		
J. Physical well-being			✓		
28. Physical fitness			✓		
K. Links between the College and industry			✓		
29. Co-operative training programme		✓			
30. Student field visits to industry			✓		
31. Lecturing and training conducted by industry representatives			✓		
32. Graduates' employment in industry			✓		
33. Involvement of industry in curricular and training facilities development			✓		
L. Selection of course of study			✓		
34. Selection of course of study			✓		

7.6 Responses for Open-Ended Questions and Interviews

As explained in the Research Methodology, an additional open-ended question is included at the end of each questionnaire to invite and encourage more comments and suggestions for a better college programme. Also a "Why?" question follows each question asked of interviewed respondents to collect more information from them, providing reasons for their replies to the questions.

Tables 7.95 and 7.96 below indicate a summary of the open-ended question results and also the reasons to the answers of the interviewed respondents.

Table 7.95
Summary of the Open-Ended Question Results

No.	Suggestions	Frequency			
		Questionnaire No. 1 (EJG)	Questionnaire No. 2 (WS)	Questionnaire No. 3 (JS)	Total
1.	Continuously develop curricula in a way to suits industry.	34	3	3	40
2.	Reduce the contact hours of Preparatory year.	4	-	-	4
3.	Concentrate on the courses related to areas of specialisation and drop other courses.	11	4	6	21
4.	Invite highly qualified employees from industry to teach at the College	6	1	1	8
5.	Activate the role of the academic advisor.	6	1	1	8
6.	Provide more instruments in the field of instrumentation and control engineering technology.	5	-	1	6
7.	Train students to interact with supervisors and colleagues.	4	2	-	6
8.	Provide training courses for graduates so as to upgrade their qualification.	7	-	-	7
9.	Concentrate on practical/hands-on training.	22	11	1	34
10.	Bring curricula into line with what is taught at *KFUPM.	9	-	1	10
11.	Give students freedom to choose their majors regardless of their GPA.	17	5	5	27
12.	Give students complete information about majors in the College.	21	-	1	22

Table 7.95 (cont'd)

No.	Suggestions	Frequency			
		Questionnaire No. 1 (EJG)	Questionnaire No. 2 (WS)	Questionnaire No. 3 (JS)	Total
13.	Place a great emphasis on safety at work.	10	2	-	12
14.	Amend lecturing and teaching schedule.	2	-	7	9
15.	Discuss teaching problems with students.	6	-	-	6
16.	Improve and follow up the Co-operative Training Programme and invite industry to participate in designing the programme.	22	13	7	42
17.	Update laboratory apparatus to comply with what is being currently used by SABIC.	23	1	1	25
18.	Arrange for visits to the College by technicians from industry to discuss the job environment with students.	23	6	-	29
19.	Update the College diploma to BSc.	28	4	4	36
20.	Promote computer and internet use in the College.	49	8	8	65
21.	Update the College library	3	-	-	3
22.	Employ more qualified staff members.	32	3	12	47
23.	Follow-up graduates after graduation.	15	3	-	18
24.	Give graduates the opportunity to enter Saudi universities.	29	3	1	33
25.	Enhance the English courses.	35	14	6	55
26.	Arrange for visits by students and staff members to industry.	51	14	5	70
27.	Update training equipment to cope with what is used in industry.	30	16	4	50
28.	Emphasize technical terms and codes used in industry.	4	-	-	4
29.	Open channels of contact between graduates and students.	4	-	1	5
30.	Increase teaching hours in specialisation by adding another semester	2	-	2	4
31.	Open new areas of specialisation	7	4	2	13
32.	Coordinate with industry regarding areas of specialisation and employment of graduates	46	20	6	72
33.	Enhance maintenance and trouble-shooting courses	2	3	-	5
34.	Cancel some areas of specialisation and enhance others.	6	-	-	6
35.	Review the mathematics course and make it more beneficial for students.	6	-	8	14

* King Fahad University of Petroleum and Minerals

Table 7.96

Reasons to the Answers of the Interviewed Respondents

No.	Question	Work Supervisors (WS)	Employed JIC Graduates (EJG)
1.	**To what extent are you satisfied with the Basic manual skills (craftsmanship skills)?**	• Students are not given enough time for training in specialisation, labs and workshops. • Students should be given more training on the basic manual skills.	• These skills are important for specialisation. • Time given for training is not enough (5). • The importance of these skills should be explained to students. • Large number of students in classes (3). Time given for training is not enough. • Shortage in training equipment in general. • Students have no previous experience in this field. • They are important because they are related to work. • These skills are similar to what is used in industry. • The previous experience in this field is similar to what is offered by the College. • They are not used in practical life. • I can't understand the question. • The number of instructors in the workshop is small. • These skills are important in practical life. • Time is not utilized as it should be. • These skills were very beneficial to students during their study. • The large number of students accepted by the College makes the benefit from workshops and labs limited. This affects the level of graduates.
2.	**To what extent are you satisfied with the Technician skills (workshop/laboratory experience)?**	• Duration of training in workshops and laboratories should be longer. • Some graduates are not able to deal with some equipment in industry although they know the basics of the job.	• Some training equipment are not identical with what is available in industry. • There is very advanced equipment. • The curriculum is good.

Table 7.96 (cont'd)

No.	Question	Work Supervisors (WS)	Employed JIC Graduates (EJG)
	Question No. 2 continued ...	• Some graduates are not able to deal with maintenance manuals.	• 70% of the course is theory. More time should be given to hands-on training and more equipment should be provided. • Good equipment and technical information is available. • More equipment is needed for hands-on training (2). • Practical training periods should be increased. • Instructors can convey the idea. • Specialisation should be offered with more details. • More subjects should be added. • Suitable equipment is available. • The previous experience in this field is similar to what is offered by the College. • I am satisfied because the College gives importance to workshop technology in preparatory year and specialisation period. Moreover, the necessary equipment is available. • Workshops are not enough. • Equipment is old and is not used properly. • The equipment is identical to what is available in industry. • Personal interview should be improved so that better quality of students is accepted regardless of high school results.
3.	**To what extent are you satisfied with the Professional skills (maintenance and troubleshooting procedures)?**	• More intensive courses related to maintenance and troubleshooting procedures should be offered.	• We didn't do any maintenance procedures (2). • Training in this field is not enough (2). • This area was not given importance. • Training we received in this field was useful after graduation. • No relation between what we studied and the real job. • Curriculum is not identical with the imposed procedures. • Troubleshooting was not taught to us (3).

Table 7.96 (cont'd)

No.	Question	Work Supervisors (WS)	Employed JIC Graduates (EJG)
	Question No. 3 continued ...		• This area was not covered by curriculum. • No opportunity was give to students to practice troubleshooting. • Curriculum does not emphasize on troubleshooting. • I am not fully satisfied because students are given the opportunity to talk to each other or to deliver lectures to each other about this course. • Occupational skills were beneficial. • These skills were not offered in details. • The course was very beneficial and identical to what is available in industry. • More courses related to maintenance and troubleshooting procedures should be added.
4.	**To what extent are you satisfied with the Sciences skills (Chemistry and Physics)?**	• Science courses (Chemistry and Physics) should suite areas of specialisation. • These skills are not necessary for specialisation. Therefore, students grades in these skills are very low contradictory to their grades in specialisation.	• Were not enough. • Very beneficial and the level of these courses is high. • These courses were beneficial especially the subjects related to properties of matter. • Teaching methodology was excellent and beneficial to students. • Were useful in specialisation. • Courses do not include anything new. • Beneficial in work environment. • These courses are necessary and beneficial for work and specialisation. • Instructors can deliver the ideas in an easy way. • Terminology for each specialisation should be defined and emphasized. • Emphasis should be put on specialisation not on these courses. • I have noticed that although many courses such as Mathematics and Physics are offered but this doesn't meet the market's demands (2).

Table 7.96 (cont'd)

No.	Question	Work Supervisors (WS)	Employed JIC Graduates (EJG)
5.	**To what extent are you satisfied with Mathematics skill?**		• Very beneficial and advanced course. • This course was beneficial particularly the part which deals with equations. • Teaching methodology is difficult and very complicated (3). • Some lecturers are not qualified. • Lecturers can't explain the ideas in a clear and easy way. • Lecturers' performance was good. • Very beneficial for specialization. • The lecturers did not take the course seriously. • No sequence in course units (2). • I like mathematics. • The course is comprehensive and lecturers could convey the ideas. • Some equations used in practical life are not covered by the course. • Lecturers are not qualified. • The course is difficult to pass because of poor presentation by the lecturers. • I have noticed that although many courses such as Mathematics and Physics are offered but this doesn't meet the market's demands.
6.	**To what extent are you satisfied with Related speciality subjects skills?**		• Beneficial for specialisation because they are related to specialisation area and to practical life (4). • Beneficial because they are related to specialisation and contain general information. • The educational value of these courses is limited and very basic. • No emphasis is put on majors. • Beneficial for specialization. • These courses should be more intensive. • "Make Process II" was not beneficial. Also "Power Electronic I" was not very useful.

Table 7.96 (cont'd)

No.	Question	Work Supervisors (WS)	Employed JIC Graduates (EJG)
	Question No. 6 continued ...		• These courses do not correspond with what is used in industry. • Lecturers are not careful enough to present these courses in a good way.
7.	**To what extent are you satisfied with the Communication skills in English?**	• Although English is the medium of teaching in the college, no emphasis is put on the communication skill. • Students should be given a better opportunity through lectures and workshop classes to talk in English.	• No enough time is given to students in classes to practice this skill. • Teaching activities are carried out according to the old methodology. • Lecturers are doing their best to convey the ideas. • It was very beneficial and I learned very good English in the College. • Very beneficial for students during their study in the College and in work (3). • Not logical • Very poor, needs to be reconsidered. • Not beneficial. • Students are not given the opportunity to communicate and to make presentations in English. • Too many students in each section • The College offers a very good English h course. The difference between the JIC College graduates and other college graduates is obvious. • Students were not motivated to talk in English language in science courses.
8.	**To what extent are you satisfied with the Comprehension skills in English?**		• It was a beneficial course and I learned excellent English in the College (2). • It was beneficial for students in their study and in their work after graduation. • Lecturers are not qualified to present the ideas. • The English course in the College is good. The difference between JIC College graduates and other colleges graduates is obvious. • Emphasis should be put on interacting with others in order to improve the comprehension skills.

Table 7.96 (cont'd)

No.	Question	Work Supervisors (WS)	Employed JIC Graduates (EJG)
9.	**To what extent are you satisfied with the Reading skills in English?**		• It was a beneficial course and I learned excellent English in the College (2). • It was beneficial for students in their study and in their work after graduation. • A better opportunity should be given individually to students to practice reading skill. • Teachers should be specialized in English. • Computers should be used and course duration should be extended. • The English course in the College is good. The difference between JIC College graduates and other colleges graduates is obvious.
10.	**To what extent are you satisfied with the Writing skills in English?**	• Obvious weakness in report writing and spelling.	• It was a beneficial course. I learned excellent English in the College. • It was beneficial for students in their study and in their work after graduation. • Emphasis should be put on dictation. • Lecturers can not convey the ideas. • The English course in the College is good. The difference between JIC College graduates and other colleges graduates is obvious.
11.	**To what extent are you satisfied with the Use of computer for data processing (classification, filing, etc.)?**	• It seems that what is taught in the College is not up to the level of graduates. • No computer programmes are beneficial in the field of fertiliser.	• The computer course is not intensive enough. • Time given to this course is not enough • Shortage in the information given. • Course subjects are very little and do not+ correspond with work. • The educational value is limited and very basic. • This course do not cope with development in this field because it s very basic. • No computers were available when I was in the College. • When I was in the College computers were not used appropriately. • This course is old and it needs to be updated.

No.	Question	Work Supervisors (WS)	Employed JIC Graduates (EJG)
	Question No. 11 continued...		• Computers are not used in work. • I am interested in computers. • Computers were not enough. • Machines were old (2) • Programmes are not beneficial in work. • No emphasis was put on this course. • Computer course should be updated to cope with new programmes.
12.	**To what extent are you satisfied with the Use of computer for word processing?**	• There are no programmes available for specialisation and fertiliser industry.	• It was not offered in the curricula. • Subjects covered by the course are little and do not cope with what is used in workplace. • The educational value of the course is limited and very basic. • The course has to be updated because it is very basic (2). • There were no computers when we were students. • Computer programmes are very old and need to be updated (2). • The time of lectures is inappropriate (2). • I did not study this course (2). • Used in one subject only. • Was not available in a good way. • No emphasis was put on this course.
13.	**To what extent are you satisfied with the Use of computer software related to profession?**	• Graduates are not able to deal with the following programmes: PLN program / Ladder, DOC, Valve sizing. • I think the College does not have programmes related to fertilisers. Therefore, graduates need to be trained on computers in industry.	• Information covered by the course is limited (2). • Computers were not available when I was a student. (4) • Computers were not used in "Industrial Control". • I can not remember. • The course does not cover the phases of computer's development.

Table 7.96 (cont'd)

No.	Question	Work Supervisors (WS)	Employed JIC Graduates (EJG)
	Question No. 13 continued...	• It seems that computer programmes are not updated	• The educational valve of the course is limited and very basic. • Computer programmes and subjects are very basic and not up to date (4). • Computer programs are old and need to be updated. • Time was not enough for training. • Few computers were available and were not updated. • Teachers were not qualified. • Develop a course that covers the actual needs such as "Power Point". • We did not used any job related programmes. • Programmes should be related to specialisation and work.
14.	**To what extent are you satisfied with the similarity between technology used for training and that generally adopted by industry?**	• Equipment should be appropriate and modern technology should be adopted. • The equipment used for training in the College is not up to date to cope with what is used in industry. Therefore, graduates have no idea about what is used in industry (3). • Technicians from the College should follow up what is used in industry through regular visits. • The technology used in fertilizer industry is not similar to what is being used in the College.	• Technology used for training is almost similar to what is used in industry (3). • Training courses should be improved to suite industry. • My current job is different from my area of specialization. • More development is needed in this field. • This technology was beneficial to prepare students in the early stage of training. • The equipment used in the College are old. • Equipment in the College are different from what is used in industry (2). • Instructors' capabilities should be improved. • This technology was not as it should be. • We found it useful in practical life.
15.	**To what extent are you satisfied with the awareness of importance of subject technology?**	• Emphasis should be put on elements related to specialisation.	• Graduates should work in the same area of specialisation. • Was beneficial especially after graduation. • Was useful in performing jobs related to specialisation.

Table 7.96 (cont'd)

No.	Question	Work Supervisors (WS)	Employed JIC Graduates (EJG)
	Question No. 15 continued...		• Beneficial because it is related to specialisation. • Lecturers were not careful enough to present the ideas. • I was not aware of specialisation and the importance of this technology (2). • This area should be improved. • I feel that it is very important in our life.
16.	**To what extent are you satisfied with the familiarity with other available technologies related to area of specialisation?**	• It seems that graduates are weak in this area. We can not tell whether this weakness is due to the course of study or the abilities of graduates.	• Not familiar with other technologies (2). • Beneficial for specialisation. • Equipment is not updated. • No support technologies are available. • I am satisfied with what I studied because it added more knowledge about instruments in addition to my major. • They were endeavours by the instructor. • Were beneficial because they make students familiar with other areas of specialisation. • Students should be given some information about other areas of specialisation and other similar technologies.
17.	**To what extent are you satisfied with the awareness and practice of Safety of individual (personal safety)?**	• I think safety was not given any attention although it is very important and should be a basic part in the programme. • Graduates are not careful of safety and they are not aware of the importance of using personal safety equipment. • Safety should be a basic part in students' study, so students will be more careful about it.	• Safety was covered by the course of study. • No emphasis was put on safety of individuals (3). • An intensive programme about safety should be offered in every semester because of the importance of this subject. • It was helpful to understand the safety of environment and personal. • Beneficial for individuals in work. • Was beneficial especially how to deal with dangerous materials. • Observation of safety is important. • To explain the importance of safety. • We were not instructed about personal safety.

Table 7.96 (cont'd)

No.	Question	Work Supervisors (WS)	Employed JIC Graduates (EJG)
	Question No. 17 continued ...		• Subjects related to safety should reconsidered because it is important for students to be familiar with safety for better performance.
18.	**To what extent are you satisfied with the awareness and practice of Safety of equipment and facilities?**	• Safety should be a basic subject in the course, so students understand its importance.	• An intensive safety programme should be offered every semester because it is very important in work. • It was helpful in understanding the concepts of environment and personal safety. • It was beneficial for individual at work. • It was very beneficial especially when dealing with dangerous materials. • Time was not enough to study safety in details. • More emphasis and practice should be given to this subject.
19.	**To what extent are you satisfied with the awareness and practice of Safety of others?**	• Safety should be a basic subject, so students will give it more attention.	• We did not received any instructions related to safety of others. • Safety should be offered to as a basic course in every semester because of its importance in work environment. • It was useful in understanding the concepts of environment and personal safety. • It is beneficial in work. • It is beneficial especially when dealing with hazardous materials. • Many incidents happened during training because lack of safety procedure.
20.	**To what extent are you satisfied with the aware-ness and practice of Safety of environment?**	• Safety should be offered as a basic course, so students would give it more attention.	• It was not included in curricula (2). • An intensive safety course should be offered every semester because of its importance. • It was helpful to understand the concepts related to safety environment and personal. • There was a good emphasis on environment pollution. • No safety precautions are available in welding and turning workshops. • Environment safety was not included in the course of study.

Table 7.96 (cont'd)

No.	Question	Work Supervisors (WS)	Employed JIC Graduates (EJG)
21.	**To what extent are you satisfied with the organizational behaviour and human performance related to Discipline (obedience to instructions and respect of others)?**		• Was not given any attention. • It is a relevant issue. • It is important in practical life. • I am very satisfied although the question was not clear to me when I completed the form. • It teachers students how to be punctual and ready to learn more. • No comments regarding this point. The compliments we received from the employers reflect the behaviour of graduates.
22.	**To what extent are you satisfied with the organisational behaviour and human performance related to Punctuality and time management?**		• Very beneficial in practical life. • Lecturers' follow up of students attendance implies a benefit for students after graduation. • The College put great emphasis on punctuality. • It was beneficial because students learned how to be punctual in their attendance.
23.	**To what extent are you satisfied with the organizational behaviour and human performance related to Readiness to learn more?**		• There is no time for more learning. • Was beneficial to learn subjects supplemental to curricula. • No motivation for more learning. • Teaching style was boring.
24.	**To what extent are you satisfied with the organisational behaviour and human performance related to Ability to execute a task with minimal supervision?**		

Table 7.96 (cont'd)

No.	Question	Work Supervisors (WS)	Employed JIC Graduates (EJG)
25.	**To what extent are you satisfied with the Job relation to course of study?**	• No emphasis should be put on subjects not directly related to specialisation. More terminology should taught to students and they should practice writing troubleshooting reports. • Specialisation courses should be more intensive • There is no relation between the job and the course of study. Emphasis is put on operation only and there is nothing about fertilisers.	• The picture is not clear to employment officials in Aramco. • My present job is very much related to my course of study (2). • The course of study should be intensive to students understand the nature of the job and the progress in specialisation area. • No strong relation between theory and practical. • There is a big difference. • My specialisation and my job are not related (2). • Study in the College covers the basic principles only (2). • We started the job immediately upon graduation. This means that they are related.
26.	**To what extent are you satisfied with the awareness of job requirements in Job duties and responsibilities?**	• One lecture or more should be assigned for this purpose.	• Students were not given an idea about job duties and responsibilities (2). • We were not aware of job's responsibilities before the co-operative programme. • These tasks and responsibilities differ from one company to another.
27.	**To what extent are you satisfied with the awareness of job requirements in the Skills and knowledge required for the job?**		• The level of the courses was good. • We were not given the opportunity to understand the basic skills of specialisation. • There is no relation between practical and theoretical parts of the course. • We were not given the appropriate instructions regarding basic skills and knowledge related to the job. • Computers were not used in the skills required. • One lecture or more should be assigned for explaining the job and the skills required.
28.	**To what extent are you satisfied with the Physical fitness?**	• It seems that graduates are relatively weak.	• There are no permanent and continuous courses in sports. • Lack of contributions in theses activities outside the College.

Table 7.96 (cont'd)

No.	Question	Work Supervisors (WS)	Employed JIC Graduates (EJG)
	Question No. 28 continued ...		• Good organisation of physical education activities and providing the necessary equipment. • Physical fitness and sports facilities need to be improved • There are no permanent and continuous courses in sports. • Lack of contributions in these activities outside the College. • Good organisation of physical education activities and providing the necessary equipment. • Physical fitness and sports facilities need to be improved. • Physical activities are not very efficient and there are no supervisors for these activities. • There should be cooperation between the College and other colleges and universities. • The College does not encourage the individual sports. • Physical education course is limited to preparatory-year. This course should continue to include students in specialisation.
29.	**To what extent are you satisfied with the links between the College and industry in Co-operative Training Programme?**	• Students should be observed and followed up during this programme. • It seems that there is no co-ordination between the College and the companies in this field. • There is no co-ordination between College officials and the direct supervisors from the companies regarding this programme. • The College is expected to create better channels of communication and co-ordination with us to give better opportunities for students in this programme.	• This programme is important to acquire the experience necessary for practical life. • College officials do not pay enough numbers of visits to students in this programme. • It is because JIC is a reputable College. • The co-operative programme which I went through in Hadeed was not related to my area of specialisation. • It was beneficial. • The College did not follow up students in this programme. • I did not go through this programme. • This programme should be provided by the appropriate organisations.

Table 7.96 (cont'd)

No.	Question	Work Supervisors (WS)	Employed JIC Graduates (EJG)
30.	**To what extent are you satisfied with the links between the College and industry in the Student field visits to industry?**	• These visits have been reduced recently. • I have never been taken in a visit to industry during my stay in the college. • The reason for not performing theses visits is probably the long distance from the College to industry.	• Very few visits (2). • Duration of the visits is not enough for specialisation students. • No field visits were carried out (5). • They are important because they increase students' understandings. • They should be scheduled. • There was no variety in these visits.
31.	**To what extent are you satisfied with the links between the College and industry in Lecturing and training conducted by industry representatives?**	• The company failed to contribute in such activities. • Technicians should be invited to give lectures to College students.	• No contribution from companies (8). • They are beneficial activities, but they are not existing. • We met students from companies studying in the College. • I do not support the idea of having technicians teaching at the College, but I suggest that students should visit industry and given an idea about the work in industry. • On the contrary, students' field visits to industry should be increased. • It can be beneficial if the participants are qualified. • There is no coordination between the College and the companies. • Technicians should be invited to lecture in the College.
32.	**To what extent are you satisfied with the links between the College and industry in Graduates' employment in industry?**		• No work opportunity is given by SABIC. • I was hired immediately after graduation. • They are interested because College curricula correspond to the technology used in industry. • Companies ask for very difficult requirement. • In that time companies were not interested to hire College graduates. • The possibility of being hired by industry is unknown. • Some companies hire high school graduates instead of college graduates.

Table 7.96 (cont'd)

No.	Question	Work Supervisors (WS)	Employed JIC Graduates (EJG)
33.	**To what extent are you satisfied with the links between the College and industry in the Involvement of industry in curricula and training facilities development?**		• This did not happen (3). • I have no idea about such kind of activities (4). • There are many pieces of equipment in the College identical to what is used in industry. • Department chairmen should contact technicians and supervisors in industry and ask them to contribute in curricula development. • There is no technical contribution and this is a failure from the companies' side. • No technical contribution from industry side. • Technicians from industry do not contribute in curricula development.
34.	**To what extent are you satisfied with the selection of course of study related to Vocational/ career guidance and counselling services?**	• There is a problem in major's selection but the problem is in finding a job related to my major.	• There is no vocational advisory (2). • The academic plan is not given to student in the appropriate time. Advisors should contact their students to discuss their problems. • Students are not given an idea about majors offered by the College (2). • It was the start of the College. • The student is not given an idea about schedules. This has a bad effect on his GPA before he goes to specialisation. • Students are not given the appropriate guidance to select suitable major. • There is no clear role for them.
35.	**To what extent are you satisfied with the selection of course of study related to the Procedures for selection of specialization?**		• When students are given more than one option it gives them the opportunity to show their interests. • There is no difficulty in major selection procedures. • The selections are done according to the job title and without any idea given to students about majors before the selection process. • Students' interests are not given any consideration. • Not beneficial. • Procedures are not appropriate and they are not up to student's level (2).

Table 7.96 (cont'd)

No.	Question	Work Supervisors (WS)	Employed JIC Graduates (EJG)
	Question No. 35 continued...		• Students can change their major in a specific time. Students are not given an idea about majors and their importance. • Implies personal interests. • They were good procedures. • Students are not given a chance to choose their own majors. • There are no options. • It gives students a chance to specify their majors. • There should be a better procedure for major selection.
36.	**To what extent are you satisfied with the selection of course of study related to your Selected area of specialisation?**		• Instruments technician job is important. • Work facilities and equipment are advanced. • Instrumentation is a creative area. • It was my first opinion. • It was not optional. • It was not satisfied. • May major is one of the best majors. It is very important to give students an idea about their specialisations. • It is related to the nature of my job and my interests. • I was able to get familiar with my major. • There were no better majors. • I was not satisfied with the major given to me.

Note:

Numbers in brackets represent the frequency the answer has been repeated in each question.

The information provided by the above two tables is used in the next chapter when the level of satisfaction of the respondents with the twelve course-related factors is discussed.

The information related to the open-ended question is intended to support the development needed for a better college programme, while the information related to the "Why?" question in the interviews is used to find out the likely causes of the low level of satisfaction of the respondents with the course-related factors under examination.

7.7 Summary

This chapter begins by presenting and analysing the data obtained as a result of the descriptive statistical measures used, such as frequencies, percentages and means related to the three groups representing the population of the study. This section of the chapter covers the respondents' background information and the level of satisfaction of each individual group with the elements within the factors as well as with the factors themselves.

The One-Sample T-Test at 5% level of significance was used to determine whether the mean of each individual group obtained was equal to the satisfaction level (satisfied = 4) or not. Also, the same test was repeated at another given value (dissatisfied = 2) to determine to what extent the level of satisfaction of each group was below the satisfied level. The findings from the above tests related to the individual groups are presented in this part.

Also, the chapter includes the analysis of the data of the three groups together to test the twelve hypotheses using the same One-Sample T-Test at a given value (satisfied = 4). In addition, this section covers also the Analysis of Variance Test (ANOVA) and the Pair-Wise Comparison Test (Tukey HSD) used to test for the differences between the mean levels of satisfaction of the three groups.

At the end, the chapter closes by summarizing the main findings of the study which will be discussed in the next chapter.

CHAPTER EIGHT

DISCUSSION AND CONCLUSIONS

8.1 Introduction

Arising from the preceding findings, this chapter is concerned with discussion based on the statistical analysis of the data related to the factors involved in this study, and the conclusions which may be drawn therefrom.

Additionally, this research will be supported by the following information when discussing and reviewing the main conclusions derived from the previous findings: a) the qualitative information collected from the three groups involved in this study with regard to the justifications of the current issues related to the components under investigation; and b) the personal technical and administrative experience of the researcher in dealing with issues relevant to the interest of this work. Moreover, this study will use the previous literature to provide discussion, explanations, comparison and conclusions.

Furthermore, this chapter will examine the support of the null hypotheses relevant to the components undertaken in this research.

8.2 Discussion of the Results and Comparison with Previous Research

In discussing the findings of the investigation, the study will use the previous four studies mentioned in the literature reviewed (pp. 119-120), namely Carlson (1997), Al Megren (1996), Al-Ghamdi (1994) and Khateeb (1985).

This is because these studies are found to be more directly related to the concerns of this study than the rest of the literature reviewed. The discussion will be mainly organised around the following thirteen factors:

1. Socio-demographic information, etc.
2. Hands-on skills.
3. Analytical skills.
4. Proficiency in English.
5. Computer literacy.
6. Technology awareness.
7. Safety awareness and practice.
8. Organisational behaviour and human performance.
9. Job relation to course of study.
10. Awareness of job requirements.
11. Physical well-being.
12. Links between the College and industry.
13. Selection of course of study.

8.2.1 Socio-Demographic Information, etc.

This factor was included in the study with the purpose of providing the study with personal and background information about the respondents from the three groups (EJG, WS and JS) and the firms for which the first two groups worked.

For the Employed JIC Graduates (EJG), the study revealed that the largest percentage of respondents (45.3%) were originally from the Eastern Region. This is simply due to the fact that JIC is located in Jubail Industrial City in the Eastern Region of the country.

The largest percentage of JIC graduates (70.6%) completed the Natural Sciences stream of the Secondary School, where 65.8 per cent of the group had a grade average of "Very Good". This is due to the requirements of admission at JIC.

The reason behind the quite large percentage (53.4%) of graduates working for firms producing petrochemicals, is the fact that Jubail Industrial City, where JIC is located, hosts the largest petrochemical industrial complex in the country.

For the Work Supervisors (WS), the study revealed that the majority of them (89.5%) were Saudis and this was due to the Saudisation programme implemented over a number of years in the firms for which they worked. Work Supervisors were experienced and educated personnel because 42.9 per cent of them held a college degree. This may help make their assessment of the qualifications of JIC graduates of relatively higher validity.

A large percentage of the respondents of this group (52.4%) worked for firms producing petrochemicals owing to the reason mentioned earlier. These firms have a high percentage of Saudis (81-100%). In fact, 54.3 per cent of these firms have reached this percentage, which is quite encouraging because it indicates their desire to Saudise their firms' cadre and therefore they are expected to assess the JIC graduates' qualifications realistically.

For the JIC Students (JS), the study revealed that the great majority (96.7%) of the current students were 20-24 years old, which clearly corresponds to the College's admission requirements, where admission is limited to entrants aged of 23 years or less.

The findings also indicated that a large percentage of students (40.0%) were originally from the Eastern Region, and a great majority (95.0%) had completed the Natural Sciences stream of the Secondary School with a "Very Good" final grade average. This is also related to the reasons previously stated for the JIC graduates.

All students (100.0%) were studying on a full-time basis as the part-time scheme is limited to those students who are currently employed.

The majority of students (96.7%) said that they had completed between 61 and 70 credit hours prior to joining the Co-operative Training Programme and this is clearly tied to the academic procedures and regulations of the College. Furthermore, a large percentage of them

(66.7%) were trained in Jubail Industrial City because of the availability of a large number of training opportunities in industries. Students claimed that they had the opportunity to practice the skills they were trained for, which may be related to the close supervision and follow-up of the College's instructional staff.

For the type of firms where they were trained, the study revealed that a large percentage (48.3%) of these firms produced petrochemicals and that is simply related to the same reason mentioned earlier.

8.2.2 Hands-on Skills

This factor, which represents the practical experience that the JIC graduate should gain upon the completion of the course of study, is considered to be probably the most important component in the technical educational and training programme offered at JIC.

This is due to the fact that the mission of the College is to prepare young Saudis for the workplace fully equipped with the practical technical know-how needed to handle future jobs, though **"employers [should] accept responsibility for developing the abilities of newly-recruited engineers and completing their professional formation"** (Macromedia, 2002, p. 1). The present researcher observed that the word "engineers" in this context could be applied to technicians as well. As a matter of fact, **"relevant background knowledge and hands-on experience are the top two skills sought by employers"** (Macromedia, 2002, p. 1). This is supported by Doeffert (1992), who indicated that **"hands-on experience, coupled with a sound educational base, appears to be among the primary requirements for newly developed jobs"** (p. 11). Employers tend highly to regard training schemes such as Sandwich Courses, owing to the **"practical experience gained by students during [these] courses"** (Hunter, 1981, p. 25). Moreover, one of the suggestions by the respondents for improving the course of study at JIC, as appears in the open-ended question list, is the need to *concentrate on practical/hands-on training* (Table 7.95).

The elements included in this factor are: 1) Basic manual skills (craftsmanship skills), 2) Technician skills (workshop/laboratory experience), and 3) Professional skills (maintenance and troubleshooting procedures).

The results of the study revealed that the level of satisfaction of the three groups together with this factor was below the satisfied level (4) and above the dissatisfied level (2) on the five-point scale. This simply means that their level of satisfaction falls in the critical category of "unsure", which indicates the neutrality of their level of satisfaction. This result was the natural reflection of the groups' levels of satisfaction with the three individual elements within the factor which were similar to that of the factor.

Furthermore, the results indicated that the three groups were similar in their levels of satisfaction with the factor and its elements, with the exception of the *Professional skills* element, where it was found that the JIC Students (JS) were the least satisfied.

As can be seen from the above findings, the null hypothesis suggested in this study seems to be supported, namely that *the three groups (EJG, WS and JS) are not satisfied with the hands-on skills offered by the course of study at JIC.*

There is some semblance of agreement between the above results and the work of Al-Ghamdi (1994), who found that "**more than a third of the [student] respondents felt that the training provided for them was not enough to equip the trainees to practice work after graduation, though 54.5 per cent of the total claimed that the nature of training provided was quite good**" (p. 391).

The work of Khateeb (1985) would lend support to the above observation. He noted that the "**training provided through technical training programs was not sufficient to fulfill the requirements of Saudi Arabia**" (p. 287).

Al Megren's study (1996) showed that **"87.2% of [the private sector employers in Saudi Arabia] agreed that the vocational education programs are not sufficient to fulfil their workforce needs, ..., and that 85.2% agreed these programs need total reform** (p. 390).

However, in a similar study in a technical college in the U.S.A. by Carlson (1997), the college graduates noted that **"college experience had prepared them more than adequately for the workplace"**. In particular it was found that **"college experiences that were most helpful were hands-on, lab experiences "** (p. vi).

In order to examine the low level of satisfaction with this factor, it is necessary to find out the likely causes. Based on the interviews with the Employed JIC Graduates (EJG) and Work Supervisors (WS) (Table 7.96), the following are the possible causes, classified according to elements.

1. Basic manual skills (craftsmanship skills):
    a) Shortage of staff compared to large number of students.
    b) Inadequate provision of training equipment.
    c) Limitation of time allocated for practical training.
    d) Unawareness of skills' importance to workplace.

2. Technician skills (workshop/laboratory experience):
    a) Limitation of time allocated for practical training.
    b) Lack of similarity between equipment used for training and that used by industry.
    c) Limited provision of equipment compared to large number of students.
    d) Lack of in-depth training.
    e) Limited diversity of training subjects.

3. Professional skills (maintenance and troubleshooting procedures):

   a) Lack of training related to maintenance and troubleshooting procedures.

   b) Lack of emphasis in the curriculum related to troubleshooting in particular.

   c) Differences between curriculum content and maintenance/troubleshooting procedures applied.

   d) Insufficiency of training related to these skills.

   e) Lack of relation between what is taught in these skills and the real world outside.

The *manual training* for craftsmanship skills is usually provided in the early stages of the students' studies in the College, with the intention of preparing them for more important technician skills at a later time.

The researcher believes that the student-to-instructor ratio during the craftsmanship training should be limited to ten, so that the students receive good individual attention from the instructor. At this early stage of their studies in the College, the students, who have just left the secondary schools to begin college education, are usually vulnerable, lack confidence and awareness of the importance of technical /manual work and are in need of a caring training environment. A low student-to-instructor ratio might help to provide such an environment.

In fact, JIC is one of the few technical colleges in the country, and one of only two such colleges which provide English-medium training. The demand for admission to JIC is high, owing primarily to the explosion of the youth population of the country. Its location within the industrial heartland of the country, where the bulk of the country's revenues is generated by industrial output, provides good employment opportunities. Secondary school leavers from all parts of the country, therefore, try hard for admission to the College.

Saudi Arabia's socio-economic situation also dictates that the College admit more and more students. As a result, there is sustained pressure on the College to open its doors wider to accept large intakes of students. The number of students admitted has increased fourfold in the last six years, though faculty recruitment and the expansion of the training facilities have not progressed at the same rate. As a consequence, it was not unexpected that those surveyed in this study reported a shortage of staff and inadequate training equipment and facilities.

Also, in the early stage of the college programme, where the students are taught various manual skills, the focus is on exposing them to the various skills they might require in the workplace; there is no emphasis on providing in-depth training in any particular skill. However, as the students progress to the higher level, beyond their preparatory stage, they get opportunities to receive more concentrated training in a particular skill which suits their courses of studies. The College's manual skills training therefore is limited in scope, and not geared towards in-depth learning.

Additionally, at the early stage of training, the instructors place more emphasis on the trades, not on the explanation of their relevance to the workplace. The students at this stage know very little about the workplace, and would probably not understand much about this relevance even if it were pointed out to them. The respondents in Al Megren's work (1996) **"believed that students lack awareness of job requirements"** (p. 131).

There is, however, no denying the fact that a good number of instructors do not have enough industrial experience to see the relevance themselves (M&MET, 2000, p. 7).

Despite the College's round-the-year recruitment drives, at home and abroad, it was not possible to recruit instructors who met the job criteria recommended by ABET (ABET, 2000, p. 6). In support of the importance of this issue to the teaching and training process at JIC, respondents, through the open-ended question, suggested that *more qualified instructional staff members should be hired* (Table 7.95). Furthermore, the work of Al Megren (1996) confirmed **"the need for vocational education teachers to have work experience"** (p. 131).

As for the training for *technician skills*, the suggestion that *time allocated for practical training was limited*, needs to be qualified. The JIC programmes are structured to provide a reasonable blend of mathematics, physics, chemistry and communication skills, besides the technical speciality courses, which were recommended by ABET (ABET, 2000, p. 1). The time spent for any technician skill-training course taught in a fifteen-week term is split into 60 per cent practical and 40 per cent knowledge (theory). This is consistent with some renowned technology training centres in the U.S.A. (Purdue University, 1996, p. 84). Carlson (1997) noted that the **"[technical] college cannot teach everything and that individuals need to take responsibility for continuing to learn on the job"** (p. 104).

Also, the *lack of similarity between the equipment used for training and that in the industries* would be expected in any technical college. At best, the colleges provide training in basic equipment, or the commonly used kinds of equipment, as only the industries could afford to employ a variety and state-of-the-art equipment, for their own particular needs. The College's training is sufficiently general, and not geared toward equipment of any particular kind; it caters for all potential employers of the graduates, and not a small group of them. It only employs equipment which closely resembles that in the industries, and might not be as robust as that in the industries. It is not required to be so. However, the speciality departments may currently use some equipment which falls short of this criterion.

As in the basic manual skills training, the student-to-instructor ratio steadily increases as more and more students enroll, and corresponding expansion of the facilities has not taken place owing to the sheer physical limitation of the place; the development costs are expensive and the fund for this has not been easily forthcoming. The need to provide training for an ever-growing youth population has had to be answered against the background of a decade-old set-up.

The respondents also noted that JIC's training programmes *lacked depth and diversity.* In some respects, depth and diversity are contradictory requirements, as diversity requires more time, which might occur at the cost of the time spent in other areas, thus affecting depth of training.

The programmes in JIC are structured according to the ABET guidelines (ABET, 2000, p. 1), which laid down the diverse topics that might be covered in a speciality programme; the scope and the content of the programme are guided by the same criteria. The latter do not specifically recommend in-depth training in any particular subject area but rather contemplated a situation where students get enough educational experience from a programme to perform effectively in a real world situation.

In training for *professional skills,* it was further suggested that the JIC programmes *lacked training related to maintenance and troubleshooting procedures.* The researcher felt that there was some truth in this suggestion. The companies preferred to carry out tasks related to maintenance and troubleshooting, by observing a set of well laid out procedures, which varied from equipment to equipment, and situation to situation. JIC provides training that evolved around some generalized procedures that do not target equipment of any particular make or situation. Consultation with the equipment manuals is not usual. A checklist-based maintenance or troubleshooting task, as practiced in the industries, is replaced by general instructions on maintenance and troubleshooting, which are not specific to any particular equipment or situation.

In any case, this is a weakness in the College programme, and the students should be taught more frequently to use the manuals for maintenance and troubleshooting tasks. In fact, respondents' answers to the open-ended question emphasized that the College should *enhance maintenance and troubleshooting courses* (Table 7.95). For the reasons cited above, all respondents felt that there was a *difference between the curriculum contents and the maintenance/troubleshooting procedures used.*

There are several possible reasons for which the JIC students were the least satisfied among the groups with the professional training that they had received in the College. They felt this fell behind what was needed in the outside world. Their observations were based on their co-operative work experience, which they gained in the industries before leaving the College.

Despite the College's best efforts, these students were placed within the industries according to the needs of each firm, with the result that students might find themselves doing things which they felt were not relevant. As in other technical colleges, JIC training programmes are not targeted at a small minority of industries, but appeal to a broad selection of them. Therefore, one might not see a great correlation between the JIC training in professional skills and those specifically required in any particular industry.

8.2.3 Analytical Skills

This factor is concerned with the students' analytical abilities to **"interpret and manipulate the information that drives [the] technologies"** (Gordon, 2000, p. 48). Basic sciences for instance are seen as the **"essential building blocks for developing human resources and national capacities which determines the advancement of science and technology, and thus development as a whole"** (UNESCO, 1990, p. 1). Moreover, subjects such as mathematics and sciences are perceived to be **"crucial to modern technology"** (McCormick, 2002, p. 7). In addition, as Greenspan (2000) notes, students being prepared for jobs **"must be equipped not simply with technical know-how but also with ability to create, analyse, and transform information"** (p. 419).

The elements included within this factor are: 1) Sciences (Chemistry and Physics), 2) Mathematics, and 3) Related speciality subjects.

The results of the study revealed that the level of satisfaction of the three groups together with this factor was below the satisfied level (4) and above the dissatisfied level (2) on the five-point scale. This simply means that their level of satisfaction falls in the critical category of "unsure", which indicates the neutrality of their level of satisfaction. This result was the natural reflection of the groups' levels of satisfaction with the three individual elements within the factor, which were similar to that of the factor.

Furthermore, the results indicated that the three groups were similar in their level of satisfaction with the factor and its elements, with the exception of the *Mathematics* element where the JIC Students (JS) were the least satisfied.

As can be seen from the above findings, the null hypothesis suggested in this study seems to be supported, namely that *the three groups (EJG, WS and JS) are not satisfied with the analytical skills offered by the course of study at JIC.*

Despite Al Megren's assertion (1996) that **"the vocational educational curriculum should be designed to prepare students to be competitive in technical knowledge skills"** (p. 141), the above level of satisfaction in the current study will probably have some reflections on Al Megren's own findings and that of Hollenbeck (1987).

Working on the private sector perception of the vocational training in Saudi Arabia, Al Megren (1996) observed that, regarding **"the importance of the basic math skills, 64.4% of the private sector thought that they were very unimportant or [just] unimportant"** (p. 132).

In a similar study, Hollenbeck (1987), as cited by Al Megren (1996), also found, while working on the vocational training in Colorado, that **"the areas of science, social and economic skills [were perceived to be] less important [by business and industry]"** (p. 17).

In contrast, McGraw and Forrant (1992), as cited by Carlson (1997), found, from a survey of 730 educated and skilled workers, that "**70.2% [of those surveyed] indicated they use math skills frequently or all the time; 73.5% use problem-solving skills frequently or all the time"** (p. 36).

Also, the graduate respondents of a technical College in Carlson's survey (1997) indicated **"the status of math requirements [in technical] program diplomas [was] high"** (p. 100).

In order to examine the low level of satisfaction with this factor, it is necessary to find out the likely causes. Based on the interviews with the Employed JIC Graduates (EJG) and Work

Supervisors (WS) (Table 7.96), the following are the possible causes, classified according to elements.

1. Sciences (Chemistry and Physics):

    a. Only speciality-related Sciences should be introduced.

    b. Sciences are not important for specialisations.

    c. Insufficient information on these subjects.

    d. Lack of practical/laboratory sessions for Science subjects.

2. Mathematics:

    a. Difficult teaching method.

    b. Complicated curriculum design.

    c. Lack of seriousness and clarity on the part of the instructors.

    d. Failure of curriculum to cover all required knowledge.

3. Related Speciality Subjects:

    a. Primitive and limited information provision.

    b. Lack of emphasis on the particular specialisations of the students.

    c. Lack of benefit in teaching some subjects.

    d. Lack of coincidence between subjects taught and what is needed by industry.

    e. Lack of enthusiasm on the part of the instructors.

The researcher thinks that these subjects are equal in importance to the technical skills because **"emerging technologies require workers who are not only steeped in specific occupational skills, but also competent in a broader spectrum of basic and general skills"** (Carlson, 1997, p. 41). Such a view was supported by the findings of a study conducted by Hollenbeck (1987) on Colorado business and industry perceptions of vocational education, when both business and industry said that they **"needed their**

employees to be competent in all skill areas [and] all of the skills should be emphasized by vocational educational programs" (Al Mgren, 1996, p. 17).

Science courses (Chemistry and Physics) are usually offered in the preparatory year to provide the necessary foundation to the technical speciality courses which the students learn in the specialisation years.

The scope of these courses is wide in order that this may cover the requirements of the speciality courses in various disciplines. A student of a particular discipline may not, therefore, readily see the relevance of science and mathematics in totality to his course of studies.

Although study of the sciences forms the necessary pre-requisite to any study of engineering and technology, some students may believe that *sciences are not important for specialisations.*

The comment that *there are no practical/laboratory sessions for science subjects* is somewhat surprising given the fact that all science courses, except Industrial Chemistry include laboratory practices. In fact, the ratio of practical to lecture sessions ranges from 1:2 in the preparatory year to 1:1 in the specialisation years.

The *Mathematics* curriculum is broadly prepared to cover the needs of all speciality departments. The information provided on a certain topic may not meet the interests of all students in different majors. The researcher believes that this might have led some students to comment that the *curriculum does not cover all required knowledge.*

The researcher, however, is aware that some students find it difficult to cope with the standard of the mathematics curriculum. This curriculum is designed to reflect the entry level mathematics of a renowned university in this region (KFUPM). Perhaps, the College staff should *review the mathematics course and make it more beneficial to students,* as indicated by the respondents to the open-ended question (Table 7.95).

The increase in the intake rate, started six years ago, has led to a significant increase in both the instructors' teaching load and the students class capacity. In a situation like this, the instructors, despite their best intentions, cannot provide more individual attention to students, which may have led the latter to suspect *lack of seriousness on the part of the instructors.*

The lack of teaching experience of some mathematics staff and the use of the physics tutors in mathematics classes may have led to the assertion about the *lack of clarity on the part of the instructors* and *a difficult teaching method in some cases.*

Related speciality subjects are designed to provide the students with the background knowledge to understand the speciality courses. Their contents, therefore, are of necessity conventional and may cause one to think of them as *primitive and limited.* It is also for the above reasons, the students noted a *lack of benefit in teaching these subjects.*

It was further suggested that the related speciality *subjects taught do not coincide with what is needed by industry.* One may not, however, see a direct correlation, as noted above, since the focus of these courses is to enhance a student's capabilities and sharpen his interpretation and analytical skills to understand the scientific and engineering matters and phenomena. Perhaps these courses should be reviewed by JIC in consultation with industry and then taught by instructors with industrial experience.

It was also noted by the respondents that there was a *lack of enthusiasm on the part of the instructors.* The researcher felt that there was some truth in this, as the increase in College enrollments in recent years and the corresponding increase in the workload of the instructors could have resulted in some decline in *enthusiasm on the part of instructors.*

8.2.4 Proficiency in English

This factor is considered as one of the very important factors related to the course of study offered by JIC. As a matter of fact, industrial employers, as well as educators, believe that this factor is as important as the technical and vocational skills of a technical educational and training programme because **"the ability to read, understand, and communicate equal in importance the ability to operate and maintain the equipment"** (Carlson, 1997, p. 41). Moreover, Doeffert (1992) believes that a **"future job will also require much higher skill levels in reading, oral communication, analysis, and writing"** (p. 11).

The elements included within this factor are: 1) Communication skills, 2) Comprehension skills, 3) Reading skills, and 4) Writing skills.

The results of the study revealed that the three groups together were satisfied with this factor. Also, the results indicate that the three groups were satisfied with all the elements with the exception of the *Communication skills,* where their level of satisfaction was below the satisfied level (4) and above the dissatisfied level (2) on the five-point scale, falling within the "unsure" category.

The three groups' levels of satisfaction were similar with regard to the factor and all the elements except for the *Writing skills,* where it was found that the Work Supervisors (WS) were the least satisfied and the JIC Students had a higher level of satisfaction.

As can be seen from the above findings, the null hypothesis suggested in this study seems not to be supported, namely that *the three groups (EJG, WS and JS) are not satisfied with the proficiency in English offered by the course of study at JIC.*

Although all the groups indicated general satisfaction with the College's English language programme, they also expressed that they were 'less than satisfied' with the *communication* *skills*. As ABET (2000) notes, **"good oral and written communication are considered ... to be a necessary achievement of a college graduate. Technically trained individuals should not be considered educated regardless of the depth of their technical education if they cannot communicate"** (p. 4).

As the respondents in the current study all have experience in industry, it is not surprising that, more than anything else, they would seek to achieve a high standard in communication skills. In so doing, they concur with McGraw and Forrant (1992) that **"employees were not only concerned about the technical skills needed for the job, but also the non-technical skills. In each industry, communication was mentioned frequently as the key to being successful in the workplace"** (Carlson, 1997, p. 37).

Also, in the same context, the respondents in the current study probably agreed with Hay's (1994) belief that **"[today's workers] must be able to communicate effectively to prevent wasting time trying to figure out what someone has said or written"** (Carlson, 1997, p. 33).

In order to examine the low level of satisfaction with the *Communication skills* element, it is necessary to find out the likely causes. Based on the interviews with the Employed JIC Graduates (EJG) and Work Supervisors (WS) (Table 7.96), the following are the possible causes:

a. Lack of concentration on communication skills.
b. Lack of encouragement for students to speak and communicate with others within the College.
c. Lack of proper practice of students' skills inside the classroom and laboratory and in front of an audience.
d. Need to evaluate and assess the curriculum of the skill.
e. Large number of students in each section.

The researcher believes that some of the above concerns could be true and they should be looked at and carefully studied by the staff concerned in the College. It should be noted that the students' education prior to the admission to the College is generally deficient in English language teaching. Therefore, the English programme at the College has to offer much in order to repair the poor background. It is probably due to this that the students achieve better results in the skills of reading, writing and listening, but not in speaking.

A possible reason is that the English language programme at the College, which is designed for a university setting, provides a rich context for reading, writing and listening through academic texts which students have to read and then listen to in the form of lectures on tapes and finally emulate in writing. All these activities, along with some oral presentations, take place during the limited hours students spend in classrooms and language laboratories. Students usually study for the first three skills outside the classroom and the fourth receives the least enforcement outside the classroom.

Respondents own readings of the low level of satisfaction with the *communication skills*, are in line with the reality of the English language programme. The English programme conducted a needs analysis in industry (1995) and found that industries need students to learn English in order to be able to read manuals, listen to instructions and write reports. Hence, the objectives of the programme were set out to prepare students to read textbooks, listen to lectures and write examinations, reports and term papers. Apparently, speaking received less emphasis at both ends. This explains the responses by EJG and WS respondents when they commented on the *lack of concentration on the communication skills,* and *lack of proper practice* related thereto, as well as on the need for the *curriculum ... to be evaluated and assessed.* For the *lack of encouragement for students to speak and communicate with others within the College*, such a policy should stem from the learners themselves but is very hard for staff to follow up in a college setting. What was expressed in the comment that there is a *large number of students in each section* is true to some extent. Usually, more than the normal number of students recommended for the communicative teaching of English is put into each class because the College falls under a great demand from parents, educators, and the industrial community to accept more students.

However, the responses from both EJG and WS respondents are clearly based on the old English language curriculum. Since the EJGs left the College, there have been many extensive changes in the programme; among them are some more speaking activities, which range from short oral class-presentations to long speeches in the presence of an audience.

As a final remark on this issue and in addition to the respondents' comments related to the *communication skills*, it was suggested when answering the open-ended question, that the College's department concerned should *enhance the English courses* and *emphasize technical terms and codes used in industry* (Table 7.95).

8.2.5 Computer Literacy

The impact of the continuous advancement of technology has made this factor a vital component of a typical technical educational and training programme. As a matter of fact, graduates of technical colleges who totally or even partially lack this type of experience face nowadays a great deal of difficulty in employment owing to the impact of technological changes in the workplace. Grubb, et al. (1992), as cited by Carlson (1997), said:

> **"with more use of the computer and other technology, workers have a greater variety of duties and responsibility. Machining, which was once considered a very traditional, manual trade using metalworking equipment like lathes and drills, now is a high-tech job requiring knowledge of computer programming and electronics"** (p. 20).

Lentz (1996) also recognised the importance of *computer literacy* when a study of nearly 10,000 workers revealed that students who know how to use e-mail earn more when they graduate (Chronicle of Higher Education, November 1, 1996).

The educational planners at JIC realized the importance of this matter and introduced computer skills as a general requirement to be taught to all students in the year 1414 A.H. (1994). In addition, speciality-related computer software packages were adopted and integrated in the curricula of the different areas of specialisation. Despite that, respondents of the study in the open-ended question (Table 7.95) asked that there be a move to *promote computer and internet use in the College.*

The elements included in this factor are: 1) Use of computer for data processing (classification, filing, etc.), 2) Use of computer for word processing, and 3) Use of computer software related to profession.

The results of the study revealed that the level of satisfaction of the three groups together with this factor was below the satisfied level (4) and above the dissatisfied level (2) on the five-point scale. This simply means that their level of satisfaction falls in the critical category of "unsure", which indicates the neutrality of their level of satisfaction. This result was the natural reflection of the groups' levels of satisfaction with the three individual elements within the factor which were similar to that of the factor.

The results indicate, however, that there were significant differences between the three groups in the level of satisfaction with the factor as well as its three elements. It was found that Employed JIC Graduates (EJG) were the least satisfied among the groups with the factor and its elements, while the JIC Students (JS) demonstrated a higher level of satisfaction compared to the other two groups.

As can be seen from the above findings, the null hypothesis suggested in this study seems to be supported, namely that *the three groups (EJG, WS and JS) are not satisfied with the computer literacy offered by the course of study at JIC.*

With the rapid advancement of computer technology and its applications in industry, it is not difficult to visualize a situation where the respondents in the current study would register a high expectation level for computer skills in JIC. As Carlson (1997) puts it, **"workers, regardless of position in the industry, without the skills to use the computerized equipment will not remain employed in the industry"** (p. 23).

Furthermore, several respondents (technical college graduates) in Carlson's (1997) survey **"wrote comments... indicating that no one should leave the technical college without strong computer skills"** (p. 100). In addition, respondents of the same study noted that the **"additional activities that would have helped them prepare for the workplace [were] more computer software and programming classes"** (p. 113).

To the best of the researcher's knowledge, none of the local studies made specific inference to the use of computer in technical education. Although Al Megren (1996) seemed to recognize **"basic computer skill/training"** (p. 172) as a key element in vocational education in Saudi Arabia, he was less than forthcoming on its role in his final analysis.

In order to examine the low level of satisfaction with this factor, it is necessary to find out the likely causes. Based on the interviews with the Employed JIC Graduates (EJG) and Work Supervisors (WS) (Table 7.96), the following are the possible causes, classified according to elements.

1. Use of Computer for Data Processing (classification, filing, etc.):
    a. Low level of programme content.
    b. Insufficient time allocation.
    c. Limited practical experience.
    d. Incompatibility of computer programmes with those in industry.
    e. Lack of development or update of the software used.
    f. Old computer equipment.
    g. Lack of study by the old graduates.

2. Use of Computer for Word Processing:

a. Limited varieties of software.

b. Programme content inappropriate for the job.

c. Lack of development or update of the software used.

d. Limited time allocation and unsuitable scheduling.

e. Lack of study by the old graduates.

3. Use of Computer Software related to Profession:

a. Non-inclusion in programme of profession-related software such as PLC, Programme/Ladder, DOC, valve sizing, industrial control and software related to fertiliser industry.

b. Low and obsolete software content.

c. Incompatibility of software with that used in industry.

d. Lack of development in this area.

e. Limited time allocation.

f. Lack of study by the old graduates.

g. Necessity to include varieties of software, e.g., Power Point, etc.

h. Inexperienced instructors.

For the computer training in *Data processing*, the researcher confirms that the content of the two courses offered to all students in the technical areas of specialisation (Introduction to Computer and Computer Applications) only includes Spread Sheet software and Word Processing facility. Therefore, no data processing software is offered to the students, except, and this only very recently (September 2002), when an elective Data Base course is offered to students enrolled in the Electrical and Electronics specialities.

Based on the above, the researcher is in agreement with the comments mentioned by the interviewed EJG and WS respondents with regard to the data processing *programme's content, practical experience* and *compatibility with what is used in industry.*

Regarding the comment that *time allocated is not enough for data and word processing*, the researcher thinks that the time allocated for computer courses, is suitable (1 credit and 3 contact hours). The time is sufficient for the course to be completed, as this is the standard followed at all levels of education, e.g., Universities, Colleges and Training Institutes. As for the comment that *scheduling is not suitable*, efforts are made to have the best scheduling but it cannot be done to the satisfaction of all students because of the resource limitation that exists in the college.

Regarding the common issue, i.e., that there is *no development or update on the software used and old computer equipment* in the data and word processing, bearing in mind the above opening statement related to the data processing, the researcher does not agree with the respondents' opinion. The researcher believes that there will always be some differences between the computer equipment used in industry and that used in colleges, as the information technology sector is very dynamic.

The technology keeps on changing very rapidly. As far as the industry is concerned, it is a profit-oriented sector and so they have to adapt to the new technology as soon as it is on the market, otherwise this will be reflected in their profit margins and production slowdown; whereas it takes some time for the educational institutions to be on a par with the technology.

Regarding the issue relating to *word processing*, i.e., that there are *limited varieties of software,* the researcher does not agree with the respondents' opinion. The software programme that is used for word processing skills in JIC is *MS-Word,* which is the most popular word processing software used in nearly all the industry to handle all the requirements of desktop publishing activity. As there is a large number of application programmes available for word processing skills in the market, it is difficult to provide training on all the available software. Selection of software should be made on the most popular and easy to use software.

The College students state that the software and hardware used in College laboratories are quite inferior to those adopted by industry, and therefore they think that the *programme content does not fulfil the requirement of the job.*

According to interviewed respondents, another cause for the low level of satisfaction with the data and word-processing courses is the fact that they *haven't studied data processing and word- processing software,* which the researcher has found out to be true, as the computer courses were only introduced in 1414 A.H. (1994).

Under the element *use of computer software related to profession,* the respondents felt that the *programme does not include profession-related software.* The researcher does not totally agree with the above comments of respondents for the following reasons.

In the researcher's opinion the technology of today's information-driven business environment plays a vital role in keeping business competitive, and education is no exception. JIC, from its inception, has been well aware of this fact and approached this need in a multifaceted fashion by introducing computer-based training courses and application-based software in some areas.

During the past few years, JIC has made intensive efforts to broaden the base of all its training activities, steering them towards computer-based course work utilizing the latest software packages and training kits. To cite some examples, JIC has equipped itself with the latest *"Electromic Multisim 2001"*, and *"PC Control Lab 2"* software related to the College's electrical and electronics courses.

The Mechanical Engineering Department uses the autocad software packages for its engineering design and drafting courses. The software used in the air-conditioning systems laboratory is *"Trace 700"*, *"Cooline"* and *"Zamil"*. These software packages are used for calculating heat load and selecting equipment in residential and commercial buildings.

Furthermore, the department also uses Computer Numerical Control (CNC) machines in the manufacturing technology major.

Likewise, the College's Chemical engineering department also uses a host of software packages for training in simulated process operations.

Recently, the College has procured a number of software packages to support its computer-based training programmes. Students can practice self-learning using these packages.

Because of the above, the researcher believes that there is no truth in the comment that *low and obsolete software content* is being used by JIC. But, on the other hand, the researcher agrees with the comment that *varieties of software need to be included* in the College's curricula.

It was further suggested by respondents that *time allocated is limited.* Perhaps it is wrong to generalize the comment for all courses in the researcher's point of view. Information technology is assuming an increasingly important role in teaching and skill development. There is hardly any speciality subject in JIC courses which doesn't require a CD-ROM or software which is normally embedded in it. So, from this point of view, the time allocated is sufficient and not limited, but presumably the respondents consider the courses taught as speciality support courses might have limited time allocation.

The respondents suggested that computer software related to profession *has not been studied by the old graduates.* It is probable that the first three groups of JIC graduates from 1993 to 1995 were exposed to limited computer software related to their professions.

The new instructors hired by the College, are labelled as *inexperienced instructors* by the respondents. As a matter of fact, JIC has a well defined and consistent policy of hiring only qualified and experienced instructors, well versed in technology and committed to the teaching profession.

8.2.6 Technology Awareness

Since JIC is an institution responsible for providing technical education and training that use technology intensively, it is inevitable that it should enhance the use of different technologies and create a full awareness of the importance of technology among students. Daggett (1998) believes that "**providing students with exposure to technology and helping them develop the academic skills and concepts that will allow them to interact with technology are significant ways to achieve equity and excellence in educating students**" (p. 3).

The elements included in this factor are: 1) Similarity between technology used for training and that generally adopted by industry, 2) Awareness of importance of subject technology, and 3) Familiarity with other available technologies related to area of specialisation.

The results of the study revealed that the level of satisfaction of the three groups together with this factor was below the satisfied level (4) and above the dissatisfied level (2) on the five-point scale. This simply means that their level of satisfaction falls in the critical category of "unsure", which indicates the neutrality of their level of satisfaction. This result was the natural reflection of the groups' levels of satisfaction with the three individual elements within the factor which were similar to that of the factor.

Furthermore, the results indicated that there were significant differences between the groups in the level of satisfaction with the factor and the first two elements, but similarity with regard to the last one. It was found that the Employed JIC Graduates (EJG) were the least satisfied among the groups with the factor and the first two elements, while the JIC Students (JS) demonstrated a higher level of satisfaction compared to the other groups.

As can be seen from the above findings, the null hypothesis suggested in this study seems to be supported, namely that *the three groups (EJG, WS and JS) are not satisfied with the technology awareness offered by the course of study at JIC.*

Khateeb (1985) recognizes the insufficiency of technology awareness in the technical education programmes in Saudi Arabia, and believes it to be due to the lack of **"educator familiarity with industrial facility"** (p. 292).

He further notes that **"teachers of technical education institutes should work in industry part-time or during a period of time ... receive more experience in equipment, methods and job assignments so that when they get back they can provide their students with the most current knowledge and methods"** (p. 291).

In order to examine the low level of satisfaction with this factor, it is necessary to find out the likely causes. Based on the interviews with the Employed JIC Graduates (EJG) and Work Supervisors (WS) (Table 7.96), the following are the possible causes, classified according to elements.

1. Similarity between technology used for training and that generally adopted by industry:
    a. Incompatibility of training equipment at JIC with that in industry because it includes different or older models.
    b. The College's failure to keep step with the advancement of technology and related equipment.
    c. The old and obsolete equipment at JIC.
    d. Lack of equipment related to fertiliser industry.
2. Awareness of importance of subject technology:
    a. Lack of concentration on elements related to area of specialisation.
    b. Carelessness on the part of the instructors.
    c. Necessity to increase awareness of importance of technology among students.
3. Familiarity with other available technologies related to area of specialisation:
    a. Unfamiliarity of graduates with other technologies related to specialisation.

b. Lack of other and support technology in the College.

c. The fact that information related to familiarity with other technologies is a mere initiative on the part of some instructors and not a part of a well-defined curriculum.

Under the element *Similarity between technology used for training and that generally adopted by industry,* it was pointed out that in the JIC programmes *the training equipment at JIC is not compatible with that in the industry, because it includes different or older models.* Moreover, respondents' answers to the open-ended question (Table 7.95) suggested that JIC should *update laboratory apparatus to comply with what is being currently used by SABIC* in particular and *update training equipment to cope with what is used in industry* in general. The researcher does not think that this is totally valid because JIC has adopted a policy since its inception of going hand in hand with industry in terms of technology by allocating an annual budget ($1,000,000 US dollars) which is distributed among JIC technical departments to fulfil their needs of either purchasing new equipment or upgrading and updating existing equipment from time to time (JIC Financial Records, 2002). Historically, JIC has always been keen to maintain up-to-date technology. To cite an example, JIC was one of the first institutions in Saudi Arabia to recognize the potential and value of process simulators as industrial training tools and installed the first generation of the TDC 2000 simulator system, which was the latest at that time. As a result many companies have benefited from the JIC system, as they have a similar system in their plant. In responding to the industry's need, and to maintain the College's status as the leading provider of this type of facility throughout the country, JIC procured the latest version of the TDC 3000 simulator system in recent years, which caters for the needs of qualified and well trained manpower with the advanced technical skills necessary in the country's increasingly "hi-tech" culture as well as for the needs of industry.

In addition, a great deal of effort was devoted to developing new facilities in terms of equipment and laboratories with multimedia programmes to facilitate training, which is contrary to the suggestion that *the College is not keeping step with the advancement of technology and related equipment.*

JIC has earned a good reputation over the past decade for its technology-based tailor-made short programmes which could not have been possible if *JIC equipment were old and obsolete.* The training packages are delivered using a blend of software and hardware that replicates as near as is possible the actual working environment the trainees will encounter in the workplace.

On the other hand, the researcher still believes that the budget allocated for this purpose may not be enough owing to the rapid development in technology and the resultant changes in the workplace requirement.

For the reasons cited above and the fact that process industries basically depend on core subjects (p. 317), as well as the fact that JIC paid equal attention to the requirements of the fertiliser industry, the researcher felt that the truth in the statement that there was a *lack of equipment related to fertiliser industry* is questionable.

Under the element *Awareness of importance of subject technology*, it was pointed out that the JIC programmes' *concentration should be placed on elements related to area of specialisation.* The researcher feels that the College is mainly concerned with courses at technician/operator level. They are designed to enable students to develop the necessary competences in specialised skills with a strong theoretical background to be more effective in their core subjects, which are the main focus of any specialisation. Without a solid background, they may not be able to master the key specialisation topics.

It was further suggested that the *awareness of importance of technology should be increased among students.* The researcher felt that there is some truth in this. The College students have few opportunities to attend seminars and lectures delivered by experts in the field. However, JIC organises at least one lecture in each semester for each major for the benefit of the students in order to enhance their awareness of technology. In addition, JIC library subscribes to a number of technology journals, scientific magazines, CD-ROMs, etc. which are available to students and staff. Some staff themselves may lack the awareness of the importance of technology and the knowledge of other available technologies which adversely affects their performance in this area.

Under the element *Familiarity with other available technologies* related to area of specialisation, it was suggested by the respondents that the JIC *graduates are not familiar with other technologies related to specialisations.* The researcher believes that this cause might reflect the need for a better focus by JIC speciality departments on such issues.

Concerning the two comments that there is a *lack of other and support technology in the College* and that *information related to familiarity with other technologies is a mere initiative on the part of some instructors and not a part of a well-defined curriculum*, the researcher believes that as a part of its modernisation policy, JIC is continuously striving to bring in related and other support technologies for the benefit of the students. A year ago, the College purchased a large amount of the latest electrical, mechanical and chemical equipment with full interactive and multimedia features for computer-based learning to compliment the classroom and practical hands-on training. These are the products of new support technologies for educational and training aids for the purpose of training individuals and groups of students skilfully and efficiently for today's various industries.

8.2.7 Safety Awareness and Practice

The slogan "Safety First" is often raised in industry, because safety is generally considered to be a very important item which may sometimes mean life or death to people and organisations.

Industry, as a client of the College, always expresses its desire to include "Safety" in every course they request, and they always emphasise the safety awareness of every graduate profile they want to employ. Therefore, JIC since its inception, has introduced "Safety" as an independent course of study to be taught to all students enrolled in the technical specialisations. This is in addition to the safety awareness and practice which is integrated in all the practical courses.

Students at the College are always encouraged to observe safety rules and regulations in all College activities. In fact, respondents of this study expressed such awareness when they commented in the open-ended question (Table 7.95) that the College should *place a greater emphasis on safety at work.*

The elements included in this factor are: 1) Safety of individual (personal safety), 2) Safety of equipment and facilities, 3) Safety of others, and 4) Safety of environment.

The results of the study revealed that the three groups together were satisfied with the factor and its elements with the exception of the *safety of environment*, where the level of satisfaction of the groups was below the satisfied level (4) and above the dissatisfied level (2) on the five-point scale, which simply means the neutral category of "unsure". The satisfaction of the groups was the natural consequence of the levels of satisfaction of the groups with the elements within the factor.

Furthermore, the results indicated that there are significant differences between the groups in the level of satisfaction with the factor and the first three elements, while they are similar in connection with the last element, *Safety of environment.*

It was found that Employed JIC Graduates (EJG) were the least satisfied among the groups with the factor itself as well as with the first three elements (Safety of individual, Safety of equipment and facilities, and Safety of others), while JIC Students (JS) were more satisfied with the above-mentioned elements.

As can be seen from the above findings, the null hypothesis suggested in this study seems not to be supported, namely that *the three groups (EJG, WS and JS) are not satisfied with the safety awareness and practice offered by the course of study at JIC.*

Despite the fact that education in safety is a very important part of technical education, to the best of the researcher's knowledge there has been no attempt to date to examine the safety aspects related to technical and vocational training in Saudi Arabia.

In order to examine the low level of satisfaction with the element *Safety of environment*, it is necessary to find out the likely causes. Based on the interviews with the Employed JIC Graduates (EJG) and Work Supervisors (WS) (Table 7.96), the following are the possible causes:

a. Lack of emphasis on Safety in general and its non-inclusion in the basic courses of the College.
b. The fact that safety of environment is not a part of the curriculum of the JIC course of study.
c. Failure to teach safety of environment to students.
d. The necessity to reform the Safety curriculum.
e. The need to emphasize environmental pollution.
f. The lack of safety equipment and aids in welding and machine shops.

The level of satisfaction expressed towards the *safety awareness and practice* factor and its first three elements, the *safety of individual, safety of equipment and facilities,* and *safety of others,* was not an unexpected response, due to the way that safety is taught and practiced at JIC. An essential safety principle in the JIC technical education curriculum is the devoting of sufficient time for safety instruction and the learning about unsafe and safe conditions in both on-site and off-site work situations. The safety instructor at JIC has never been the principal trainer in safety. The principal trainers in safety are the instructors who train students in hands-on experience and laboratory work. Training for example is a very important delivery mode and students are more influenced by what their instructors do than by what they say.

The College is one of the academic institutions in Saudi Arabia which have included relevant safety courses in their curricula. These include environmental pollution control engineering, safety in chemical laboratories and Industrial safety. The first course addresses environmental pollution; the remaining two courses are geared more towards occupational safety, in the laboratory environment and outside. The suggestion that the *safety of environment was not a part of the curriculum of JIC course of study,* does not hold much validity as this topic, as indicated above, is indeed taught in some majors of the College; however, the need for its inclusion in other majors cannot be ignored. As Chaaban (1998) remarks:

> **"It is essential that engineering technology curriculum should include environmental education in different disciplines at various levels. It is needed to expand the contents of environmental-related courses as well as to integrate them into the existing subjects. Educational and training programmes should produce skilled professional and technical manpower that has been exposed to environmental issues related to their profession"** (p. 1).

A great deal of emphasis has also been put upon enforcing safety through procedures. In this respect one can refer to the manual on Safety and Health Procedures. This manual was developed by the Safety Section of JIC. The College enforces a coordinated safety programme on its premises for developing safe practices and a healthy working environment among its inhabitants. It has a well laid out manual on safety and health procedures. Its safety committee assists in updating safety rules responding to health and safety issues. There is a safety coordinator in each of the technical departments of the College.

A further contributor to the satisfactory level of satisfaction with the *safety awareness and practice* factor could be the distinct site of the College. JIC is located at the heart of the industrial complex of Jubail Industrial City. JIC students have the advantage of being constantly influenced by this kind of environment and therefore they develop a sense of safety awareness through visits to industry and the co-operative training programme which they enjoy.

The unsure level of satisfaction in the area of *safety of environment* and the comments made in this regard are not very surprising, as this is not fully covered in the curriculum of the JIC safety course. This probably has caused some deficiency in environmental safety awareness among students.

It was further suggested that at JIC *there was no emphasis on safety in general and it was not a part of the basic courses of the College.* It is difficult to see what may prompt this suggestion as indeed the general safety course, which comprises personal and workplace safety, forms part of the technical specialisation curricula of the College.

Also, the comment on the *lack of safety equipment and aids in welding and machine shops,* requires to be qualified. The practices in the College's machine shops are consistent with those in industry, with the provision of safety equipment for the operator and the machine, as would be expected. The situation in the welding workshops is no different. It is true that the latter were not well ventilated, but the ventilation has been significantly improved recently and poses no serious safety hazards.

8.2.8 Organisational Behaviour and Human Performance

The organisational behaviour and human performance of students and graduates is a factor that cannot be neglected if the educational institutions want to produce marketable graduates. Industry in particular is very much concerned with organisational behaviour and human conduct due to the nature of its operations, where carelessness can cause immeasurable damage.

In fact, the respondents themselves, as indicated by their answers to the open-ended question (Table 7.95), are concerned with the impact of this factor upon their performance in the workplace. They believe that the College should *train students to interact with supervisors and colleagues.*

To enforce this factor, a course entitled Industrial and Organisational Psychology is included in the College curricula, which must be read by all the students.

The importance placed upon this factor at JIC arises from two concerns, namely: a) to produce a disciplined person who serves his country and community better, and b) to produce a technician who understands the organisational behaviour and human conduct expected at the workplace.

The elements included within this factor are: 1) Discipline (obedience to instructions and respect for others), 2) Punctuality and time management, 3) Readiness to learn more, and 4) Ability to execute a task with minimal supervision (self-motivation).

The results of the study revealed that the three groups together were more than just satisfied with this factor, because their level of satisfaction was equal to a value above 4 (satisfied). The results indicate that the groups were also more than just satisfied with the elements within the factor except for the element *Ability to execute a task with minimal supervision,* where the level of the satisfaction of the groups was below the satisfied level (4) and above the dissatisfied level (2) on the five-point scale. It means that the groups' level of satisfaction with the stated element falls in the neutral position of "unsure". The high satisfaction of the groups with this factor was an outcome of their level of satisfaction with the elements forming the factor.

Moreover, the results of the study have indicated that there are significant differences between the levels of satisfaction of the groups with the factor and its elements, except for the *Punctuality and time management* element where the three groups are similar.

Also it was found that the JIC Students were the least satisfied with the factor itself and the *Readiness to learn more* element, while the Work Supervisors were the least satisfied with the *Discipline* element.

As can be seen from the above findings, the null hypothesis suggested in this study seems not to be supported, namely that *the three groups (EJG, WS and JS) are not satisfied with the organisational behaviour and human performance offered by the course of study at JIC.*

Al Megren's (1996) work showed that the private sector in Saudi Arabia **"believed that the students [in vocational schools] lack discipline, self-confidence and aspiration"** (p. 131). It further notes that **"the curriculum used in the vocational education system has to be designed ... to demonstrate ... the deep desire for developing positive values and work attitudes among students [and] such characteristics [which] would include responsibility, dependability, willingness to learn and a feeling [for] success"** (pp. 140-141).

On the issue of the *readiness to learn more* , Carnevale et al., as cited in Carlson (1997), remark that of **"[the] skills employees determined to be important to the workplace, ... learning to learn"** was one of the sixteen key skills which were considered mostly needed in the workplace (p. 34).

A thorough review of the above findings may indicate that the high satisfaction among the groups relevant to the first three elements of *organisational behaviour and human performance* could be due to certain organisational and societal characteristics, such as, religion, tribe and family system, culture and the formal organisational system of JIC.

In this respect, it can be indicated that the tight control and formal disciplinary systems used by JIC have a substantial impact on the students' behaviour and attitudes. Specifically, the formal procedures of student registration and attendance, formal assessment and examination, and general student administration exerted by JIC management and academic staff can be considered as important determinants in shaping students' attitudes and behaviour towards the obedience of systems and respect for others *(discipline)*, *punctuality and time management* and *readiness to learn more.*

Another explanation, which can be put forward in this study, may be religion. Islam and its instructions stress the values of respecting others, high organisational commitment and performance, self-discipline and a sincere desire to learn. These values can be seen as factors influencing the working climate and relationships with superiors and other students involved in this study.

The third explanation could be the family and tribal system peculiar to Saudi Arabia. As can be noticed, the societal factors have a certain reasonable influence on the socialisation and self-discipline of JIC students. That is, tribal and parental power and authority may influence behaviour, attitudes and performance of JIC students.

Although the results of the interviews with the Employed JIC Graduates and Work Supervisors have not revealed any possible causes for the low level of satisfaction (unsure) with the element *Ability to execute a task with minimal supervision*, the researcher believes that the low level of satisfaction could be due to certain contextual and work-related factors, such as, the extent of task variety, ability to analyse, managerial styles, lack of employees' participation in decision-making, lack of integration and communications and possibly lack of knowledge, training and technical skills among the groups.

Thus, the lack of work autonomy and task variety (high routines), besides the autocratic styles of management, may have contributed in reducing the desire of JIC graduates to be independent and use their own initiative to conduct the activities and tasks related to their jobs (Perrow, 1971).

Likewise, the lack of integration and communications for example, may violate the organisational climate relevant to the interrelationships between supervisors and these individuals.

Moreover, the present researcher thinks that the low level of satisfaction associated with this particular element may be referred to the fact that the majority of JIC employed graduates are still at the beginning of their careers, which may restrict them from showing initiative or at least make them hesitant in this direction.

8.2.9 Job Relation to Course of Study

The links between the job that the graduate is currently handling and the course of study that he has pursued at the College is essential for the success of the graduate and vital for the organisation that the graduate works for, because **"the days when colleges will continue to offer traditional programme regardless of the training needs of local industries in which they are located, or the regions they serve"** are over (Kader, 2000, p. 3).

In the case of employment, a college graduate from courses which are not linked to a particular job will have more difficulty and take longer finding a worthwhile occupation (Brennan, 1988, p. 43). On the other hand, **"graduates with degrees – and jobs – in the professional fields earn 25 percent more annually than classmates who have the same major but do not work in jobs connected to what they studied"** (Freeland, 1999, p. 1). This concept was supported by the results of the 1987 survey of the Canadian graduates of 1982, when it was found that graduates of study programmes that are not designed to qualify students for a specific profession, **"may take longer initially to achieve a successful placement in the labour market than do those whose field of study is closely connected to an occupation or profession"** (OCED, 1992, vol. II, p. 36).

Therefore, the industries often advise JIC to offer courses which are job-oriented in terms of knowledge and hands-on contents, so that these may fulfil the requirements of the intended jobs. Employers also share some responsibility in assigning the right person to the right job, thereby playing their part as the factor suggests they should.

This factor only includes one element and that is the *Job relation to course of study.*

The results of the study revealed that the level of satisfaction of the three groups together with this factor was below the satisfied level (4) and above the dissatisfied level (2) on the five-point scale. This simply means that the level of satisfaction falls in the critical category of "unsure", which indicates the neutrality of their level of satisfaction. The result was the neutral reflection of the groups' level of satisfaction with the single element of the factor.

Furthermore, the results indicated that there were significant differences between the groups' level of satisfaction toward the factor and the element. It was found that the Employed JIC Graduates (EJG) were the least satisfied among the groups with the factor and its element, while the JIC Students (JS) demonstrated a higher level of satisfaction compared to the other groups.

As can be seen from the above findings, the null hypothesis suggested in this study seems to be supported, namely that *the three groups (EJG, WS and JS) are not satisfied with the relation between the job and the course of study offered at JIC.*

Khateeb (1985) studied the effectiveness of the technical education in Saudi Arabia in fulfilling the needs of Saudi industry, and the on-the-job-training which the industry provided. His observations below, which contrast with the above findings of the current study, were that the **"middle managers in Saudi industrial organizations, as a group, agreed that both technical education programs and the on-the-job training programs were sufficient to fulfil the requirements of the Saudi industry"** (p. 281). However, the individuals themselves who participated in the technical education programmes thought that **"these programs were not sufficient to fulfil the requirements of Saudi industry"** (p. 290).

Moreover, those who received the on-the-job-training thought that **"these programs were sufficient to fulfil the requirements of Saudi industry"** (p. 291).

Khateeb (1985) concludes that **"the course contents of the technical programs [in Saudi Arabia] should be revised to correlate more closely with the [immediate] and the long-term needs"** of Saudi industry (pp. 289-290).

Al-Ghamdi's (1994) study on technical education and vocational training in Saudi Arabia notes that **"more than a third of the [student] respondents felt that the training provided for them was not enough to equip [them] to practice work after graduation"** (p. 391).

The importance of employment in a job related to the student's training was also highlighted in Carlson's (1997) work. She remarks that **"not only has it been a measure of success for the graduate and in turn the vocational school, it has also served as a measure of employment demand"** (p. 36). Her survey among the technical college graduates reveals that **"78.7% [of those asked] indicated that their job was related to their education"** (p. 71).

In order to examine the low level of satisfaction with this factor, it is necessary to find out the likely causes. Based on the interviews with the Employed JIC Graduates (EJG) and Work Supervisors (WS) (Table 7.96), the following are the possible causes:

a) Lack of emphasis in JIC curricula on the job requirements related to the fertiliser industry in particular.

b) Need to shift emphasis in JIC curricula to the areas of specialisation.

c) Weak relationship between the hands-on and theoretical subjects taught.

d) The fact that JIC curricula only provide fundamental knowledge and basic skills related to profession.

e) Lack of on-the-job training when joining the firms.

For the element *Job relation to course of study,* it was suggested that *curricula should emphasize the job requirements related to the fertiliser industry in particular.* The researcher believes that all process industries, including the fertiliser industry, basically depend on core subjects taught in specialisations. As such the students learn process operations and process control of various products, such as fertilisers, chemicals, petrochemicals, etc.

It was further suggested that the *emphasis in JIC curricula should be shifted to the areas of specialisation.* The researcher thinks that there is a reasonable emphasis on specialisation subjects in JIC curricula. It is true to say that JIC is not a vocational centre for learning skills only; it is also a seat of higher learning that provides knowledge with skills. The College curricula offer broad-based study that focuses on the specialisation subjects. As a result, students are able to understand specialisation subjects more thoroughly, and place much greater emphasis on the areas of specialisation.

It was further suggested that there is a *weak relationship between the hands-on and theoretical subjects taught* at JIC. The researcher thinks this generalization may not hold much validity. Each course at JIC provides a balanced study in theory and practice. It seeks to stimulate students' creativity, develop technical competence and encourage good understanding of relevant industrial practices. However, in view of the above comment by the respondents, a review of the speciality and speciality-related courses for theoretical and practical contents will be helpful.

The researcher further believes that globalisation and speed of technological changes etc. make one aware of the fact that excellence in certain areas alone does not guarantee long-term security of employment. The technicians have to master additional skills to meet the new challenges. One should always bear in mind that basic and fundamental skills and knowledge should make up a major portion of the core speciality subjects, especially in technical colleges, firstly because they are supposed to cater for the common skills and knowledge required by employers, and secondly because they are a part of the higher education system.

The researcher does not dispute that the College graduates *lack on-the-job training prior to employment*. The only period during which the College students get some on-the-job experience is during their co-operative training in industries. This period is brief, and is only intended to give them some exposure to industrial practices, not to receive enough on-the-job experience for later employment. One has to see the context in which the educational experience in the college prepares a graduate for employment.

8.2.10 Awareness of Job Requirements

The awareness of clear and well defined job description and requirements, such as duties, responsibilities, skills and knowledge, help the graduate in forming the proper expectations of the job, which results in his readiness to execute it according to what the employer wants. This is a shared responsibility between the educational institution and the employer, because the required information related to this factor is in the possession of the employer, and **"unless educational institutions are made fully aware of these requirements they cannot assist efficiently"** (Hunter, 1981, p. 18).

This factor includes two elements: 1) Job duties and responsibilities, and 2) Skills and knowledge required for the job.

The results of the study revealed that the level of satisfaction of the three groups together with this factor was below the satisfied level (4) and above the dissatisfied level (2) on the five-point scale. This simply means that their level of satisfaction falls in the critical category of "unsure", which indicates the neutrality of their level of satisfaction. This result was the natural reflection of the groups' levels of satisfaction with the two individual elements within the factor, which were similar to that of the factor.

Furthermore, the results show that there were significant differences between the levels of satisfaction of the groups with the factor and its elements. It was found that Employed JIC Graduates were the least satisfied among the groups with the factor and its elements, while the JIC Students demonstrated a higher level of satisfaction compared to the other groups.

As can be seen from the above findings, the null hypothesis suggested in this study seems to be supported, namely that *the three groups (EJG, WS and JS) are not satisfied with the awareness of job requirements offered by the course of study at JIC.*

The above result has some semblance of agreement with those in some previous studies.

Al Megren's (1996) work on vocational education in Saudi Arabia showed that **"the students [in vocational education] lack awareness of the job requirements"** (p. 131).

Al-Ghamdi (1994) in studying the factors which influence technical education and vocational training in Saudi Arabia remarks, **"The students should spend [time] in workplace [which] would familiarize [them] with the nature of the work which they are going to do"** (p. 407).

In order to examine the low level of satisfaction with this factor, it is necessary to find out the likely causes. Based on the interviews with the Employed JIC Graduates (EJG) and Work Supervisors (WS) (Table 7.96), the following are the possible causes, classified according to elements.

1. Job duties and responsibilities:

   a. Lack of awareness by graduates of the duties and responsibilities of their jobs until they have joined the co-operative training programme.

b. Lack of formally organized lectures on the definition, importance and responsibilities of the job.

c. Difference of job duties and responsibilities in different firms.

2. Skills and knowledge required for the job:

   a. The fact that basic skills of the speciality area are not thoroughly introduced.

   b. Lack of relation between practical and theoretical subjects.

   c. Lack of guidance or counselling related to this matter.

   d. Need for formal training sessions introducing the meaning and definition of a job and explaining skills required.

Under the element *Job duties and responsibilities*, it was suggested by the interviewed EJG and WS that JIC *graduates are unaware of the duties and responsibilities of their jobs until they have joined the Co-operative training programme*. The researcher believes that the students are not given enough advice in the College on the jobs they may do upon graduation. Most instructors do not provide this owing to their lack of industrial experience, which prevents them from identifying the sectors in industry where the College graduates may fit in. This may also occur due to the instructors' limited contact with industry.

The above, although it may not greatly affect the learning process, will make the students wait till they go to the industries for co-operative training or employment upon graduation before getting much information on this subject. This deficiency in the College programme clearly needs to be examined. In this regard, the researcher proposes to share, through Industrial Advisory Committees (IACs), information related to graduates expected job function, problem-solving skills, personal attitudes and disciplinary requirements, which impact personal well-being at work.

Furthermore, it was pointed out by respondents that there is a *lack of formally organised lectures on the definitions, importance and responsibilities of the job.*

This points to the small number of seminars which are held in the College with industrial participation.

As a matter of fact, one of the suggestions related to the open-ended question indicates that JIC should *arrange for visits to the College by technicians from industry to discuss the job environment with students.* Such arrangements as they believe, may lead to a better graduate.

JIC fully recognises the fact that *job duties and responsibilities differ from one firm to another,* but, presumably, the researcher expects all students to achieve the same level of understanding after a transition from College to industry. This suggests that simple progression through study and training over a semester or two may not be as effective as some lectures or talks in which important elements related to job are discussed at intervals.

Under the element *Skills and knowledge required for the job,* it was suggested that *basic skills of the speciality area were not thoroughly introduced.* The College aspires to prepare its graduates to a great extent as job-ready technicians. It caters for the basic skills of the speciality areas by offering some of the basic courses with speciality subjects. So the researcher strongly believes that JIC curricula are designed carefully and thoroughly and indeed cater for basic skills needed for speciality subjects.

The respondents felt that there is *no relation between practical and theoretical subjects.* The researcher believes that science and engineering are the subjects which cannot be taught without practical sessions. That is to say theory and practicals are complementary to each other.

The respondents also noted little or *no guidance or counselling related to the above matter.* The researcher felt that there is some truth in that, because JIC does not formally provide such guidance to students, simply because it is assumed that the students will be familiarised with the required skills and knowledge once they complete the course of study and the Co-operative training programme in industry.

The researcher is convinced of the validity of respondents' suggestion that *formal training sessions introducing the meaning and definition of a job and explaining skills required were essential.*

8.2.11 Physical Well-Being

Physical fitness and well-being of the students have become increasingly important for both the individual and the employer **"as social awareness of physical appearance, physiological fitness and mental well-being have come to the forefront"** (Westminster College, 2002, p. 1). As a matter of fact, industrial employers very often deny requests for employment if the candidate does not appear physically fit.

Therefore, JIC has attempted to enhance the physical fitness and well-being of its students through two means: a) the formal compulsory physical education courses, and b) the evening recreational and sports activities.

This factor only includes one element and that is *Physical fitness.*

The results of the study revealed that the level of satisfaction of the three groups together with the factor was below the satisfied level (4) and above the dissatisfied level (2) on the five-point scale. This simply means that their level of satisfaction falls in the critical category of "unsure", which indicates the neutrality of their level of satisfaction. This result is a natural reflection of the groups' level of satisfaction with the single element within the factor.

Moreover, the results indicate that there are significant differences between the three groups in the level of satisfaction with the factor and its element. It is found that the Employed JIC

Graduates were the least satisfied among the groups with the factor and its element, while the JIC Students had a higher level of satisfaction.

As can be seen from the above findings, the null hypothesis suggested in this study seems to be supported, namely that *the three groups (EJG, WS and JS) are not satisfied with the physical fitness programme at JIC.*

Despite the fact that the physical well-being of the students is part of the technical education, to the best of the researcher's knowledge there has been no attempt to date to examine this aspect within the context of technical and vocational training in Saudi Arabia.

In order to examine the low level of satisfaction with this factor, it is necessary to find out the likely causes. Based on the interviews with the Employed JIC Graduates (EJG) and Work Supervisors (WS) (Table 7.96), the following are the possible causes:

a. Lack of continuity on sports programmes.
b. Limited College participation in national tournaments and competitions.
c. The fact that sport facilities need maintenance and care.
d. Lack of recreational staff.

With regard to the above comments related to the JIC *physical fitness* programme, the present researcher believes that JIC has recently taken different measures for rectifying the minor deficiencies in the programme as seen by the respondents interviewed.

The increase in the student admission rate, which started in 1996, resulted in scheduling a number of College classes in the evening. This might have reduced the students' participation in recreational activities and intercollegiate sports, and hinders the College's participation in nationwide competitions and tournaments. This may partially justify the comment about *limited college participation in national tournaments and competitions.*

The issue of the *lack of recreational staff* no longer exists, since the College has recently started hiring qualified staff to be responsible for recreational activities and improving the College's participation in regional and national sports tournaments. Moreover, the shortage of staff formerly minimised organised evening recreational activities. This, perhaps, justifies the origin of the comment about *lack of continuity in sports programmes.*

As far as the *sport facilities* are concerned, the researcher believes that JIC has adequate facilities covering almost all types of outdoor and indoor sports. These facilities are always kept in good condition through continuous maintenance services. The researcher thinks that if there was any repair needed in the past, it did not really go beyond the normal maintenance requirements.

8.2.12 Links Between the College and Industry

This factor covers all the various links that exist between the College and industry and the impact of such links on a graduate's qualification. The links between educational institutions and industrial employers is a vital element in the process of providing industry with the qualified manpower needed, because **"where this relationship is poorly developed students prospects are uncertain"** (Al Megren, 1996, p. 161). Therefore, technical colleges and industrial organisations must sit down and work co-operatively. They must not only engage in this dialogue, but also encourage it, leaving aside mistrust and self-interest (Buckler, 1992, p. 34).

JIC has tried consistently to build up this relationship and to enhance it afterwards through the following activities: a) Co-operative training programme, b) Student field visits to industry, c) Lecturing and training conducted by industry representatives, d) Graduates' employment in industry, and e) Involvement of industry in the development of curricular and training facilities. In addition, in the year 2000 the College formed seven Industrial Advisory

Committees, with clear objectives, to support the technical speciality areas, as mentioned earlier.

The results of the study revealed that the level of satisfaction of the three groups together with this factor was below the satisfied level (4) and above the dissatisfied level (2) on the five-point scale. This simply means that their level of satisfaction falls in the critical category of "unsure", which indicates the neutrality of their level of satisfaction. This result was the natural reflection of the groups' levels of satisfaction with the four elements within the factor. That level of satisfaction was below the satisfied level (4) and above the dissatisfied level (2) with all the elements except the *Co-operative training programme* where the groups' level of satisfaction was equal to the satisfied level (4).

Furthermore, the results indicated that there are significant differences between the groups in the level of satisfaction with the factor and its elements. It has been found that the Employed JIC Graduates were the least satisfied while the JIC Students were the highest satisfied with the factor and four elements, and Work Supervisors were the highest with regard to the *Graduates' employment in industry.*

As can be seen from the above findings, the null hypothesis suggested in this study seems to be supported, namely that *the three groups (EJG, WS and JS) are not satisfied with the College's links to industry.*

Al-Ghamdi (1994) cites weak links between vocational training and the workplace in Saudi Arabia, and remarks **"The problem [is] common among the developing countries, where practical education is largely isolated from the natural work environment"**, (p. 393). He further notes that **"the overwhelming majority of vocational training students [in Saudi Arabia] had not been given external training related to their specializations"** (p. 393).

Al Megren's (1996) work also shows weak links between the technical and vocational education in Saudi Arabia and the private-sector employers. He notes that **"although the**

majority (54.4%) of the private sector is willing to cooperate with vocational educational schools, it seems there is little, if any, cooperation" (p. 133).

Regarding students' field visits to industries, Al-Ghamdi (1994) notes that **"only 4.6 percent of interviewees responded that their schools organised visits to some industrial establishments"** (p. 388).

On the effectiveness of the cooperative training programme in technical education, Khateeb (1985) finds **"technical training program administrators, as a group, agreed that ... on-the-job training programs were sufficient in practical instruction"** (p. 284).

On graduate employment in industry, Khateeb (1985) shows that **"effective procedures for facilitating the transfer of individuals between technical training or on-the-job training programs and appropriate jobs in Saudi industry did not exist"** (p. 282). In particular, the **"individuals participating in the technical education programs, as a group, agreed by a wide margin that they did not obtain suitable jobs upon transfer from programs to industry"** (pp. 282-283).

Khateeb (1985) regrets that the links between the technical education and the industry **"often failed to ensure that technical education programs fulfilled the requirements of Saudi industry"** (p. 288).

On the role of the industry in curriculum planning, Carlson (1997) notes that **"vocational education curriculum may be the most important factor in workplace issue"** (p. 127).

This must be, she notes, **"delivered in a way that meets the needs of the work environment. Educators have a responsibility to work with business and industry to provide up-to-date curriculum"** (p. 127).

In order to examine the low level of satisfaction with this factor, it is necessary to find out the likely causes. Based on the interviews with the Employed JIC Graduates (EJG) and Work

Supervisors (WS) (Table 7.96), the following are the possible causes, classified according to elements.

1. Student field-visits to industry:

   a) Rarity of field visits.

   b) Insufficiency of time allocated for field visits.

   c) Need for field visits to cover a wide range of industries.

2. Lecturing and training conducted by industry representatives:

   a) Non existence of such lecturing and training.

   b) The claim that they are not necessary as students make field visits to industry.

   c) Importance of quality of representatives.

3. Graduates' employment in industry:

   a) Difficult job requirements.

   b) The fact that some companies started hiring graduates of Secondary Schools instead of the College's graduates.

   c) Lack of information about JIC graduates.

4. Involvement of industry in curricular and training facilities development:

   a) Shortage of contribution on the part of industry.

   b) The fact that industry may not have the calibre of people able to do these tasks especially curricula development.

   c) Complete lack of involvement of industry in curricular and training facilities development.

   d) Needs to encourage industries' participation.

Under the element *Student field visits to industry,* it was suggested that the *field visits are rare or few.* Field visits to industry are an essential component of students' learning, as these enable the students to develop an awareness of the requirements of the real world. Most of the companies in the region are only willing to entertain a few visits by college students. As a matter of fact, JIC has only arranged for 32 field visits to industry during the academic year 1419/1420 A.H. – 1998/1999 (JIC, A Decade of Accomplishments, 1420 A.H., p. 26).

In any case, this is a weakness of the system which cannot easily be remedied. In the open-ended question the respondents also suggested that the College *arrange for visits by students and staff members to industry* (Table 7.95).

It was further noted that the *time allocated for field visits was not sufficient.* The researcher fully agrees with that. By having sufficient time for a field visit, students may get proper learning experience.

It was also suggested that the *field visits need to cover a wide range of industries.* The researcher recognizes the need to cover a wide range of industries, whereas at present student field visits are restricted to a few industries only, partly for security reasons and partly owing to the engagement of industry in large expansion projects. However, the researcher believes that the latter reason is a temporary phase and the situation will improve with the passage of time.

The respondents also thought that the lectures related to technical topics and conducted by industry representatives *do not exist at all.* The researcher feels that this statement is partially true, because the number of technical lectures organised by inviting experts from industry is limited and does not cover all the student sections or the College disciplines.

It was further suggested by the respondents that the lecturing and training conducted by representatives of industry is *not necessary, and that student field visits to industry are better.*

The researcher believes both have their own importance and significance. Technical lectures benefit students and also help staff update their knowledge.

In fact, respondents suggested through the open-ended question that the quality of the educational and training programme offered by JIC can be enhanced by *the invitation of highly qualified employees from industry to teach at the College,* which confirms the importance of this element (Table 7.95).

Under the element *Graduates' employment in industry,* it was suggested that the *job requirements are difficult* for graduates to follow. The main objective of any college programme is to prepare students to assume job responsibilities for the jobs assigned to them in business, commerce and industry. Lack of sufficient orientation in the job-related skills by employers probably creates difficulties among new employees in meeting job requirements.

The researcher feels that all students should be oriented in the College before they are considered for graduation, through technical lectures and by company representatives in related fields.

It was pointed out that the *some companies started hiring graduates of secondary school instead of college graduates.* The researcher believes that there is some truth in this. Hiring graduates of secondary school is still practiced by a few companies, even though most of them realise the benefits of hiring college graduates. This is perhaps due to the shortage of qualified technical college graduates.

It was pointed out that there is a *lack of information about JIC graduates* which may hinder their employment in industry. JIC maintains connections with prospective employers and arranges on-campus interviews for graduating students. It regularly stages career days when major employers exhibit aspects of their companies. Students get the opportunity to meet company representatives on campus. In addition, through the co-operative training programme, students themselves develop useful connections with prospective employers.

Despite the above, the researcher believes that there is some shortage of information about JIC graduates among industrial organisations.

To demonstrate their awareness of the importance of the links between the College and industry, especially with regard to disciplines and graduates' employment, respondents, in the open-ended question, suggested that JIC should *coordinate with industry regarding areas of specialisation and employment of graduates* (Table 7.95).

Under the element *Involvement of industry in curricular and training facilities development,* it was pointed out that there is a *shortage of contribution on the part of industry.*

As the College continuously endeavours to build its educational programmes in line with industrial needs, it is aware that its educational objectives cannot be fulfilled without the active participation of the industrial community it serves. The importance of working in liaison with industry in evaluating and upgrading its programme is recognized by JIC. The setting up of seven Industrial Advisory Committees is a good example of this. The goal of the committees is to ensure that the skilled workforce produced by the College meets the requirements of industry.

It was further suggested that *industry may not have the calibre of people able to do these tasks, especially curriculum development.* The researcher recognises that industry does not require to be involved directly in specialised tasks such as curriculum development but can play a significant role in identifying the required elements of the curriculum which are of industrial importance.

Moreover, it was suggested that the involvement of industry in curricular and training facilities development *does not exist at all.* The researcher believes that the participation and contribution of industry is limited in this respect.

The researcher believes that the College has maintained some links with the different industries in the area. So far, these links have been active and helped in providing the College's graduates with job placement opportunities, co-operative training slots, and the conduct of professional development training programmes tailored to the needs of industries. The industrial advisory committee scheme established recently will further enhance the relationship between the College and industry by providing the technical speciality areas of JIC with the necessary information related to workplace requirements as well as the employers' expectations of the graduates.

8.2.13 Selection of Course of Study

This factor mainly covers whether the graduate selected the appropriate specialisation that is best suited to his own ability and matches his own interests. The researcher believes that if a wrong choice is made, then it may be a reason for the unsatisfactory quality of the graduate. As a matter of fact, **"students should spend significant time – beginning in high school and extending throughout the their freshman year in college – deciding on a course of study"** (Freeland, 1999, p. 1). Two additional elements were included in the survey instruments of the EJG and JS groups to determine to what extent the two groups are satisfied or not satisfied. These elements are: a) Vocational/guidance and counselling services, and b) Procedures for selection of specialisation. The second group (WS) was excluded because the researcher assumed that the respondents of that group are not aware of these two elements due to the fact that these two elements were internal services and procedures of JIC and they are only known to the College's students and graduates. Therefore, the factor that underwent analysis has only one element and that is the *Selection of course of study.*

The results of the study revealed that the level of satisfaction of the three groups together with this factor was below the satisfied level (4) and above the dissatisfied level (2) on the five-point scale. This simply means that their level of satisfaction falls in the critical position of "unsure", which indicates the neutrality of their level of satisfaction. This result was the natural reflection of the groups' level of satisfaction with the element as there is only one single element within the factor.

Furthermore, the results indicated that there are significant differences between the groups' levels of satisfaction with the factor. It is found that the Employed JIC Graduates are the least satisfied of the groups.

As can be seen from the above findings, the null hypothesis suggested in this study seems to be supported, namely that *the three groups (EJG, WS and JS) are not satisfied with graduates' selection of their courses of study at JIC.*

The researcher believes the above findings have significant relevance for the work of Al-Ghamdi (1994) who, rather alarmingly, notes that **"a large percentage of students in both industrial education and vocational training [in Saudi Arabia] did not choose their specialisation according to their personal desire, abilities, aptitudes or the availability of work opportunities in the future, but according to other factors, as a result of which many would not continue to practice the trade they had chosen, after graduation"** (p. 390).

Al-Ghamdi (1994) further remarks, **"the deficiency of vocational guidance in directing students into the specialization consistent with their desire, abilities and aptitude ... are important reasons why graduates of TVE [technical and vocational education] do not practice vocational work after graduation"** (pp. 395-396).

Al Megren's (1996) work shows that the private sector in Saudi Arabia believes that career counselling is important in vocational education (p. 133).

In order to examine the low level of satisfaction with this factor, it is necessary to find out the likely causes. Based on the interviews with the Employed JIC Graduates (EJG) and Work Supervisors (WS) (Table 7.96), the following are the possible causes:

a) Lack of vocational guidance and counselling at the College,

b) Insufficient student knowledge of specialisations because of lack of information,

c) Inadequacy of academic advisors in the performance of their roles,

d) Because it was the start of JIC,

e) Lack of discussion about student's degree plan between the student and his academic advisor.

The researcher wants to draw attention to the fact that JIC has developed and applied procedures for the selection of specialisations that depends primarily upon the following:

a. The Speciality-department criteria.

b. The student GPA.

c. The availability of vacancies in the specialisation.

d. The prioritised preference of the students.

The researcher thinks that these procedures do not exactly lead to a positive response in the particular choice of each student, and they will not provide that in the near future as long as the process of declaration of majors relies on the availability of vacancies in the different specialities and the degree to which the student's achievement (credentials) meet the departmental criteria, including the GPA. This is not in line with the respondents' suggestion in the open-ended question (Table 7.95) that *students should be given the freedom to choose their majors regardless of their GPA*.

Moreover, the JIC Students Affairs Procedures allow students to change their majors if they wish, based on the change of major requirements (JIC, Student Affairs Regulations Manual, 2000, p. 14).

With regard to the respondents' two comments related to the *lack of vocational guidance and counselling at the College* as well as the assumptions that *academic advisors are not doing their jobs*, the researcher believes the College's academic advisors are failing in their advisory duties of providing vocational/ career guidance and counselling services to the students.

Academic advising is an integral part of the educational process and it is not just a support service. The International Association on Educational and Vocational Guidance (IAEVG) declared in September 2001 that:

> **"Effective Educational and vocational guidance and counselling can assist individuals to understand their talents and potential and enable them to plan the appropriate steps to develop essential skills that will lead to personal, educational, economic and social advancement for the individual, family, community and nation"** (UNESCO, 2002, p. 6).

Winston et al. (1984) also found that **"Effective advising programs offer students an opportunity to realize their full potential"** (Mavrovouniotis, 1996, p. 156). The educational process and the goals it serves are complex and confusing to most students. As the student is coping with the complex college environment, it is easy for him to focus on minor details and daily duties rather than on his personal and educational development. Winston et al. (1982) reported: **"The advisor's office, with its many systematic student contacts is a powerful mechanism for implementing intentional and deliberate student development. Academic advising has an impact on students' retention, academic success, and the career-choice process"** (Mavrovouniotis, 1996, p. 156).

Kramer et al. (1977) offer an expanded classification of advisory roles, emphasizing that **"the roles shift depending on the particulars of the advising question and on symmetric roles assumed by the students"** (Mavrovouniotis, 1996, p. 157).

Despite the importance of career guidance and counselling, especially that related to the *selection of course of study*, the researcher is of the opinion that insufficient attention has been paid to academic advising at JIC. As a matter of fact, respondents' answers to the open-ended question (Table 7.95) have clearly called for *activation of the role of the academic advisor* and suggested that advisors should *discuss learning problems with students.*

Mavrovouniotis (1996) has found that academic advising has an impact on students' academic success and career choice process. An advisor should motivate students through encouragement and support, but the responsibility for making a decision concerning a student's career path is his own.

It was further suggested that the *specialisations are not very well known to students because they have not been oriented.* In addition, respondents in the open-ended question (Appendix E) suggested that the academic staff and advisors should *give students complete information about majors* of study available at JIC so they can be oriented and able to select the most suitable one.

Despite the importance of the above two comments, the researcher believes that students are assumed to be naturally immature and thus orientation alone cannot serve the purpose, but definitely it will be a first step towards better understanding.

In the respondents' view there was a *lack of discussion about the students' degree plan between the student and his advisor.* In the researcher's opinion, this is partly true. In routine advising sessions, an advisor simply reviews his advisee's progress with the degree plans. Since the advisor usually has the authority to approve or deny students' requests and is responsible for ensuring that the degree requirements plan is met, he may need to be more pro-active and leave somewhat less freedom to the students.

8.3 Conclusions

The conclusions of this study will be divided into two parts as detailed below:

8.3.1 Respondents' Profiles

Before presenting the main conclusions of the study, the researcher feels it is useful to include a typical profile of each of the three groups involved in this study. These profiles were created from the collected descriptive data related to the socio-demographic and other background information of the respondents.

1. Employed JIC Graduates (EJG)

The findings of the descriptive analysis of the data showed that a typical Employed JIC Graduate of the present study is characterized as:

- A 25- to 29-year-old married Saudi, originally from either the Eastern or the Southern Region and a graduate of the Natural Sciences stream of the Secondary School with a grade average of "Very Good", who joined JIC to be a skilled technician.
- A full-timer when at the College, majoring in Instrumentation and Control, Electrical Power or Electromechanical Engineering Technology with a grade point average of from 2.5 to 2.99.
- An employee of a firm producing petrochemicals, and receiving a monthly salary ranging from 5000 to 6999 Saudi Riyals.

2. Work Supervisors (WS)

The findings of the descriptive analysis of the socio-demographic information related to Work Supervisors showed that a typical work supervisor of the present study is characterized as:

- A 36- to 45-year-old Saudi with a College degree and 6 to 10 years of experience. He is currently supervising 1 to 10 employees and has been supervising JIC graduate(s) for 3 to 4 years.
- Working for a firm typically characterized to have been in operation for 16 to 20 years, producing either petrochemicals or petroleum and employing more than 1000 employees, of whom 81 to 100 per cent are Saudis.

3. JIC Students (JS)

The findings of the descriptive analysis of the socio-demographic data of the JIC students showed that a typical JIC student of the present study is characterized as:

- A 20- to 24-year-old single Saudi, originally coming from either the Eastern or the Central Region who has completed the Natural Sciences stream of the Secondary School with a grade average of "Very Good".

- A full-timer at the College, specialising in Chemical, Instrumentation and Control, Electrical Power or Manufacturing Engineering Technology, with a current GPA of from 2.0 to 2.49.

- Having just completed the Co-operative Training in Jubail with a final grade of A+, A or B+, having had the opportunity to practice the skills trained for in a firm producing either petrochemicals or petroleum and after the completion of 61 to 70 credit hours of College work prior to the Co-operative Training.

8.3.2 <u>Main Conclusions</u>

The following main conclusions are drawn from the findings of the research conducted in this study, and are organised around the twelve factors and their elements related to the course of study, services and procedures offered at JIC.

1. The respondents of the study, as a group, did not express satisfaction with the *hands-on skills* that the JIC graduates should have gained before graduation. Such a low level of satisfaction, the researcher believes, could be due to the large number of students in the practical training sections, the lack of industrial experience on the part of some instructors and the lack of similarity between the equipment used for training and that adopted in the real workplace. The researcher also thinks that the lack of training related to the maintenance and troubleshooting procedures required for the development of

professional skills, was a factor in the low level of satisfaction expressed by the three groups. This conclusion is based on the following findings:

a) The level of satisfaction of all the groups together with the hands-on skills offered by the course of study at JIC is not at the satisfied level. It is within the "unsure", the neutral level, which is the critical area on the five-point scale. This level is the natural outcome of the levels of satisfaction of the same groups with the following three elements within the factor: a) *Basic manual skills* (*craftsmanship skills*), b) *Technician skills* (*workshop/laboratory experience*), and c) *Professional skills (maintenance and troubleshooting procedures*).

b) The Work Supervisors, who represent the industrial employers of the JIC graduates, as a group, indicated their satisfaction with the two elements within the factor, namely, *Basic manual* and *Technician skills.*

c) The JIC Students, as a group, indicated their satisfaction with the factor and the two elements within the factor, namely, *Basic manual* and *Technician skills.*

d) The groups' levels of satisfaction were different with regard to the *Professional skills* element only, where it was found that the Work Supervisors were the most, and JIC Students were the least satisfied.

2. The *Analytical skills* content in the JIC course of study, which comprises Sciences, Mathematics, and other speciality-related subjects, fell short of the expectations and the satisfaction of the three groups of the study. The researcher assumes that the increase in class size and the instructors' teaching load in recent years may have affected the students' achievement in the above subjects. Also, the researcher believes that the fact that the Mathematics course was originally designed for a university of Science and Engineering setting could be a reason for students finding it difficult to cope with its standards. In addition, one may not see a direct correlation between these courses and

the speciality courses because the former ones were designed to provide the background knowledge necessary for the latter courses. This conclusion is based on the following findings:

a) The level of satisfaction of all the groups together with the analytical skills offered by the course of study at JIC is not at the satisfied level. It is within the "unsure", the neutral level, which is the critical area on the five-point scale. This level is the natural outcome of the levels of satisfaction of the same groups with the following three elements within the factor: a) *Sciences (Chemistry and Physics)*, b) *Mathematics*, and c) *Related speciality subjects*.

b) The Employed JIC Graduates, as a group, indicated their satisfaction with the *Mathematics* element.

c) The JIC Students, as a group, indicated their satisfaction with this factor and the elements relating to *Sciences* and *Related speciality subjects*.

d) The groups' levels of satisfaction were different with respect to the *Mathematics* element only, where it was found that the Employed JIC Graduates were the most and JIC Students were the least satisfied.

3. The *Proficiency in English* offered by the JIC course of study was found to be relevant to a large extent to the needs of the individual and the workplace. The respondents of the study were satisfied with the *Comprehension, Reading* and *Writing skills,* but not with the *Communication skills* element, which is not up to the standard required by the College's students and graduates. The researcher believes that the students' weakness in the communication skills in particular, is due to the poor background that the student had prior to admission to the College. The large number of students in the English classes and the limited time allocated for the speaking and communication skills, could be reasons for the expressed level of satisfaction with these skills. The English language

programme, which was originally designed for a university setting, only provides limited oral presentations. And these presentations receive the least enforcement outside the classroom, which may justify the level of satisfaction spelt out by the respondents of the study. In addition, the notion that the industrial employers are only concerned with the ability of the college graduates to read manuals, listen to instructions and write reports may encourage the Work Supervisors to express their satisfaction with the communication skills currently offered by the JIC course of study. This conclusion is based on the following findings:

a) The level of satisfaction of all the groups together with the proficiency in English offered by the course of study at JIC is at the satisfied level. In fact, they are satisfied with the three elements: *Comprehension skills*, *Reading skills*, and c) *Writing skills*. But the level of satisfaction with the *Communication skills* is below the satisfied level (4) and above the dissatisfied level (2), which simply means the neutral level of "unsure".

b) The Employed JIC Graduates, as a group, indicated their satisfaction with this factor and its three elements, namely, *Comprehension, Reading* and *Writing skills.*

c) The Work Supervisors, as a group, indicated their satisfaction with the factor and its four elements.

d) The JIC Students, as a group, indicated their satisfaction with the factor and the elements concerning *Communication*, *Comprehension* and *Reading skills*. They also expressed a higher level of satisfaction with the *Writing skills,* above the satisfied level.

e) The groups' levels of satisfaction were different with regard to the *Writing skills* element, where it was found that the JIC Students were the most, and the Work Supervisors, were the least satisfied.

4. Despite the great impact of computer technology on the workplace and its applications in industry, the *Computer literacy* offered by the JIC course of study was found not to meet the expectations and satisfaction of all the three groups of the study. The researcher thinks that the lack of data processing and other software packages related to students' professions such as those in the fertiliser industry could be a cause for the above-mentioned level of satisfaction. Another possible reason for this low level of satisfaction by the respondents, the researcher presumes, is the fact that a number of JIC graduates who graduated between 1993 and 1995 were only exposed to limited computer software related to their professions. This explains why neither the Employed JIC Graduates nor the Work Supervisors were satisfied with this factor or any of its elements. This conclusion is based on the following findings:

   a) The level of satisfaction of all the groups together with the computer literacy offered by the course of study at JIC is not at the satisfied level. It is within the "unsure", the neutral level, which is the critical area on the five-point scale. This level is the natural outcome of the levels of satisfaction of the same groups with the three elements: a) *Use of computer for data processing (classification, filing, etc.)*, b) *Use of computer for word processing*, and c) *Use of computer software related to profession.*

   b) The JIC Students, as a group, indicated their satisfaction with the two elements within the factor, namely, *Use of computer for data processing* and *Use of computer for word processing.*

   c) The groups' levels of satisfaction were different in terms of the factor and its three elements, as indicated below.

- For the *Computer literacy* factor, *Use of computer for data processing* and *Use of computer for word processing* elements, it was found that JIC Students were the most, and the Employed JIC Graduates were the least satisfied.

- For the *Use of computer software related to profession,* it was found that Work Supervisors were the most, and the Employed JIC Graduates were the least satisfied.

5. Exposing the college students to technology and creating an awareness of its importance among students is a significant way of achieving excellence in technical education (Daggett, 1998). *Technology awareness* currently offered by the JIC course of study, fell short of the expectations of all the respondents of the study, which in fact will not support this goal. The researcher believes that the small number of seminars and lectures conducted at JIC by experts in the field, to orient students to the available technologies and their importance may have helped in producing such a low level of satisfaction among the three groups, while the limited student field visits to industry could be another reason. This conclusion is based on the following findings:

   a) The level of satisfaction of all the groups together with the technology awareness offered by the course of study at JIC is not at the satisfied level. It is within the neutral level of "unsure", which is the critical position on the five-point scale. This level is the natural outcome of the levels of satisfaction of the same groups with the elements within the factor: a) *Similarity between technology used for training and that generally adopted by industry*, b) *Awareness of importance of subject technology*, and c) *Familiarity with other available technologies related to area of specialisation.*

b) JIC Students, as a group, indicated their satisfaction with the two elements within the factor, namely, *Similarity between technology used for training and that generally adopted by industry* and *Awareness of importance of subject technology.*

c) The groups' levels of satisfaction were different in relation to the factor and the first two elements within the factor, namely, *Similarity between technology used for training and that generally adopted by industry* and *Awareness of importance of subject technology.* It was found that JIC Students were the most, and Employed JIC Graduates were the least satisfied.

6. The *Safety awareness and practice* offered by the course of study, services and procedures at JIC, was one of the three factors that the respondents of the study claimed to meet their satisfaction, with the exception of the part pertaining to *Safety of environment.* The College's programme, where the Safety course is taught to all students and safety awareness and practice is integrated in all practical courses may be attributed to the level of satisfaction associated with this factor. Moreover, the safety procedures enforced at JIC premises could be considered to be another reason for the high level of satisfaction. On the other hand, the lower level of satisfaction (unsure) pertaining to the *Safety of environment* may be due to the fact that such an issue is not fully covered in the curriculum of safety at JIC. This conclusion was based on the following findings:

a) The level of satisfaction of all the groups together with the safety awareness and practice offered by the course of study at JIC is at the satisfied level. In fact, they are satisfied with these three elements: a) *Safety of individual (personal safety)*, b) *Safety of equipment and facilities,* and c) *Safety of others.* However, results show that the level of satisfaction related to the *Safety of environment* is below the satisfied level (4) and above the dissatisfied level (2), which simply means the neutral level of "unsure".

b) The Employed JIC Graduates, as a group, were satisfied with the elements within the factor except for the *Safety of environment.*

c) The Work Supervisors, as a group, were satisfied with the factor and all the elements within the factor.

d) The JIC Students, as a group, were more than satisfied with the factor and its first three elements, namely, *Safety of individual, Safety of equipment and facilities* and *Safety of others,* while they were just satisfied with the element on *Safety of environment.*

e) The groups' levels of satisfaction were different with the factor and its first three elements, but they were similar with regard to the *Safety of environment.* It was found that the JIC Students were the most and the Employed JIC Graduates were the least satisfied.

7. The College's efforts related to the *Organisational behaviour and human performance* were clearly recognised by the three groups of the study. In fact, this factor received the highest level of satisfaction (a value above 4) compared to the rest of the factors related to the course of study. Such recognition was expected by the researcher due to the emphasis that JIC placed on students' discipline, attendance and other matters related to organisation and human behaviour and conduct. The only element within the factor that invited a lower level of satisfaction was the *Ability to execute a task with minimal supervision.* The researcher believes that this low level of satisfaction could be due to certain contextual and work-related factors, such as, the extent of task variety, the ability to analyse, managerial styles, lack of employees' participation in decision making, lack of integration and communications and possibly lack of knowledge, training and technical skills among the groups. This conclusion is based on the following findings:

a) The level of satisfaction of all the groups together with the organisational behaviour and human performance aspects offered in the course of study at JIC is more than just satisfied. Their level of satisfaction exceeds the value of 4 (satisfied) on the five-point scale. This level is the natural outcome of the levels of satisfaction of the same groups with the three elements: a) *Discipline (obedience to instructions and respect of others)*, 2) *Punctuality and time management*, and 3) *Readiness to learn more*. Only the element *Ability to execute a task with minimal supervision* has received a lower level of satisfaction compared to other elements. It is below the satisfied level (4) and above the dissatisfied level (2), which means the unsure position on the five-point scale.

b) The Employed JIC Graduates, as a group, were satisfied with the factor and the two elements, namely, *Discipline* and *Readiness to learn more.* And they were more than just satisfied with the *Punctuality and time management* element.

c) The Work Supervisors, as a group, were more than satisfied with the factor and its first three elements, while they were just satisfied with the last element, *Ability to execute a task with minimal supervision.*

d) The JIC Students, as a group, were more than satisfied with the factor and its first three elements, and just satisfied with the last element, *Ability to execute a task with minimal supervision.*

e) The groups' levels of satisfaction were different with the factor and the three elements, namely, *Discipline, Readiness to learn more* and *Ability to execute a task with minimal supervision.* It was found that the JIC Students were the most, and the Employed JIC Graduates were the least satisfied with regard to the factor and the *Readiness to learn more* element. Also, it was found that the Work Supervisors were the most and the Employed JIC Graduates were the least satisfied in terms of *Discipline* and the *Ability to execute a task with minimal supervision.*

8. As for the *Job relation to course of study*, the respondents of the study did not show satisfaction at the links between the jobs that the JIC Graduates were performing and the nature of the courses of study that they had pursued at JIC. The researcher thinks that the existing weak links between the College and industry may have had an impact on this issue and accordingly brought down the level of satisfaction of the respondents. This conclusion was based on the following findings:

   a) The level of satisfaction of all the groups together with the job relation to course of study offered by the course of study at JIC is not at the satisfied level. It is within the neutral level of "unsure", which is the critical position on the five-point scale. This level is the neutral outcome of the level of satisfaction of the same groups with the single element of the factor *Job relation to course of study.*

   b) The JIC Students, as a group, were satisfied with the relation between the co-operative training and the course of study.

   c) The group's levels of satisfaction were different with the factor and its single element. It was found that JIC Students were the most, while the Employed JIC Graduates were the least satisfied.

9. The JIC Graduates' *Awareness of job requirements,* which includes job duties and responsibilities, in addition to the skills and knowledge required to perform such duties, was not seen to be adequate by the respondents of the study, especially the two important groups, namely, the Employed JIC Graduates and Work Supervisors. The researcher believes that the students were not properly advised on the jobs that they might hold upon graduation, which may simply refer to the lack of industrial experience on the part of the instructors of practical subjects. Also, the inadequate guidance and

counselling offered to students could be another cause for this low level of satisfaction with the students' awareness of job requirements. In addition, the insufficient number of students' field visits to industry and seminars and lectures conducted by representatives from industry may be another cause. This conclusion is based on the following findings:

a) The level of satisfaction of all the groups together with the awareness of job requirements offered by the course of study at JIC is not at the satisfied level. It is within the "unsure", the neutral level, which is the critical area on the five-point scale. This level is the natural outcome of the levels of satisfaction of the same groups with the following two elements: a) *Job duties and responsibilities*, and 2) *Skill and knowledge required for the job.*

b) JIC Students, as a group, were satisfied with the factor and its two elements, namely, *Job duties and responsibilities* and *Skills and knowledge required for the job.*

c) The groups' levels of satisfaction were different with the factor and its two elements. It was found that JIC Students were the most, and the Employed JIC Graduates were the least satisfied.

10. The physical fitness programme responsible for developing the *Physical and mental well-being* of the College's students was not satisfactory to the respondents of the study. The researcher thinks that the College's late evening classes of other subjects might have reduced the students' participation in sport and recreational activities, thus lowering the level of satisfaction for the Employed JIC Graduates and the JIC Students involved in this study. Furthermore, the previous shortage of recreational staff perhaps justifies this level of satisfaction. This conclusion is based on the following findings:

a) The level of satisfaction of all the groups together with the physical fitness programme offered at JIC is not at the satisfied level. It is within the "unsure", the neutral level, which is the critical area on the five-point scale. This level is the natural outcome of the level of satisfaction of the same groups with the element, namely, *Physical fitness*.

b) The Work Supervisors, as a group, were more than satisfied with the factor and its element.

c) The groups' levels of satisfaction were different with the factor and its element. It was found that the Work Supervisors were the most while the Employed JIC Graduates were the least satisfied.

11. The various *links between the College and industry* that exist seem not to satisfy the three groups of the study. In fact, the respondents of the three groups were only satisfied with the links involving the *Co-operative training programme*, despite the efforts that the JIC management and staff were making. The researcher thinks that the small number of students' field visits to industry, the time allocated for them and the limited range of industries covered in those visits could be a possible cause for the low level of satisfaction of the respondents of the study. Furthermore, it is assumed by the researcher that the insufficient lecturing and training offered to students by representatives of industry and the limited participation of industry in curricular and training facilities development were the causes of the above. This conclusion is based on the following findings:

a) The level of satisfaction of all the groups together with the College's links to industry is not at the satisfied level. It is at the neutral level, "unsure", which is the critical area on the five-point scale. As far as elements within factor are concerned, the groups' level of satisfaction is the same as that with the factor, except for the element *Co-operative training programme* where the level of satisfaction of the three groups equals the satisfied level (4).

b) The Employed JIC Graduates, as a group, were satisfied with the *Co-operative training programme.*

c) The Work Supervisors, as a group, were more than satisfied with the *Graduates' employment in industry* and just satisfied with the *Co-operative training programme.*

d) The JIC Students, as a group, were satisfied with the *Co-operative training programme* and *student field visits to industry.*

e) The groups' levels of satisfaction were different with the factor and all of its elements. These differences can be summarized as follows:

- For the *Links between the College and industry* factor and all the elements except the *Graduates' employment in industry,* it was found that JIC Students were the most, while Employed JIC Graduates were the least satisfied.

- For the *Graduates' employment in industry,* it was found that the Work Supervisors were the most while the Employed JIC Graduates were the least satisfied.

12. Despite of the fact that students' *Selection of course of study* may lead to success or failure in the career path ahead, and despite the College's efforts in encouraging its students to choose the appropriate specialisations, it seems that the College was not successful in the view of the respondents of this study, as expressed by the low level of satisfaction with regard to this issue. The researcher thinks that the JIC procedures related to the selection of specialisations, which do not give the student the freedom to select the speciality he wants, can be seen as an important factor in shaping the level of satisfaction of the respondents, especially the Work Supervisors. Poor vocational guidance and counselling and formal orientation on disciplines offered to students by the

College's staff and advisors may be considered further reasons. This conclusion is based on the following findings:

a) The level of satisfaction of all the groups together with the JIC graduates' selection of their courses of study is not at the satisfied level. It is within the "unsure", the neutral level, which is the critical area on the five-point scale. This level is the natural outcome of the level of satisfaction of the same groups with the only element within the factor *Selection of course of study*.

b) The Employed JIC Graduates, as a group, were satisfied with the *Selected area of specialisation* element.

c) The JIC Students, as a group, were more than satisfied with the *Selected area of specialisation.*

d) The groups' levels of satisfaction were different with regard to the *Selection of course of study* factor and its element. It was found that the Work Supervisors were the most, while the Employed JIC Graduates were the least satisfied.

8.4 Summary

This chapter discusses the results of the survey carried out to ascertain the views of the three groups of respondents, Employed JIC Graduates (EJG), Work Supervisors (WS) and JIC Students (JS), with regard to the course of study offered at Jubail Industrial College. It begins by describing the socio-demographic information related to the three groups and then moves on to examine the twelve factors and their component elements, which were formulated in order to assess these views.

It examines the overall degree of satisfaction with each factor in terms of the five-point scale, ranging from Very satisfied through Satisfied to Unsure (that is, Neutral in terms of satisfaction), and then to Dissatisfied and Very dissatisfied.

Moreover, it examines each element within the factor individually and also describes the variation in levels of satisfaction as between the three groups. From these results conclusions are drawn as to whether each of the null hypotheses formulated in relation to the twelve factors is supported or not.

Throughout the chapter extensive reference is made to the work of other writers in order to support and consolidate the results of the present thesis. Furthermore, using the information from the interviews conducted with the sample from each of the first two groups (EJG and WS), possible causes for the low levels of satisfaction are identified. The researcher then examines these carefully to assess to what extent their claims are valid.

In the final section of the chapter a typical profile for each of the three groups is presented, and then the material presented earlier is brought together and conclusions are drawn in relation to the factors and their elements.

CHAPTER NINE

SUMMARY AND RECOMMENDATIONS

This chapter provides a brief summary of the study and lists the main recommendations which are formulated on the basis of the findings and the conclusions drawn. It also, includes suggestions for further research and final comments by the researcher.

9.1 Summary

This study aims to assess the status and relevance of the qualifications of the graduates of Jubail Industrial College (JIC) and then formulate procedures (recommendations) leading to a more appropriate and relevant college programme.

The assessment of the graduates' qualifications involved a randomly selected sample consisting of three non-overlapping groups of people. They were the Employed JIC Graduates (EJG), the Work Supervisors (WS) and the JIC Students who have completed the Co-operative Training Programme (JS).

This assessment was built around twelve course-related factors, which were considered to be the principal components of the qualifications of a typical technical college graduate, as revealed by the personal and work experience of the researcher and the literature reviewed.

The qualifications of the JIC graduates were examined through the testing of twelve null hypotheses, which were developed and extracted from the twelve factors indicated above.

The review of the previous related literature covered issues of technical educational and training programmes, College graduates' qualifications, social attitudes to technical education and vocational training, technical colleges' links with industry, employers' perceptions, College graduates' employment and specific studies related to Saudi Arabia. It also highlighted the absence of similar research conducted on technical and industrial college programmes in Saudi Arabia. Four studies were identified to be the most relevant to the current study for the purpose of a later comparison.

Data collection of the field work was carried out in six cities in the Eastern Region of Saudi Arabia and involved the use of self-administered questionnaires and personal interviews. This process adopted different statistical procedures, e.g. descriptive ones, including frequencies, percentages and means, in addition to statistical tests including One-sample T-test, Analysis of Variance (ANOVA) and Pair-Wise Comparison (Tukey).

The findings of the study indicated that the respondents were satisfied or more than satisfied with three factors, namely proficiency in English, safety awareness and practice and organisational behaviour and human performance. However, the levels of satisfaction of the same respondents with the remaining nine factors equal the "Unsure" level, which is below the satisfied and above the dissatisfied levels.

The work conducted and the results obtained have fully or partially fulfilled the study's aims through the achievement of the twelve specific objectives, as noted below. References to pages in the following discussion refer to the analysis and discussion of the data obtained from the fieldwork.

Objective No. 1: To give a clear and accurate picture of the quality of tuition on offer in Jubail Industrial College.

The quality of tuition offered by JIC is primarily affected by hands-on and analytical skills, proficiency in English and computer literacy. These are the core components of the tuition for the day-to-day delivery of the College's programme.

The quality of tuition was found to be insufficient in the case of hands-on and analytical skills and computer literacy. However, proficiency in English was found to be satisfactory, except for communication skills (pp. 300, 306, 311 and 315).

Objective No. 2: To assess the current status of the quality of the college's graduates.

The quality of the College's graduates encompasses all the twelve factors which are considered to be the principal elements of the qualifications of a typical technical college graduate (pp. 124-125).

The consolidated results of the twelve factors show that the overall quality of the College's graduates has not met the satisfaction of the various respondents of the study (p. 268).

Objective No. 3: To find out whether or not the current qualifications of the graduates meet the requirements laid down by the industrial organisations.

This issue was examined by the extent to which the Work Supervisors (WS), representing the industrial organisations as an individual group, were satisfied with the factors forming the profile of the College's graduates.

The Work Supervisors indicated that they were satisfied or very satisfied with the organisational behaviour and human performance, physical well-being, proficiency in English and safety awareness and practice of JIC graduates. They were less than satisfied with the remaining eight factors. However, they were satisfied with the basic manual and technician skills, related to the hands-on skills factor (pp. 228-229).

Objective No. 4: To investigate whether there are any weaknesses in the qualifications of graduates.

The results of the study indicated that there were weaknesses in the qualifications of the JIC graduates. These included basic manual, technician and professional skills within the hands-on factor; Sciences and Mathematics and other speciality-related courses in the analytical skills factor; English communication skills; use of data, word-processing and professional software in computer literacy; environmental safety awareness; graduates' ability to work with minimal supervision; job relation to course of study; awareness of job requirements; the College's links with industry and graduates' selection of course of study (pp. 274-275).

Objective No. 5: To encourage employers to judge the quality of JIC graduates.

The study encouraged the industrial organisations for whom the JIC graduates currently worked to judge the quality of the qualifications of the College's graduates. This was simply achieved through the participation of the Work Supervisors, who represent these organisations, in the assessment of the quality of the graduates' qualifications (pp. 132 and 153).

Objective No. 6: To encourage employed graduates to judge their own performance.

The study encouraged the JIC graduates to judge their own performance by simply including them as a group within the sample of the study and by properly analysing their responses to the various factors of the study (pp. 132 and 153).

Objective No. 7: To encourage JIC students who have completed their Co-operative Training to formulate their expectations as to whether their studies will fulfil the job requirements.

The study encouraged the JIC students who have just completed their Co-operative Training to formulate their expectations as to whether their course of study will fulfil the job requirements by simply including them as a group in the sample of the study and properly analysing their responses to the twelve factors of this study (pp. 133 and 153-154).

Objective No. 8: To guide those who are involved in designing educational programmes for industrial and technical institutions in Saudi Arabia.

The study provides guidance to those responsible for designing industrial and technical educational programmes in Saudi Arabia in the form of recommendations (pp. 376-391).

Objective No. 9: To suggest improvements which will not impinge on the areas which are satisfactory.

The study makes appropriate recommendations to the management and staff of JIC to rectify the weaknesses identified in the College's course of study with regard to the twelve factors of the study (pp. 377-386).

Objective No. 10: To provide recommendations based above all on the perceptions of the attitudes of the respondents participating in the study, along with the researcher's guidelines.

The study provides three sets of recommendations to JIC management and staff, employers of the College's graduates and the policy makers in the different government organisations (pp. 376-391).

Objective No. 11: To provide the management and staff of Jubail Industrial College with useful information to guide future methods of running appropriate and relevant programmes.

The study provides appropriate recommendations to the JIC management and staff for the current and future programmes offered by the College (pp. 377-386).

Objective No. 12: To suggest further studies in this respect.

The study identifies the need for further research related to the current work and highlights it in a later part of this chapter (p. 392).

9.2 Recommendations

On the basis of the findings and conclusions stated in the previous two chapters, three sets of recommendations are made. The first is formulated to enable Jubail Industrial College to improve its educational and training programme, services and procedures by rectifying the deficiencies found as a result of this study.

The second set is presented to encourage the industrial organisations (employers) involved in this study to participate actively in the development of the technical education programmes offered by technical and industrial colleges and therefore contribute to the improvement of the qualifications of the graduates of these colleges.

The third set addresses the policy makers in the different government organisations, namely the Royal Commission for Jubail and Yanbu, the General Organization for Technical Education and Vocational Training, the Ministry of Higher Education, the Ministry of Education, the Ministry of Labour and Social Affairs, the Ministry of Planning, the Ministry of Industry and Electricity and finally the Ministry of Finance and National Economy. This set of recommendations aims to encourage and stimulate those individuals in the above-mentioned organisations to support and facilitate the efforts needed to improve the role and outcome of the academic institutions responsible for technical education and training in the country.

The overall goal of the three sets of recommendations is to help technical and industrial colleges supply the country with its requirements for trained technicians in the years to come. These recommendations are formulated below. Page references in the following discussion refer to the analysis and discussion of the findings obtained from the fieldwork.

9.2.1 Recommendations Concerning JIC Programme under Investigation

The following recommendations which are built around the twelve course-related factors, are formulated to help JIC rectify the deficiencies found by this study and hence develop its educational and training programme on offer as well as its related services and procedures:

1. **Recommendations related to *Hands-on Skills:***

   a) A low student-to-instructor ratio of about 10:1 should be provided in all practical training sessions, especially during the basic manual/craftsmanship training, which may involve recruitment of extra staff (p. 302).

   b) The amount of equipment used for practical training should be increased to train more students and to reduce the student-to-equipment ratio (p. 303).

   c) JIC should expand its facilities designated to practical training (pp. 303-304).

   d) JIC instructors involved in teaching practical subjects should be selected from those having enough industrial experience to understand the requirements of training for industry. This experience should be regularly upgraded by exposure to the industrial environment (p. 303).

   e) Equipment used for practical training should be regularly updated, as technology advances, to closely resemble that generally adopted by industry (p. 304).

   f) JIC should develop new maintenance and troubleshooting laboratories and workshops in every technical speciality (p. 305).

   g) JIC curriculum designers should place more emphasis on practical training related to maintenance and troubleshooting procedures using standard procedures commonly adopted by industry (p. 305).

h) Students should be made more aware of the importance of professional skills to the workplace and future employment through the use of field visits, co-operative training, and seminars and workshops conducted by representatives from industry (pp. 305-306).

2. Recommendations related to *Analytical Skills:*

a) Co-operation between science and engineering technology faculties should be enhanced because it can lead to a better experience for JIC students by discussion and mutual consultation regarding areas of common interest (p. 309).

b) The Mathematics course content currently in use at JIC should be reviewed and made appropriate to the needs of technical college students by conducting a needs analysis among the speciality departments (pp. 309-310).

c) The number of students in Mathematics classes should be limited to a maximum of 20 (p. 310).

d) Mathematics should be taught by mathematicians only. Other tutors from different subjects such as Physics should not be assigned to teach Mathematics (p. 310).

e) The weekly teaching load of instructors of Mathematics and speciality-related subjects should not exceed the JIC standard (p. 310).

f) Industry's participation in the course design of the speciality-related subjects should be encouraged through the involvement of industrial experts recommended by the Industrial Advisory Committees (p. 310).

g) JIC should hire instructors with adequate industrial experience to teach speciality-related subjects, and then assist them to upgrade this by exposure to the industrial environment (p. 310).

3. **Recommendations related to *Proficiency in English* with particular reference to the *Communication Skills* :**

a) The curriculum should include more weekly teaching contact hours for speaking skills (pp. 313-314).

b) Instructors should pay special attention to substitution drills of words within sentence patterns in the grammar exercises, especially at the beginning of the programme (pp. 313-314).

c) Individual and choral drilling of words should be used when introducing new vocabulary (pp. 313-314).

d) Size of classes should be reduced to 20 students, so that students have a greater opportunity to participate in class and oral work, such as discussion, pair-work and conversational drills (pp. 313-314).

e) Simple class oral presentations should prepare and lead students first to deliver speeches in front of the class in an organised manner with an introduction, development and conclusion, and second to develop these into material for a speech contest delivered to a wider audience at College level. Such topics should be genuine and vivid, touching students' daily life and of interest to them (pp. 313-314).

f) Study halls or workshops where students meet with their teachers informally should be designed and provided. Rooms have to be equipped with movies, T.V. sets, newspapers, etc. to generate topics of discussion (pp. 313-314).

g) Tapes of real life dialogues should be made available for students to listen to in their leisure time (pp. 313-314).

h) Since English is the medium of instruction at JIC, the College should create an English-speaking environment in the campus through making English the language of verbal and written communication, not only within the classroom but also without. Instructors should use English at all times, all notices should be in English only, and student publications in English should be encouraged (pp. 313-314).

4. **Recommendations related to *Computer Literacy*:**

a) The JIC programme should include more computer courses related to data-processing skills in accordance with the advancement in the field of information technology and the requirements of industry (p. 317).

b) Computer courses should be scheduled in a way that maximises the students' benefits and achievement (p. 318).

c) Computer courses should be regularly reviewed to reflect changes in Information Technology. For this purpose staff should keep themselves updated with the latest advances in such technology (p. 318).

d) A Computer Centre and Internet Café should be established where students can freely practice and improve their computer skills (pp. 317-319).

e) The library should be equipped with a variety of computer materials to enhance students' knowledge in this field (pp. 317-319).

f) Seminars, lectures and field visits to industry should be made available to students during their course of study (pp. 317-319).

g) It is essential that the teaching methodology should be reviewed and better tools to deliver the information should be put in place, e.g. e–learning, on-line tutorials, computer presentations and simulation centres (pp. 317-319).

h) The Speciality Departments at JIC should work to upgrade the existing software and introduce new software that can complement and improve the current courses in the different specialisations. This can be better achieved through proper consultation with industry (pp. 319-320).

i) JIC should provide the computer instructional staff with exposure to new developments in software and hardware through attending exhibitions and participating in seminars (p. 320).

5. Recommendations related to *Technology Awareness*:

a) JIC Speciality Departments should always keep up with the advancement of technology by introducing new technology especially that related to practical training (pp. 323-324).

b) Student field visits to industry should be increased to acquaint students with the different available technology related to their areas of specialisation (pp. 324-325).

c) JIC should encourage its instructional staff to undertake staff development opportunities and participate actively in speciality workshops and other professional development activities (p. 325).

d) Technical Departments should include in their programmes items which would enhance the students' awareness of the importance of technology and expose them to other available technology (p. 325).

6. Recommendations related to *Safety Awareness and Practice* with particular reference to the *Safety of Environment*:

a) JIC should include safety of the environment related to environmental pollution in the general safety course (pp. 328-329).

b) Seminars and workshops on safety and health issues should be organised to raise the staff's and the students' awareness, especially in relation to environmental matters. Whenever possible, experts from industry should be invited for this purpose (p. 329).

c) JIC students should be encouraged to use various safety materials, e.g. posters, manuals, booklets, pictures, magazines, etc., produced by local industries, especially those related to the environment (pp. 328-329).

d) JIC should introduce systematic procedures for identifying and measuring pollution hazards in the laboratories and workshops in order to enhance students practical experience (p. 328).

e) The JIC library should subscribe to international environmental magazines and journals, in addition to other audio-visuals and computer software in order to stimulate environmental safety awareness among staff and students (pp. 328-329).

7. **Recommendations related to *Organisational Behaviour and Human Performance* with particular reference to *Ability to Execute a Task with Minimal Supervision (Self-motivation)*:**

a) JIC instructors should encourage and motivate students to participate, discuss and provide feedback relevant to lesson plans, materials and objectives by holding discussion meetings with them (pp. 332-333).

b) JIC instructors should relate their lessons to practical case studies relevant to the students' specialisations. These cases have to be constructive, close to reality and sufficient for the purposes of the lesson plans and topics (pp. 332-333).

c) JIC students should be encouraged to write certain assignments relevant to the recent techniques and principles involved in their courses. These assignments should be systematic in creating strategic thinking and guidance of the JIC students (pp. 332-333).

d) During the teaching or laboratory sessions, the students need to be encouraged by their tutors and instructors to present and discuss their experiments, assignments and opinions in front of the class in order to enhance their self-esteem and confidence (pp. 332-333).

e) The preceding recommendations related to organisational behaviour and human performance, which enhance students' ability to execute tasks with minimal supervision, can be better achieved through rewarding the students' participation by, for example, allocating certain marks for this in the evaluation and assessment procedures (pp. 332-333).

8. Recommendations related to *Job Relation to Course of Study*:

a) JIC curricula should be reviewed so that these may meet the job requirements of industry with a particular emphasis on primary industry, including the production of fertiliser, through consultation with experts from industry (p.336).

b) JIC should encourage more student field visits to primary industries including the fertiliser industry, to reinforce their understanding of the industrial processes and their relevance to the course of study (p. 336).

c) JIC should review the theoretical and practical contents of the speciality and the speciality-related courses to ensure that the theoretical content is fully relevant to the practical needs of the course (p. 336).

9. **Recommendations related to *Awareness of Job Requirements*:**

a) JIC should educate students about job requirements through industrial field visits, and through seminars and workshops conducted by representatives from industry (p. 339).

b) JIC should utilise the Co-operative Training Programme for activities enhancing the awareness of job requirements (pp. 340-341).

c) JIC staff should be enabled to gain enough industrial experience to help their students become familiar with job requirements (p. 339).

d) Well-qualified instructors with adequate industrial experience should provide vocational guidance and counselling to students about job descriptions and requirements (pp. 339-341).

10. **Recommendations related to *Physical Well-Being*:**

a) All indoor and outdoor sports and recreational facilities should be adequately maintained (p. 343).

b) Students should be encouraged to participate in internal sports competitions, e.g. between dormitories and departments and against faculty teams (p. 342).

c) College evening classes in other subjects should be minimized to enable students to participate in the sports and recreational evening activities (p. 342).

d) Inter-collegiate clubs or teams should be created in various sports to support successful competition against other colleges (pp. 342-343).

11. **Recommendations related to *Links Between the College and Industry*:**

a) JIC expert staff should contribute to the solving of technical problems facing industry through staff visits to industry and consultation with industrial representatives, including those participating in the Industrial Advisory Committees (p. 343).

b) The number of student field visits to industry should be increased to cover a wide range of industries, such as petrochemicals (e.g. fertiliser), chemicals and steel (pp. 347-348).

c) Time allocated for student field visits to industry should be sufficient for the students to benefit therefrom (p. 347).

d) Seminars, lectures, workshops, and other forms of education and training conducted by representatives from industry should be organised and encouraged, and it should be ensured that the people invited to participate are all experts in their fields (pp. 347-348).

e) Industry should be encouraged to participate actively in the review and upgrading of the College's programme content and should help JIC identify the required curricular elements which are of industrial importance by the conduct of needs analysis surveys (p. 349).

f) The role of the Industrial Advisory Committees should be expanded to cover areas such as the development and upgrading of facilities and equipment, course content, staff development and information related to industrial needs (p. 349).

g) JIC should endeavour to produce more qualified graduates in all disciplines through increased admission, expansion of facilities, increase of staff and introduction of new specialisations (p. 348).

h) Relevant JIC departments should exert more effort in promoting and marketing the College's graduates to enhance their opportunities for employment through the design and implementation of a long-range plan for promoting JIC graduates, programmes and services (p. 348).

12. Recommendations related to *Selection of Course of Study*:

a) Students in the last phase of the preparatory year programme should be exposed to and oriented towards the different professions through field visits to industry and by attending seminars, workshops and question-and-answer sessions conducted by experts from industry, including College alumni (pp. 353-354).

b) Technical departments should participate in providing vocational counselling services to all students in the preparatory year (p. 353).

c) Academic advisors should advise students in the preparatory year programme fully about the procedures and requirements for selecting and changing a major to study (pp. 352-354).

d) Procedures for the selection and change of majors at JIC should be flexible enough to allow students to choose the majors which suit their needs provided that speciality-department criteria are met (p. 352).

9.2.2 Recommendations for the Industrial Organisations (Employers):

The following recommendations are presented to the industrial organisations involved in this study, for which the JIC graduates currently work. They are intended to encourage and stimulate the employers to extend their assistance and therefore become engaged in the improvement of the qualifications of the JIC graduates. These recommendations are linked to the weaknesses found in the College's course of study as a result of the present research.

1. Industry should participate actively in the review, upgrading and development of the College's programme curriculum content by helping the College identify the required elements concerning job skills and knowledge which are of industrial importance, through meetings between the College's academic staff and the Industrial Advisory Committees and by active industrial participation in the needs analysis surveys conducted by the College (pp. 303-305, 310, 336, 344-345 and 348-350).

2. Industry should help the College plan student intakes by furnishing the College with information and statistics related to their current and future manpower needs (p. 348).

3. Industry should support the College in improving its programme and rectifying the current weaknesses by dispatching experts to conduct lectures, seminars and workshops in the different fields of interest to the College, particularly in the practical specialities and the speciality-related courses and in the awareness of technology, environmental safety and job requirements (pp. 302-303, 324-325, 340 and 347-348).

4. Industry should welcome and facilitate more staff and student field visits in order to expose them to areas of interest and concern, e.g. the technology used and the environmental safety practiced. It should also help the preparatory year students become familiar with and survey the various professions which will enable them select the proper course of study (p. 347).

5. Industry should furnish the College with manuals on the safety rules, regulations and practices expected in the workplace, with special emphasis on safety of environment (pp. 328-329).

6. Industrial Supervisors should ensure that JIC students are properly and formally oriented towards environmental safety during the Co-operative Training at their industrial sites to augment environmental training at JIC (pp. 328-329).

7. Industry should contribute to the development of the instructional staff of the College by accommodating them for a short period of time, so that they are exposed to and oriented towards the different skills and other requirements needed in their areas of specialisation (pp. 303 and 324-325).

8. Industry should encourage the use of English communication skills among its employees especially those who have just joined the industry (p. 313).

9. Industry should participate in the exposure of the College's instructional staff to the computer software packages related to manufacturing, operations, maintenance and office management by providing the College with some teaching materials, e.g. manuals, diagrams, posters, tables and checklists. This will help the instructors deliver effective and job-oriented courses (pp. 317-318, 324-325 and 339).

10. The role of representatives of industry in the Industrial Advisory Committees at the College should be seriously pursued for mutual benefit (pp. 339-340).

11. Industry should provide the College with procedure manuals and other necessary materials to enhance the hands-on training related to maintenance and troubleshooting (p. 305).

12. Industry, in co-ordination with the College, should utilize a part of the Co-operative Training programme to expose the College students to job requirements (p. 339).

13. JIC graduates should be encouraged to use their knowledge and skills effectively in solving day-to-day problems in their departments or sections. This will enhance their participation in the decision-making process relevant to their technical and professional duties (pp. 332-333).

14. Organisations should encourage their supervisors and managers to enhance employees' participation, particularly in determining duties, plans, incentive systems, training

programmes and other schemes of employment. This can be conducted through the reasonable devolution of authority to these employees in order to create a democratic working climate through which these employees can be independent in conducting their duties and flexible in expressing their ideas in order to improve the productivity and effectiveness of their organisations (pp. 332-333).

15. Organisational members should promote the application of best practices (Business process management techniques) such as empowerment, benchmarking and Quality Circles (QC) through which new methods and forms of technology can be introduced to develop the work itself and enhance employees' knowledge, experience and efficiency in dealing with their roles in their jobs (pp. 332-333).

16. Organisations should encourage sensitivity and simulation training sessions through which employees can develop their skills and knowledge in the use of problem-solving and expressing their ideas to their superiors (pp. 332-333).

17. The preceding recommendations related to organisational behaviour and human performance (Nos. 13-16), which enhance the ability of JIC graduates to execute their tasks with minimal supervision, can be better achieved through linking the employees' participation to reward schemes through which innovative employees can have certain rewards relevant to the value of their proposals (pp. 332-333).

9.2.3 Recommendations for the Government Organisations:

The following recommendations are presented to the Government Organisations which have responsibility for education or are able to make a significant contribution thereto. They are made on the basis of the results arising from the fieldwork of the study. In particular it may be noted that the programme to replace the expatriate manpower by Saudi nationals (pp 12-16) and the intention to expand industrialisation and increase economic diversification (pp. 68-72) will require an increasing output of graduates qualified in technical fields.

1. **Royal Commission for Jubail and Yanbu:**

The two industrial colleges in Jubail and Yanbu need significant financial support to:

a) Develop their current programmes and introduce new ones to meet the country's requirement of trained manpower (pp. 318-319 and 323-325).

b) Increase the student intakes and hence meet the country's need for trained manpower (pp. 302-303 and 348).

c) Expand facilities to accommodate more students (pp. 302-304).

d) Enhance the recently introduced staff professional development/scholarship programme to attract more Saudi instructional staff (p. 303).

2. **General Organization for Technical Education and Vocational Training (GOTEVOT):**

Colleges of Technology should be encouraged to make use of the recommendations addressed to the JIC management and staff in the current study (pp. 377-386).

3. **Ministry of Higher Education:**

Those involved in Community Colleges and in the two-year Diploma programmes in Applied Engineering conducted in some Saudi universities should be encouraged to make use of the recommendations addressed to the JIC management and staff in the current study (pp. 377-386).

4. **Ministry of Education:**

a) English communication (speaking) skills should be enhanced in the Secondary School curriculum (pp. 311 and 313).

b) The Secondary School curriculum should enhance the awareness of students of the importance of technical education. Students should be encouraged to join the technological sciences stream and an incentive system should be introduced for this purpose (p. 302).

5. **Ministry of Labour and Social Affairs:**

Industrial organisations should be advised by the Labour Offices to employ more college graduates and provide them with appropriate benefit and remuneration packages (pp. 348-349).

6. **Ministry of Planning:**

Projects related to the development of technical education should be given priority in the future five-year development plans (pp. 302-303).

7. **Ministry of Industry and Electricity:**

Industrial organisations across the country should be encouraged to co-operate more with industrial and technical colleges in their areas by providing these colleges with the required information and other types of support to facilitate the development of the colleges' programmes and make these programmes more job-oriented, as proposed in the second set of recommendations in this study (pp. 386-389).

8. **Ministry of Finance and National Economy:**

Institutions responsible for providing technical education should be financially supported so that they will be able to upgrade and expand their facilities, resources, equipment and curricula, and increase the number of employees to meet the ever-increasing student enrollment (pp. 302-303, 313-314, 318-319 and 323-325).

9.3 Suggestions for Further Research

The areas which have been examined in the present study were certainly worthy of independent research. However, in the light of the findings from this study and the author's own experience, there is still a need for further research in the following areas:

1. A study to assess the status and relevance of the qualifications of JIC graduates from the Business Studies disciplines should be investigated.

2. For the purpose of comparison with this study, a study to assess the relevance of the qualifications of graduates from Yanbu Industrial College, the sister college of JIC, should be conducted.

3. A further study should be carried out to assess the impact of the use of English as a medium of instruction on the employment of technical college graduates.

4. More research should be undertaken to assess the status and relevance of the qualifications of graduates from Colleges of Technology in Saudi Arabia.

9.4 Final Comments

As indicated in Chapter 1, this study is desirable because the graduates of Jubail Industrial College and their employers feel that it would be beneficial to assess the attitudes of both graduate employees and work supervisors in terms of their satisfaction or dissatisfaction with the standard and quality of training provided to students by the College.

As the mission of JIC is to prepare students for the workplace fully equipped with the technical skills and knowledge required and able to cope with the rapid change in the work environment, it becomes necessary to assess the quality of its output and the extent to which this output meets the requirements laid down by the employers.

Data gathered can be used for the improvement of the curriculum design and delivery, the College's services and procedures, the evaluation and modifications of the existing programme, and planning for future development.

The recommendations given in this study are intended to stimulate JIC and other similar colleges in the country to continue seriously to address the changing needs of the workplace. Technicians prepared to join industry or other economic sectors are no longer dependent on the traditional basic technical skills to perform their tasks. Rapid changes in the workplace and in technology, especially that related to information, have made jobs very complex. Employees must now be able to use information, communicate, analyse, and participate effectively in decision-making. They must also be aware of technology and of safety and health practices; and, finally, they must perform work to quality standards and specifications.

The issues raised in this study are of wider import than simply the improvement of curricula in Jubail Industrial College. Saudi Arabia's socio-economic development and prosperity, as expressed in the goals and objectives of the national development plans, depend upon an adequate supply of trained, efficient and well-motivated Saudi manpower. This in turn depends upon the effectiveness of training offered by technical colleges. The present study is, therefore, of vital national importance leaving no room for complacency. Enlightened management and staff in JIC and in other colleges, as well as industrial employers and government policy makers in the various ministries, should all take this study seriously.

Those in authority must exert every effort and use all their influence to ensure that the recommendations made in this study are not ignored and that changes are implemented without delay. Those who will must take the lead and set an example for others to follow; for if changes are not made, if inertia takes hold, the results may not be in the interests of the national economy and hence could affect the very future of Saudi Arabia.

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APPENDICES

Page No.

Appendix A

Factors Related to JIC Graduates' Qualifications

APPENDIX A

Factors Related to JIC Graduates' Qualifications

Part I:

1. Background Information:

Questionnaire No. 1

- Age
- Marital status
- Place of origin
- Monthly income
- Type of Secondary School
- Secondary School Final Grade Average
- Method of study
- Specialisation

Questionnaire No. 2

- Age
- Nationality
- Length of service
- Length of supervision
- Job/Position title
- Educational qualification
- Number of employees supervised
- Type of firm (products)
- Number of employees in firm
- Saudization
- Firm's years in operation

Questionnaire No. 3

- Age
- Marital status
- Place of origin
- Method of study
- Student's Grade Point Average (GPA)
- Type of firm (products)
- Practice of skills
- Place of Co-operative Training

- Specialisation
- Co-operative Training Final Grade
- Number of credit hours completed before Co-operative Training

Part II: Factors related to the Course of Study (for all questionnaires)

2. Hands-on-Skills:

- Basic manual skills (craftsmanship skills)
- Technician skills (workshop/laboratory experience)
- Professional skills:
    - Maintenance procedures
    - Troubleshooting procedures

3. Analytical Skills:

- Sciences
- Mathematics
- Related speciality subjects

4. Proficiency in English:

- Communication skills
- Comprehension skills
- Reading skills
- Writing skills

5. Computer Literacy:

- Use of computer for data processing (classification, filing, etc.)
- Use of computer for Word Processing (generating reports)
- Use of computer software related to profession

6. **Technology Awareness:**

- Similarity between technology used for training and that generally adopted by industry
- Awareness of importance of subject technology
- Familiarity with other available technologies

7. **Safety Awareness and Practice:**

- Safety of individual (Personal safety)
- Safety of equipment and facilities
- Safety of others
- Safety of environment

8. **Organisational Behaviour and Human Performance:**

- Discipline
- Punctuality and time management
- Readiness to learn more
- Ability to execute a work with minimal supervision (self-motivated)

9. **Job Relation to Course of Study:**

- Job relation to course of study

10. **Awareness of Job Requirements:**

- Awareness of job duties and responsibilities
- Awareness of skill and knowledge required for the job

11. **Physical Well-Being:**

- Physical fitness

12. Links Between the College and Industry:

- Co-operative training programme
- Students field visits to industry
- Lecturing and training conducted by industry representatives
- Job placement services
- Involvement of industry in curricular and training facilities development

13. Selection of Course of study:

- Vocational/career guidance and counselling services
- Procedures for selection of specialisation
- Your selected area of specialisation

Part III: Factors related to Social Attitude and Awareness (for Questionnaire No. 1)

14. Social Attitudes towards Technical and Vocational Education:

- Technical and vocational education is necessary to the existence of the society
- Technical and vocational education is very important for our country to continue its progress in the fields of technology
- Technical and vocational education is important for the industrialisation of Saudi Arabia
- Technical and vocational education plays an essential role in solving the problems related to shortage of Saudi labour force
- I joined Jubail Industrial College because I wanted to be a skilled technician

15. **Understanding the Importance of Industry for the Development of the Kingdom:**

- Industrialisation provides more jobs for Saudi nationals
- Industrialisation raises the standard of living in the country
- Industrialisation encourages the utilisation of natural resources

16. **Understanding the Importance of Saudisation for the Development of the Kingdom:**

- Saudisation helps reduce dependency on foreign workforce
- Saudisation has a great financial impact
- Saudisation has an important socio-cultural impact

Appendix B

Validity Test of Questionnaires

1. Fill-in Form for Questionnaire No. 1 (EJG)

2. Fill-in Form for Questionnaire No. 2 (WS)

3. Fill-in Form for Questionnaire No. 3 (JS)

4. Summary Results of Validity Test of Questionnaire No. 1 (EJG)

5. Summary Results of Validity Test of Questionnaire No. 2 (WS)

6. Summary Results of Validity Test of Questionnaire No. 3 (JS)

QUESTIONNAIRE NO. 1:

FOR EMPLOYED JIC GRADUATES (EJG)

To answer, please place an "X" in the appropriate box for each question in the attached questionnaire.

Question Number	NOT RELEVANT	MINIMALLY RELEVANT	UNSURE	RELEVANT	VERY RELEVANT
	1	2	3	4	5
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
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27					
28					
29					
30					
31					
32					
33					
34					

EJG (cont'd)

Question Number	NOT RELEVANT 1	MINIMALLY RELEVANT 2	UNSURE 3	RELEVANT 4	VERY RELEVANT 5
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
51					
52					
53					
54					
55					
56					

Other comments:

APPENDIX B

QUESTIONNAIRE NO. 2:

FOR WORK SUPERVISORS (WS)

To answer, please place an "X" in the appropriate box for each question in the attached questionnaire.

Question Number	NOT RELEVANT	MINIMALLY RELEVANT	UNSURE	RELEVANT	VERY RELEVANT
	1	2	3	4	5
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
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27					
28					
29					
30					
31					
32					
33					
34					

Question Number	NOT RELEVANT	MINIMALLY RELEVANT	UNSURE	RELEVANT	VERY RELEVANT
	1	2	3	4	5
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					

Other comments:

APPENDIX B

QUESTIONNAIRE NO. 3

FOR STUDENTS WHO HAVE PARTIALLY COMPLETED THEIR STUDIES IN THE COLLEGE AND HAVE ALSO UNDERTAKEN THEIR CO-OPERATIVE TRAINING PROGRAMME (JS)

To answer, please place an "X" in the appropriate box for each question in the attached questionnaire.

Question Number	NOT RELEVANT	MINIMALLY RELEVANT	UNSURE	RELEVANT	VERY RELEVANT
	1	2	3	4	5
1					
2					
3					
4					
5					
6					
7					
8					
9					
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32					
33					
34					

Question Number	NOT RELEVANT	MINIMALLY RELEVANT	UNSURE	RELEVANT	VERY RELEVANT
	1	2	3	4	5
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					

Other comments:

APPENDIX B

SUMMARY RESULTS OF VALIDITY TEST OF QUESTIONNAIRE NO. 1 (EJG)

Question Number	ITEMS	Not Relevant	Minimally Relevant	Unsure	Relevant	Very Relevant
	Part I:					
1.	Age group		10%		30%	60%
2.	Marital status		10%		50%	40%
3.	Place of origin	20%	20%		40%	20%
4.	Monthly income		30%		40%	30%
5.	Type of Secondary School completed prior to College enrollment	10%	10%		10%	70%
6.	Secondary School Final Grade	10%	10%		30%	50%
7.	Method of Study at JIC				30%	70%
8.	Specialisation of Course of Study				10%	90%
	Part II:					
9.	***Hands-on skills:*** Basic manual skills (craftsmanship skills)				10%	90%
10.	Technician skills (workshop/laboratory experience)					100%
11.	Professional skills (maintenance and troubleshooting procedures)				10%	90%
12.	***Analytical skills:*** Sciences				10%	90%
13.	Mathematics				10%	90%
14.	Related speciality subjects				20%	80%
15.	***Proficiency in English:*** Communication skills				10%	90%
16.	Comprehension skills				10%	90%
17.	Reading skills				10%	90%
18.	Writing skills				10%	90%
19.	***Computer literacy:*** Use of computer for classification, filing and processing of data				30%	70%
20.	Use of computer for word processing		20%		10%	70%
21.	Use of computer software related to profession		10%		20%	70%
22.	***Technology awareness:*** Similarity between technology used for training and that generally adopted by industry		10%		20%	70%
23.	Awareness of importance of subject technology		10%	10%	20%	60%
24.	Familiarity with other available technologies		20%	10%	20%	50%

Question Number	ITEMS	Not Relevant	Minimally Relevant	Unsure	Relevant	Very Relevant
25.	***Safety awareness and practice:*** Safety of individual (Personal safety)				10%	90%
26.	Safety of equipment and facilities				10%	90%
27.	Safety of others	10%				90%
28.	Safety of environment				20%	80%
29.	***Organisational behaviour and human performance:*** Discipline				30%	70%
30.	Punctuality and time management				20%	80%
31.	Readiness to learn more		10%	10%	20%	60%
32.	Ability to execute a task with minimal supervision (self-motivated)		10%	10%		80%
33.	***Job relation to course of study:*** Job relation to course of study				30%	70%
34.	***Awareness of job requirements:*** Awareness of job duties and responsibilities		10%		40%	50%
35.	Awareness of skills and knowledge required for the job		20%		30%	50%
36.	***Physical well-being:*** Physical fitness		20%	10%	50%	20%
37.	***Links between the college and industry:*** Co-operative Training Programme				20%	80%
38.	Students field visits to industry		10%		20%	70%
39.	Lecturing and training sessions conducted by representatives of industries			10%	40%	50%
40.	Job placement services		20%		20%	60%
41.	Involvement of industry in curricular and training facilities development				10%	90%
42.	***Selection of course of study:*** Vocational and career guidance and counselling services				20%	80%
43.	Procedures for selection of specialisation				10%	90%
44.	Your selected area of specialisation			10%	30%	60%
45.	**Part III:** ***Social attitudes towards technical and vocational education:*** Technical and vocational education is necessary to the very existence of the society		10%		40%	50%
46.	Technical and vocational education is very important for our country to continue its progress in the fields of technology		10%		30%	60%

Question Number	ITEMS	Not Relevant	Minimally Relevant	Unsure	Relevant	Very Relevant
47.	Technical and vocational education is important for the industrialization of Saudi Arabia		10%		20%	70%
48.	Technical and vocational education plays an essential role in solving the problems related to shortage of qualified Saudi labour force				30%	70%
49.	I joined a technical college because I wanted to be a skilled technician		20%	10%	20%	50%
50.	***<u>Understanding the importance of industry for the development of the Kingdom :</u>*** Industrialisation provides more jobs for Saudi nationals		10%		40%	50%
51.	Industrialisation raises the standard of living in the country		20%		30%	50%
52.	Industrialisation encourages the utilization of natural resources		10%	10%	50%	30%
53.	***<u>Understanding the importance of Saudisation for the development of the Kingdom :</u>*** Saudisation helps reduce dependency on foreign workforce		10%		20%	70%
54.	Saudisation has a great financial impact				50%	50%
55.	Saudisation has an important socio-cultural impact		10%		20%	70%
56.	Suggestions to JIC course of study			20%	10%	70%

APPENDIX B

SUMMARY RESULTS OF VALIDITY TEST OF QUESTIONNAIRE NO. 2 (WS)

Question Number	ITEMS	Not Relevant	Minimally Relevant	Unsure	Relevant	Very Relevant
	Part 1:					
1.	Age group		30%		30%	40%
2.	Nationality				40%	60%
3.	How long have you been working in this firm?		20%		50%	30%
4.	How long have you supervised the subject JIC graduate?					100%
5.	Job/position title in this firm		20%		10%	70&
6.	Highest level of education reached			10%	30%	60%
7.	How many employees are you currently supervising?				50%	50%
8.	How would you classify the firm's type of product(s)?		20%		20%	60%
9.	Total number of employees in your firm		10%		40%	50%
10.	Percentage of Saudis in your firm				20%	80%
11.	Approximately how many years has your firm been in operation?		30%		30%	40%
12.	**Part II:** ***Hands-on skills:*** Basic manual skills (craftsmanship skills)				10%	90%
13.	Technician skills (workshop/laboratory experience)				10%	90%
14.	Professional skills (maintenance and troubleshooting procedures)				10%	90%
15.	***Analytical skills:*** Sciences				10%	90%
16.	Mathematics				10%	90%
17.	Related speciality subjects				20%	80%
18.	***Proficiency in English:*** Communication skills				10%	90%
19.	Comprehension skills				10%	90%
20.	Reading skills				10%	90%
21.	Writing skills				10%	90%
22.	***Computer literacy:*** Use of computer for classification, filing and processing of data		10%		10%	80%
23.	Use of computer for word processing		20%		20%	60%
24.	Use of computer software related to profession				20%	80%

Question Number	ITEMS	Not Relevant	Minimally Relevant	Unsure	Relevant	Very Relevant
25.	***Technology awareness:*** Similarity between technology used for training and that generally adopted by industry		10%	10%	10%	70%
26.	Awareness of importance of subject technology		10%	10%	20%	60%
27.	Familiarity with other available technologies		10%	20%	30%	40%
28.	***Safety awareness and practice:*** Safety of individual (Personal safety)				10%	90%
29.	Safety of equipment and facilities				20%	80%
30.	Safety of others				10%	90%
31.	Safety of environment				10%	90%
32.	***Organisational behaviour and human performance:*** Discipline				10%	90%
33.	Punctuality and time management				10%	90%
34.	Readiness to learn more				20%	80%
35.	Ability to execute a task with minimal supervision (self-motivated)		10%			90%
36.	***Job relation to course of study:*** Job relation to course of study				20%	80%
37.	***Awareness of job requirements:*** Awareness of job duties and responsibilities		10%		20%	70%
38.	Awareness of skills and knowledge required for the job		10%		20%	70%
39.	***Physical well-being:*** Physical fitness		20%		40%	40%
40.	***Links between the college and industry:*** Co-operative Training Programme		10%		10%	80%
41.	Students field visits to industry		10%		20%	70%
42.	Lecturing and training sessions conducted by representatives of industries				40%	60%
43.	Job placement services		20%		10%	70%
44.	Involvement of industry in curricular and training facilities development				20%	80%
45.	***Selection of course of study:*** Based on your observations, to what extent are your satisfied with the graduate's selection of specialisation?		10%	10%	20%	60%
46.	Suggestions to JIC course of study			30%		70%

APPENDIX B

SUMMARY RESULTS OF VALIDITY TEST OF QUESTIONNAIRE NO. 3 (JS)

Question Number	ITEMS	Not Relevant	Minimally Relevant	Unsure	Relevant	Very Relevant
	Part 1:					
1.	Age group		10%		20%	70%
2.	Marital status		10%		40%	50%
3.	Place of origin	10%	20%		50%	20%
4.	Method of Study at JIC		10%		20%	70%
5.	Specialisation of Course of Study				30%	70%
6.	Final Grade in the Co-operative training programme				30%	70%
7.	Grade Point Average (GPA) in the College		10%		20%	70%
8.	How would you classify the firm's type of product(s)?		10%		40%	50%
9.	Did you have an opportunity to practice the skills you have been trained for?				20%	80%
10.	Where were you trained?	10%	20%		30%	40%
11.	How many credit hours did you complete prior to undertaking the Co-operative training?				30%	70%
	Part II:					
	Hands-on skills:					
12.	Basic manual skills (craftsmanship skills)				10%	90%
13.	Technician skills (workshop/laboratory experience)				10%	90%
14.	Professional skills (maintenance and troubleshooting procedures)				20%	80%
	Analytical skills:					
15.	Sciences				30%	70%
16.	Mathematics				20%	80%
17.	Related speciality subjects				30%	70%
	Proficiency in English:					
18.	Communication skills				10%	90%
19.	Comprehension skills				10%	90%
20.	Reading skills				10%	90%
21.	Writing skills				20%	80%
	Computer literacy:					
22.	Use of computer for classification, filing and processing of data		10%		20%	70%
23.	Use of computer for word processing		10%		50%	40%
24.	Use of computer software related to profession				30%	70%

Question Number	ITEMS	Not Relevant	Minimally Relevant	Unsure	Relevant	Very Relevant
25.	***Technology awareness:*** Similarity between technology used for training and that generally adopted by industry				30%	70%
26.	Awareness of importance of subject technology		10%		20%	70%
27.	Familiarity with other available technologies		10%		20%	70%
28.	***Safety awareness and practice:*** Safety of individual (Personal safety)					100%
29.	Safety of equipment and facilities					100%
30.	Safety of others					100%
31.	Safety of environment					100%
32.	***Organisational behaviour and human performance:*** Discipline				10%	90%
33.	Punctuality and time management				10%	90%
34.	Readiness to learn more		10%	10%	10%	70%
35.	Ability to execute a task with minimal supervision (self-motivated)		10%		10%	80%
36.	***Job relation to course of study:*** Job relation to course of study				10%	90%
37.	***Awareness of job requirements:*** Awareness of job duties and responsibilities				10%	90%
38.	Awareness of skills and knowledge required for the job				20%	80%
39.	***Physical well-being:*** Physical fitness		20%	10%	20%	50%
40.	***Links between the college and industry:*** Co-operative Training Programme					100%
41.	Students field visits to industry				20%	80%
42.	Lecturing and training sessions conducted by representatives of industries				30%	70%
43.	Job placement services		10%		10%	80%
44.	Involvement of industry in curricular and training facilities development					100%
45.	***Selection of course of study:*** Vocational and career guidance and counselling services			10%	10%	80%
46.	Procedures for selection of specialisation			10%		90%
47.	Your selected area of specialisation			10%	10%	80%
48.	Suggestions to JIC course of study			30%		70%

Appendix C

Pilot Study

1. Summary of Results of Questionnaire No. 1 (EJG)

2. Summary of Results of Questionnaire No. 2 (WS)

3. Summary of Results of Questionnaire No. 3 (JS)

APPENDIX C

SUMMARY OF RESULTS OF QUESTIONNAIRE NO. 1 (EJG) (FOR EMPLOYED JIC GRADUATES) (PILOT STUDY)

Table 1

1. Age	20 - 24 years	25 – 29 years	30 – 34 years	35 – 39 years	40 years or more
Percentage	25%	50%	10%	15%	0%

Table 2

2. Marital Status	Single	Married
Percentage	50%	50%

Table 3

3. Place or Origin	Northern Region	Southern Region	Western Region	Eastern Region	Central Region	Other
Percentage	15%	20%	10%	45%	10%	0%

Table 4

4. Type of Secondary School	Secondary School (Natural Sciences)	Secondary School (Technological Sciences)	Industrial Secondary Institute	Other
Percentage	80%	5%	15%	0%

Table 5

5. Secondary School Final Grade	Excellent (90 – 100%)	Very Good (75 – 89%)	Good (60 – 74%)
Percentage	15%	80%	5%

Table 6

6. Status at the College	Full-Time	Part-Time	Both of the above
Percentage	100%	0%	0%

Table 7

7. Specialisation	Instrumentation and Control Engineering Technology	Electrical Power Engineering Technology	Industrial Laboratory Technology	Chemical Engineering Technology
Percentage	30%	20%	20%	5%
	Air Conditioning and Refrigeration Engineering Technology	Manufacturing Engineering Technology	Electromechanica l Engineering Technology	
Percentage	5%	10%	10%	

Table 8

8. Grade Point Average (GPA)	2.0 – 2.5	2.6 – 3.0	3.1 – 3.5	3.6 – 4.0
Percentage	20%	25%	40%	15%

Table 9

9. Monthly Salary	Less than 3000 Saudi Riyals	3000 – 4999 Saudi Riyals	5000 – 6999 Saudi Riyals	7000 – 8999 Saudi Riyals	9000 Saudi Riyals or more
Percentage	21.1%	57.9%	21.1%	0%	0%

Table 10

10. Firm's Type of Product(s)	Petroleum	Cement	Petrochemicals	Air Conditioning/ Refrigeration
Percentage	15%	0%	45%	0%
	Chemicals	Paper	Iron and Steel	Glass
Percentage	20%	0%	15%	0%
	Electrical/ Electronics	Food	Gas	Other
Percentage	0%	0%	5%	0%

Table 11

Items	Percentage				
	Very Satisfied	Satisfied	Undecided	Dissatisfied	Very Dissatisfied
11. Basic manual skills (craftsmanship skills)	20%	60%	20%	0%	0%
12. Technician skills (workshop/laboratory experience)	26.3%	52.6%	21.1%	0%	0%
13. Professional skills (maintenance and trouble-shooting procedures)	38.9%	38.9%	16.7%	506%	0%
14. Sciences	5%	95%	0%	0%	0%
15. Mathematics	21.1%	73.7%	0%	5.3%	0%
16. Related speciality subjects	33.3%	44.4%	16.7%	5.6%	0%
17. Communication skills	30%	50%	5%	10%	5%
18. Comprehension skills	15%	85%	0%	0%	0%
19. Reading skills	20%	80%	0%	0%	0%
20. Writing skills	25%	75%	0%	0%	0%
21. Use of computer for data processing (classification, filing, etc.)	5.6%	22.2%	50%	22.2%	0%
22. Use of computer for word processing	12.5%	18.8%	50%	18.8%	0%
23. Use of computer software related to profession	17.6%	23.5%	41.2%	17.6%	0%
24. Similarity between technology used for training and that generally adopted by industry	25%	75%	0%	0%	0%
25. Awareness of importance of subject technology	22.2%	72.2%	5.6%	0%	0%
26. Familiarity with other available technologies	20%	40%	25%	15%	0%
27. Safety of individual (personal safety)	47.4%	47.4%	0%	5.3%	0%
28. Safety of equipment and facilities	45%	40%	5%	10%	0%
29. Safety of others	30%	55%	10%	5%	0%
30. Safety of environment	36.8%	36.8%	15.8%	10.5%	0%
31. Discipline	50%	44.4%	5.6%	0%	0%
32. Punctuality and time management	70%	30%	0%	0%	0%
33. Readiness to learn more	52.6%	36.8%	10.5%	0%	0%
34. Ability to execute a task with minimal supervision (self-motivated)	20%	55%	20%	5%	0%
35. Job relation to course of study	30%	55%	5%	5%	5%
36. Job duties and responsibilities	26.3%	63.2%	5.3%	5.3%	0%
37. Skills and knowledge required for the job	7.1%	78.6%	7.1%	7.1%	0%

Table 11 (cont'd)

Items	Percentage				
	Very Satisfied	Satisfied	Undecided	Dissatisfied	Very Dissatisfied
38. Physical fitness	35%	50%	15%	0%	0%
39. Co-operative Training Programme	45%	45%	10%	0%	0%
40. Student field visits to industry	25%	40%	25%	5%	5%
41. Lecturing and training conducted by industry representatives	0%	31.3%	62.5%	0%	6.3%
42. Job placement services	35%	45%	15%	0%	5%
43. Involvement of industry in curricular and training facilities development	0%	31.6%	57.9%	5.3%	5.3%
44. Vocational/career guidance and counselling services	10%	65%	15%	10%	0%
45. Procedures for selection of specialisation	25%	60%	5%	10%	0%
46. Your selected area of specialisation	36.8%	63.2%	0%	0%	0%

Table 12

Items	Percentage				
	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
47. Technical and vocational education is necessary to the existence of the society	35%	30%	25%	10%	0%
48. Technical and vocational education is very important for our country to continue its progress in the fields of technology	45%	55%	0%	0%	0%
49. Technical and vocational education is important for the industrialization of Saudi Arabia	45%	55%	0%	0%	0%
50. Technical and vocational education plays an essential role in solving the problems related to shortage of qualified Saudi labour force	65%	30%	0%	5%	0%
51. I joined Jubail Industrial College because I wanted to be a skilled technician	50%	35%	5%	5%	5%
52. Industrialisation provides more jobs for Saudi nationals	68.4%	21.1%	5.3%	5.3%	0%
53. Industrialisation raises the standard of living in the country	50%	45%	5%	0%	0%
54. Industrialisation encourages the utilisation of natural resources	55.6%	44.4%	0%	0%	0%
55. Saudisation helps reduce dependency on foreign workforce	75%	25%	0%	0%	0%
56. Saudisation has a great financial impact	60%	30%	10%	0%	0%
57. Saudisation has an important socio-cultural impact	47.4%	47.4%	5.3%	0%	0%

APPENDIX C

SUMMARY OF RESULTS OF QUESTIONNAIRE NO. 2 (WS) (FOR WORK SUPERVISORS) (PILOT STUDY)

Table 1

1. Age	25 years or less	26 – 35 years	36 –45 years	46 - 55 years	56 years or more
Percentage	0%	18.2%	54.5%	27.3%	0%

Table 2

2. Nationality	Saudi	Non-Saudi
Percentage	100%	0%

Table 3

3. Length of service	5 years or less	06 – 10 years	11 - 15 years	16 - 20 years	Over 20 years
Percentage	18.2%	36.4%	18.2%	27.3%	0%

Table 4

4. Job/Position	
Percentage	%

Table 5

5. Highest level of education attained	Secondary School or below	Post-secondary Technical/ vocational Certificate or Diploma	College Degree	MA or Ph.D
Percentage	18.2%	27.3%	54.5%	0%

Table 6

6. Number of employees currently supervising	01 – 10 employees	11 - 20 employees	21 - 30 employees	31 - 40 employees	41 - 50 employees	More than 50 employees
Percentage	45.5%	36.4%	9.1%	9.1%	0%	0%

Table 7

7. Number of years of supervision	2 years or less	3 – 4 years	5 – 6 years	7 – 8 years	9 – 10 years
Percentage	63.6%	27.3%	9.1%	0%	0%

Table 8

8. Firm's Type of Product(s)	Petroleum	Cement	Petrochemicals	Air -Conditioning/ Refrigeration
Percentage	9.1%	0%	54.5%	0%
	Chemicals	**Paper**	**Iron and Steel**	**Glass**
Percentage	27.3%	0%	0%	0%
	Electrical/ Electronics	**Food**	**Gas**	**Other**
Percentage	0%	0%	0%	9.1%

Table 9

9. Number of employees in your firm	200 employees or less	201 – 401 employees	401 - 600 employees	601 - 800 employees	801 - 1000 employees	More than 1000 employees
Percentage	30%	30%	30%	10%	0%	0%

Table 10

10. Percentage of Saudis in your firm	20% or less	21% - 40%	41% - 60%	61% - 80%	81% - 100%
Percentage	25%	12.5%	12.5%	37.5%	12.5%

Table 11

11. Number of years your firm in operation	5 years or less	06 - 10 years	11 - 15 years	16 - 20 years	21 -25 years	26 years or more
Percentage	10%	20%	10%	60%	0%	0%

Table 12

Items	Percentage				
	Very Satisfied	Satisfied	Undecided	Dissatisfied	Very Dissatisfied
12. Basic manual skills (craftsmanship skills)	9.1%	54.5%	36.4%	0%	0%
13. Technician skills (workshop/ laboratory experience)	0%	60%	40%	0%	0%
14. Professional skills (maintenance and trouble-shooting procedures)	0%	77.8%	11.1%	11.1%	0%
15. Sciences	18.2%	63.6%	18.2%	0%	0%
16. Mathematics	18.2%	81.8%	0%	0%	0%
17. Related speciality subjects	0%	77.8%	22.2%	0%	0%
18. Communication skills	40%	60%	0%	0%	0%
19. Comprehension skills	27.3%	72.7%	0%	0%	0%
20. Reading skills	27.3%	72.7%	0%	0%	0%
21. Writing skills	27.3%	72.7%	0%	0%	0%
22. Use of computer for data processing (classification, filing, etc.)	0%	9.1%	81.8%	9.1%	0%
23. Use of computer for word processing	0%	0%	90.9%	9.1%	0%
24. Use of computer software related to profession	0%	36.4%	54.5%	9.1%	0%
25. Similarity between technology used for training and that generally adopted by industry	0%	63.6%	18.2%	18.2%	0%
26. Awareness of importance of subject technology	18.2%	54.5%	9.1%	18.2%	0%
27. Familiarity with other available technologies	0%	36.4%	45.5%	18.2%	0%
28. Safety of individual (personal safety)	27.3%	72.7%	0%	0%	0%
29. Safety of equipment and facilities	27.3%	72.7%	0%	0%	0%
30. Safety of others	27.3%	72.7%	0%	0%	0%
31. Safety of environment	18.2%	72.7%	9.1%	0%	0%
32. Discipline	54.51%	45.5%	0%	0%	0%
33. Punctuality and time management	45.5%	45.5%	0%	9.1%	0%
34. Readiness to learn more	27.3%	63.6%	9.1%	0%	0%
35. Ability to execute a task with minimal supervision (self-motivated)	9.1%	81.8%	0%	9.1%	0%
36. Job relation to course of study	0%	72.7%	18.2%	0%	9.1%
37. Job duties and responsibilities	9.1%	54.5%	27.3%	0%	9.1%
38. Skills and knowledge required for the job	0%	77.8%	11.1%	0%	11.1%
39. Physical fitness	0%	36.4%	63.61%	0%	0%
40. Co-operative Training Programme	36.4%	45.5%	18.2%	0%	0%

Table 12 (cont'd)

Items	Percentage				
	Very Satisfied	Satisfied	Undecided	Dissatisfied	Very Dissatisfied
41. Student field visits to industry	40%	20%	30%	10%	0%
42. Lecturing and training conducted by industry representatives	0%	22.2%	66.7%	11.1%	0%
43. Job placement services	0%	20%	70%	10%	0%
44. Involvement of industry in curricular and training facilities development	0%	30%	60%	0%	10%
45. Based on your observations, to what extent are you satisfied with the graduate's selection of specialisation?	9.1%	45.5%	45.5%	0%	0%

APPENDIX C

SUMMARY OF RESULTS OF QUESTIONNAIRE NO. 3 (JS)

(FOR STUDENTS WHO HAVE PARTIALLY COMPLETED THEIR STUDIES IN THE COLLEGE AND HAVE ALSO UNDERAKEN THEIR CO-OPERATIVE TRAINING PROGRAMME)
(PILOT STUDY)

Table 1

1. Age	20 - 24 years	25 – 29 years	30 – 34 years	35 – 39 years	40 years or more
Percentage	80%	20%	0%	0%	0%

Table 2

2. Marital Status	Single	Married
Percentage	100%	0%

Table 3

3. Place or Origin	Northern Region	Southern Region	Western Region	Eastern Region	Central Region	Other
Percentage	9.1%	36.4%	9.1%	27.3%	18.2%	0%

Table 4

4. Type of Secondary School	Secondary School (Natural Sciences)	Secondary School (Technological Sciences)	Industrial Secondary Institute	Other
Percentage	90.9%	9.1%	0%	0%

Table 5

5. Secondary School Final Grade	Excellent (90 – 100%)	Very Good (75 – 89%)	Good (60 – 74%)
Percentage	0%	63.6%	36.4%

Table 6

6. Status at the College	Full-Time	Part-Time	Both of the above
Percentage	100%	0%	0%

Table 7

7. Specialisation	Instrumentation and Control Engineering Technology	Electrical Power Engineering Technology	Industrial Laboratory Technology	Chemical Engineering Technology
Percentage	9.1%	18.2%	18.2%	9.1%
	Air Conditioning and Refrigeration Engineering Technology	Manufacturing Engineering Technology	Electro-mechanical Engineering Technology	
Percentage	9.1%	18.2%	18.2%	

Table 8

8. Grade Point Average (GPA)	2.0 – 2.5	2.6 – 3.0	3.1 – 3.5	3.6 – 4.0
Percentage	63.6%	27.3%	9.1%	0%

Table 9

9. Credit hours completed	50 credit hours or less	51 – 60 credit hours	61 -70 credit hours	More than 70 credit hours
Percentage	0%	0%	100%	0%

Table 10

10. Where were you trained?	Jubail	Eastern Region (excluding Jubail)	Other
Percentage	81.8%	18.2%	0%

Table 11

11. Did you have an opportunity to practice the skills you have been trained for?	Yes	Uncertain	No
Percentage	100%	0%	0%

Table 12

12. Final Grade in the Co-operative Training Programme	A+	A	B+	B	C+	C	D+	D	F
Percentage	0%	36.4%	27.3%	27.3%	0%	0%	9.1%	0%	0%

Table 13

13. Firm's Type of Product(s)	Petroleum	Cement	Petrochemicals	Air Conditioning/ Refrigeration
Percentage	18.2%	0%	72.7%	9.1%
	Chemicals	**Paper**	**Iron and Steel**	**Glass**
Percentage	0%	0%	0%	0%
	Electrical/ Electronics	**Food**	**Gas**	**Other**
Percentage	0%	0%	0%	0%

Table 14

Items	Percentage				
	Very Satisfied	Satisfied	Undecided	Dissatisfied	Very Dissatisfied
14. Basic manual skills (craftsmanship skills)	50%	40%	0%	10%	0%
15. Technician skills (workshop laboratory experience)	63.6%	18.2%	0%	18.2%	0%
16. Professional skill (maintenance and trouble-shooting procedures)	40%	30%	30%	0%	0%
17. Sciences	36.4%	45.5%	9.1%	9.1%	0%
18. Mathematics	36.4%	36.4%	0%	9.1%	9.1%
19. Related speciality subjects	60%	40%	0%	0%	0%
20. Communication skills	54.5%	27.3%	9.1%	9.1%	0%
21. Comprehension skills	45.5%	27.3%	18.2%	9.1%	0%
22. Reading skills	72.7%	18.2%	0%	9.1%	0%
23. Writing skills	72.7%	18.2%	0%	9.1%	0%
24. Use of computer for data processing (classification, filing, etc.)	27.3%	45.5%	9.1%	9.1%	9.1%
25. Use of computer for word processing	36.4%	45.5%	9.1%	0%	9.1%
26. Use of computer software related to profession	18.2%	18.2%	27.3%	27.3%	9.1%
27. Similarity between technology used for training and that generally adopted by industry	27.3%	45.5%	18.2%	9.1%	0%
28. Awareness of importance of subject technology	18.2%	54.5%	27.3%	0%	0%
29. Familiarity with other available technologies	18.2%	54.5%	27.3%	0%	0%
30. Safety of individual (personal safety)	54.5%	36.4%	0%	9.1%	0%
31. Safety of equipment and facilities	54.5%	45.5%	0%	0%	0%
32. Safety of others	54.5%	45.5%	0%	0%	0%

Table 14 (cont'd)

Items	Percentage				
	Very Satisfied	Satisfied	Undecided	Dissatisfied	Very Dissatisfied
33. Safety of environment	45.5%	27.3%	0%	18.2%	9.1%
34. Discipline	45.5%	45.5%	9.1%	0%	0%
35. Punctuality and time management	72.7%	27.3%	0%	0%	0%
36. Readiness to learn more	36.4%	54.5%	0%	9.1%	0%
37. Ability to execute a task with a minimal supervision (self-motivated)	45.5%	27.3%	0%	27.3%	0%
38. Co-operative Training relation to course of study	63.6%	27.3%	0%	9.1%	0%
39. Job duties and responsibilities	54.5%	18.2%	27.3%	0%	0%
40. Skills and knowledge required for the job	18.2%	45.5%	36.4%	0%	0%
41. Physical fitness	18.2%	27.3%	9.1%	36.4%	9.1%
42. Co-operative Training Programme	40%	60%	0%	0%	0%
43. Student field visits to industry	45.5%	18.2%	9.1%	27.3%	0%
44. Lecturing and training conducted by industry representatives	0%	31.3%	62.5%	0%	6.3%
45. Job placement services	36.4%	45.5%	0%	9.1%	9.1%
46. Involvement of industry in curricular and training facilities development	36.4%	27.3%	27.3%	9.1%	0%
47. Vocational/career guidance and counselling services	9.1%	45.5%	9.1%	36.4%	0%
48. Procedures for selection of specialisation	18.2%	36.4%	18.2%	18.2%	9.1%
49. Your selected area of specialisation	36.4%	36.4%	0%	18.2%	9.1%

Appendix D

Main Study

1. Covering Letter for Questionnaire No. 1 (English Version)
2. Questionnaire No. 1 for Employed JIC Graduates (English Version)
3. Covering Letter for Questionnaire No. 2 (English Version)
4. Questionnaire No. 2 for Work Supervisors (English Version)
5. Covering Letter for Questionnaire No. 3 (English Version)
6. Questionnaire No. 3 for Student who have Partially Completed their Studies in the College and have also Undertaken their Co-operative Training Programme (English Version)
7. Covering Letter for Questionnaire No. 1 (Arabic Version)
8. Questionnaire No. 1 for Employed JIC Graduates (Arabic Version)
9. Covering Letter for Questionnaire No. 2 (Arabic Version)
10. Questionnaire No. 2 for Work Supervisors (Arabic Version)
11. Covering Letter for Questionnaire No. 3 (Arabic Version)
12. Questionnaire No. 3 for Student who have Partially Completed their Studies in the College and have also Undertaken their Co-operative Training Programme (Arabic Version)

APPENDIX D

Covering Letter

Dear JIC Graduate,

The enclosed questionnaire is part of a PhD research study aimed at assessing the status and relevance of the qualifications of the graduates of Jubail Industrial College, in order to formulate procedures leading to more appropriate and relevant college programmes.

It is only concerned with College graduates from the technical specialisations.

Please answer the questions to the best of your knowledge.

Thank you for your co-operation and the time and effort spared in this regard.

Best wishes,

KHALIFA S. AL-KHALDI
Jubail Industrial College

Encl: a/s

APPENDIX D

QUESTIONNAIRE NO. 1:

FOR EMPLOYED JIC GRADUATES

Part I: Factors related to background information:

Please read each question carefully and then place an "**X**" in the appropriate box.

1. What is your age?

1. ☐ 20 - 24 years 2. ☐ 25 – 29 years

3. ☐ 30 - 34 years 4. ☐ 35 – 39 years

5. ☐ 40 years or more

2. What is your marital status?

1. ☐ Single 2. ☐ Married

3. Where is your place of origin?

1. ☐ Northern Region 2. ☐ Southern Region

3. ☐ Western Region 4. ☐ Eastern Region

5. ☐ Central Region 6. ☐ Other (Please specify) ________

4. What type of secondary school did you complete prior to college enrolment?

1. ☐ Secondary School (Natural Sciences)

2. ☐ Secondary School (Technological Sciences)

3. ☐ Industrial Secondary Institute

4. ☐ Other (Please specify) ______________________________

5. What was your secondary school final grade average?

1. ☐ Excellent (90 – 100%) 2. ☐ Very Good (75 – 89%)

3. ☐ Good (60 – 74%)

Q-1/1

6. What was your student status at the College?

1. ☐ Full-Time
2. ☐ Part-Time
3. ☐ Both of the above

7. What was your specialisation in your course of study?

1. ☐ Instrumentation and Control Engineering Technology
2. ☐ Electrical Power Engineering Technology
3. ☐ Industrial Laboratory Technology
4. ☐ Chemical Engineering Technology
5. ☐ Air-Conditioning and Refrigeration Engineering Technology
6. ☐ Manufacturing Engineering Technology
7. ☐ Electromechanical Engineering Technology

8. What is your present grade point average (GPA) in the College?

1. ☐ 2.0 – 2.49
2. ☐ 2.5 –2.99
3. ☐ 3.0 – 3.49
4. ☐ 3.5 – 4.0

9. How much is your monthly salary?

1. ☐ Less than 3000 Saudi Riyals
2. ☐ 3000 – 4999 Saudi Riyals
3. ☐ 5000 – 6999 Saudi Riyals
4. ☐ 7000 – 8999 Saudi Riyals
5. ☐ 9000 Saudi Riyals or more

Q-1/2

10. How would you classify the firm's type of product(s)?

1.	☐	Petroleum	2.	☐	Cement
3.	☐	Petrochemicals	4.	☐	Air Conditioning/Refrigeration
5.	☐	Chemicals	6.	☐	Paper
7.	☐	Iron and Steel	8.	☐	Glass
9.	☐	Electrical / Electronics	10.	☐	Food
11.	☐	Gas	12.	☐	Other (Please specify) _____

11. You joined Jubail Industrial College because (Please select one answer that represents your reason very strongly):

1. ☐ You wanted to be a skilled technician.
2. ☐ You needed a job.
3. ☐ You could not find a place at the universities.
4. ☐ You were influenced by others (parents/relatives/friends, etc.).
5. ☐ Others: (Please specify) ____________________________

Q-1/3

Part II: Factors related to the course of study:

Please indicate to what extent you are satisfied with the quality of the following skills, knowledge, procedures and services offered to you by your JIC course of study. Place an "X" in the column that best represents your answer for the items listed.

ITEMS	Very Satisfied	Satisfied	Unsure	Dissatisfied	Very Dissatisfied
	5	4	3	2	1
A. ***Hands-on skills*** **The degree of your satisfaction with the following skills:** 1. Basic manual skills (craftsmanship skills)					
2. Technician skills (workshop/laboratory experience)					
3. Professional skills (maintenance and troubleshooting procedures)					
B. ***Analytical skills:*** **The degree of your satisfaction with the Following skills:** 4. Sciences (Chemistry and Physics)					
5. Mathematics					
6. Related speciality subjects					
C. ***Proficiency in English:*** **The degree of your satisfaction with the proficiency in the following English skills:** 7. Communication skills					
8. Comprehension skills					
9. Reading skills					
10. Writing skills					
D. ***Computer literacy:*** **The degree of your satisfaction with the computer literacy in the following areas:** 11. Use of computer for data processing (classification, filing, etc.)					
12. Use of computer for word processing					
13. Use of computer software related to profession					

ITEMS	Very Satisfied	Satisfied	Unsure	Dissatisfied	Very Dissatisfied
	5	4	3	2	1
E. ***Technology awareness:*** **The degree of your satisfaction with the technology awareness in the following areas:** 14. Similarity between technology used for training and that generally adopted by industry					
15. Awareness of importance of subject technology					
16. Familiarity with other available technologies related to area of specialisation					
F. ***Safety awareness and practice:*** **The degree of your satisfaction with the awareness and practice of safety as related to:** 17. Safety of individual (personal safety)					
18. Safety of equipment and facilities					
19. Safety of others					
20. Safety of environment					
G. ***Organisational behaviour and human performance:*** **The degree of your satisfaction with the organisational behaviour and human performance related to:** 21. Discipline (obedience to instructions and respect of others)					
22. Punctuality and time management					
23. Readiness to learn more					
24. Ability to execute a task with minimal supervision (self-motivation)					
H. ***Job relation to course of study:*** **The degree of your satisfaction with:** 25. Job relation to course of study					
I. ***Awareness of job requirements:*** **The degree of your satisfaction with the awareness of job requirements in the following areas:** 26. Job duties and responsibilities					
27. Skills and knowledge required for the job					
J. ***Physical well-being:*** **The degree of your satisfaction with the College programmes for:** 28. Physical fitness					

Q-1/5

ITEMS	Very Satisfied	Satisfied	Unsure	Dissatisfied	Very Dissatisfied
	5	4	3	2	1
K. ***Links between the College and industry:*** **The degree of your satisfaction with the links between the College and industry in the following areas:** 29. Co-operative Training Programme					
30. Student field visits to industry					
31. Lecturing and training conducted by industry representatives					
32. Graduates' employment in industry					
33. Involvement of industry in curricular and training facilities development					
L. ***Selection of course of study:*** **The degree of your satisfaction with the selection of course of study and the following related services and procedures:** 34. Vocational/career guidance and counselling services					
35. Procedures for selection of specialisation					
36. Your selected area of specialisation					

Additional question

In your opinion what changes would you suggest to the JIC course of study that might lead to a better graduate? Please arrange your ideas in points starting with the most important as you see it.

1. ______________________________

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2. ______________________________

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3. ______________________________

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4. ______________________________

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5. ______________________________

Q-1/6

APPENDIX D

Covering Letter

Dear Work Supervisor,

The enclosed questionnaire is part of a PhD research study aiming at assessing the status and relevance of the qualifications of the graduates of Jubail Industrial College, in order to formulate procedures leading to more appropriate and relevant college programmes.

It is only concerned with College Graduates from the technical specialisations.

Please answer the questions to the best of your knowledge.

Thank you for your cooperation and the time and effort spared in this regard.

Best wishes.

KHALIFA S. AL-KHALDI
Jubail Industrial College

Encl: a/s

APPENDIX D

QUESTIONNAIRE NO. 2:

FOR WORK SUPERVISORS

Part I: Factors related to background information:

The following questions seek general information about you that will help in analysing this questionnaire. Please answer each question to the best of your knowledge by placing an "**X**" in the appropriate box.

1. What is your age?

1. ☐ 25 years or less
2. ☐ 26 – 35 years
3. ☐ 36 – 45 years
4. ☐ 46 – 55 years
5. ☐ 56 years or more

2. What is your nationality?

1. ☐ Saudi
2. ☐ Non-saudi

3. How long have you been working in this firm?

1. ☐ 5 years or less
2. ☐ 06 – 10 years
3. ☐ 11 – 15 years
4. ☐ 16 – 20 years
5. ☐ Over 20 years

4 What is your highest level of education attained?

1. ☐ Secondary School or below
2. ☐ Post-secondary Technical/Vocational Certificate or Diploma
3. ☐ College Degree
4. ☐ MA or Ph.D

5. How many employees are you currently supervising?

1. ☐ 01 – 10 employees
2. ☐ 11 – 20 employees
3. ☐ 21 – 30 employees
4. ☐ 31 – 40 employees
5. ☐ 41 – 50 employees
6. ☐ More than 50 employees

6. How long have you been supervising the subject JIC graduate(s)? Please indicate the longest period of supervision if you have more than one graduate.

1. ☐ 2 years or less
2. ☐ 3 – 4 years
3. ☐ 5 – 6 years
4. ☐ 7 – 8 years
5. ☐ 9 – 10 years

7. How would you classify your firm's type of product(s)?

1. ☐ Petroleum
2. ☐ Cement
3. ☐ Petrochemicals
4. ☐ Air Conditioning/Refrigeration
5. ☐ Chemicals
6. ☐ Paper
7. ☐ Iron and Steel
8. ☐ Glass
9. ☐ Electrical / Electronics
10. ☐ Food
11. ☐ Gas
12. ☐ Other (Please specify) ______

8. What is the total number of employees in your firm?

1. ☐ 200 employees or less
2. ☐ 201 – 400 employees
3. ☐ 401 – 600 employees
4. ☐ 601 – 800 employees
5. ☐ 801 – 1000 employees
6. ☐ More than 1000 employees

9. What is the percentage of Saudis in your firm?

1. ☐ 20% or less
2. ☐ 21% - 40%
3. ☐ 41% - 60%
4. ☐ 61% - 80%
5. ☐ 81% - 100%

Q-2/2

10. How many years has your firm been in operation?

1.	☐	5 years or less	2.	☐	06 – 10 years
3.	☐	11 – 15 years	4.	☐	16 - 20 years
5.	☐	21 – 25 years	6.	☐	26 years or more

Part II: Factors related to the course of study:

Based on your observations as an immediate supervisor, please indicate to what extent you are satisfied with the quality of the following skills, knowledge, procedures and services offered to your subject employee(s) by the JIC course of study. Place an "X" in the column that best represents your answer for the items listed.

ITEMS	Very Satisfied	Satisfied	Unsure	Dissatisfied	Very Dissatisfied
	5	4	3	2	1
A. ***Hands-on skills*** **The degree of your satisfaction with the graduate's performance in the following skills:** 1. Basic manual skills (craftsmanship skills)					
2. Technician skills (workshop/laboratory experience)					
3. Professional skills (maintenance and troubleshooting procedures)					
B. ***Analytical skills:*** **The degree of your satisfaction with the graduate's knowledge in the following skills:** 4. Sciences (Chemistry and Physics)					
5. Mathematics					
6. Related speciality subjects					
C. ***Proficiency in English:*** **The degree of your satisfaction with the graduate's proficiency in the following English skills:** 7. Communication skills					
8. Comprehension skills					
9. Reading skills					
10. Writing skills					

Q-2/3

ITEMS	Very Satisfied	Satisfied	Unsure	Dissatisfied	Very Dissatisfied
	5	4	3	2	1
D. ***Computer literacy:*** **The degree of your satisfaction with the graduate's computer literacy in the following areas:** 11. Use of computer for data processing (classification, filing, etc.)					
12. Use of computer for word processing					
13. Use of computer software related to profession					
E. ***Technology awareness:*** **The degree of your satisfaction with the graduate's technology awareness in the following areas:** 14. Similarity between technology that the graduate trained on and that generally adopted by industry					
15. Awareness of importance of subject technology					
16. Familiarity with other available technologies related to area of specialisation					
F. ***Safety awareness and practice:*** **The degree of your satisfaction with the awareness and practice of safety as related to:** 17. Safety of individual (personal safety)					
18. Safety of equipment and facilities					
19. Safety of others					
20. Safety of environment					
G. ***Organizational behaviour and human performance:*** **The degree of your satisfaction with the organisational behaviour and human performance related to:** 21. Discipline (obedience to instructions and respect of others)					
22. Punctuality and time management					
23. Readiness to learn more					
24. Ability to execute a task with minimal supervision (self-motivation)					
H. ***Job relation to course of study:*** **The degree of your satisfaction with:** 25. Job relation to course of study					
I. ***Awareness of job requirements:*** **The degree of your satisfaction with the graduate's awareness of job requirements in the following areas:** 26. Job duties and responsibilities					
27. Skills and knowledge required for the job					

ITEMS	Very Satisfied	Satisfied	Unsure	Dissatisfied	Very Dissatisfied
	5	4	3	2	1
J. *Physical well-being:* **The degree of your satisfaction with:** 28. Graduate's Physical fitness					
K. *Links between the College and industry:* **The degree of your satisfaction with the links between the College and industry in the following areas:** 29. Co-operative Training Programme					
30. Student field visits to industry					
31. Your firm's participation in part-time lecturing and training at JIC					
32. Graduates' employment in industry					
33. Your firm's involvement in development of JIC curricula and training facilities					
L. *Selection of course of study:* 34. Based on your observations, to what extent are you satisfied with the graduate's selection of specialisation?					

Additional question

In your opinion what changes would you suggest to the JIC course of study that might lead to a better graduate? Please arrange your ideas in points starting with the most important as you see it.

1. ______________________________

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2. ______________________________

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3. ______________________________

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4. ______________________________

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5. ______________________________

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Q-2/5

APPENDIX D

Covering Letter

Dear JIC Student,

The enclosed questionnaire is part of a PhD research study aiming at assessing the status and relevance of the qualifications of the graduates of Jubail Industrial College, in order to formulate procedures leading to more appropriate and relevant college programmes.

It is only concerned with College Graduates from the technical specialisations.

Please answer the questions to the best of your knowledge.

Thank you for your cooperation and the time and effort spared in this regard.

Best wishes.

KHALIFA S. AL-KHALDI
Jubail Industrial College

Encl: a/s

APPENDIX D

QUESTIONNAIRE NO. 3:

FOR STUDENTS WHO HAVE PARTIALLY COMPLETED THEIR STUDIES IN THE COLLEGE AND HAVE ALSO UNDERTAKEN THEIR CO-OPERATIVE TRAINING PROGRAMME

Part I: Factors related to background information:

Please read each question carefully and then place an "X" in the appropriate box.

1. What is your age?

1. ☐	20 - 24 years	2. ☐	25 - 29 years
3. ☐	30 - 34 years	4. ☐	35 - 39 years
5. ☐	40 years or more		

2. What is your marital status?

1. ☐	Single	2. ☐	Married

3. Where is your place of origin?

1. ☐	Northern Region	2. ☐	Southern Region
3. ☐	Western Region	4. ☐	Eastern Region
5. ☐	Central Region	6. ☐	Other (Please specify) _____

4. What type of secondary school did you complete prior to college enrolment?

1. ☐ Secondary School (Natural Sciences)
2. ☐ Secondary School (Technological Sciences)
3. ☐ Industrial Secondary Institute
4. ☐ Other (Please specify) ______________________________

5. What was your secondary school final grade average?

1. ☐ Excellent (90 – 100%)
2. ☐ Very Good (75 – 89%)
3. ☐ Good (60 – 74%)

Q-3/1

6. What is your student status at the College?

   1. ☐ Full-Time

   2. ☐ Part-Time

   3. ☐ Both of the above

7. What is your specialisation in your course of study?

   1. ☐ Instrumentation and Control Engineering Technology

   2. ☐ Electrical Power Engineering Technology

   3. ☐ Industrial Laboratory Technology

   4. ☐ Chemical Engineering Technology

   5. ☐ Air-Conditioning and Refrigeration Engineering Technology

   6. ☐ Manufacturing Engineering Technology

   7. ☐ Electromechanical Engineering Technology

8. What is your present grade point average (GPA) in the College?

   1. ☐ 2.0 – 2.49   2. ☐ 2.5 –2.99

   3. ☐ 3.0 – 3.49   4. ☐ 3.5 – 4.0

9. How many credit hours did you complete prior to undertaking the Co-operative Training? (Do not count the preparatory year credit hours.)

   1. ☐ 50 credit hours or less

   2. ☐ 51 – 60 credit hours

   3. ☐ 61 – 70 credit hours

   4. ☐ More than 70 credit hours

10. Where were you trained?

1. ☐ Jubail

2. ☐ Eastern Region (excluding Jubail)

3. ☐ Other (Please specify) ______________

11. Did you have an opportunity to practice the skills you have been trained for?

1. ☐ Yes   2. ☐ Uncertain   3. ☐ No

12. What is your final grade in the Co-operative Training Programme?

1. ☐ A+	2. ☐ A	3. ☐ B+	4. ☐ B	5. ☐ C+
6. ☐ C	7. ☐ D+	8. ☐ D	9. ☐ F	

13. How would you classify the firm's type of product(s)?

1. ☐ Petroleum	2. ☐ Cement
3. ☐ Petrochemicals	4. ☐ Air Conditioning/Refrigeration
5. ☐ Chemicals	6. ☐ Paper
7. ☐ Iron and Steel	8. ☐ Glass
9. ☐ Electrical / Electronics	10. ☐ Food
11. ☐ Gas	12. ☐ Other (Please specify) _____

Q-3/3

Part II: Factors related to the course of study:

In the light of your co-operative training, please state to what extent you expect that the content and depth of the course of study you are currently pursuing at JIC will meet the needs of your future employment. Place an "X" in the column that best represents the degree of your satisfaction with the items listed.

ITEMS	Very Satisfied	Satisfied	Unsure	Dissatisfied	Very Dissatisfied
	5	**4**	**3**	**2**	**1**
A. *Hands-on skills* **The degree of your satisfaction with the following skills:** 1. Basic manual skills (craftsmanship skills)					
2. Technician skills (workshop/laboratory experience)					
3. Professional skills (maintenance and troubleshooting procedures)					
B. *Analytical skills* **The degree of your satisfaction with the following skills:** 4. Sciences (Chemistry and Physics)					
5. Mathematics					
6. Related Speciality subjects					
C. *Proficiency in /English* **The degree of your satisfaction with the Proficiency in the following English skills:** 7. Communication skills					
8. Comprehension skills					
9. Reading skills					
10. Writing skills					
D. *Computer literacy* **The degree of your satisfaction with the computer literacy in the following areas:** 11. Use of computer for data processing (classification, filing, etc.)					
12. Use of computer for word processing					
13. Use of computer software related to profession					
E. *Technology awareness* **The degree of your satisfaction with the Technology awareness in the following areas:** 14. Similarity between technology used for training and that generally adopted by industry					

ITEMS	Very Satisfied	Satisfied	Unsure	Dissatisfied	Very Dissatisfied
	5	**4**	**3**	**2**	**1**
15. Awareness of importance of subject technology					
16. Familiarity with other available technologies related to area of specialisation					
F. *Safety awareness and practice* **The degree of your satisfaction with the awareness and practice of safety as related to:** 17. Safety of individual (personal safety)					
18. Safety of equipment and facilities					
19. Safety of others					
20. Safety of environment					
G. *Organisational behaviour and human performance* **The degree of your satisfaction with the organizational behaviour and human performance related to:** 21. Discipline (obedience to instructions and respect of others)					
22. Punctuality and time management					
23. Readiness to learn more					
24. Ability to execute a task with minimal supervision (self-motivation)					
H. *Job (Co-operative Training) relation to course of study* **The degree of your satisfaction with:** 25. Co-operative Training relation to course of study					
I. *Awareness of job requirements* **The degree of your satisfaction with the awareness of job requirements in the following areas:** 26. Job duties and responsibilities					
27. Skills and knowledge required for the job					
J. *Physical well-being* **The degree of your satisfaction with the College programmes for:** 28. Physical fitness					
K. *Links between the College and industry* **The degree of your satisfaction with the links between the College and industry in the following areas:** 29. Co-operative Training Programme					

Q-3/5

ITEMS	Very Satisfied	Satisfied	Unsure	Dissatisfied	Very Dissatisfied
	5	4	3	2	1
30. Student field visits to industry					
31. Lecturing and training conducted by industry representatives					
32. Graduates' employment in industry					
33. Involvement of industry in curricular and training facilities development					
L. *Selection of course of study* **The degree of your satisfaction with the selection of course of study and the following related services and procedures:** 34. Vocational/career guidance and counselling services					
35. Procedures for selection of specialisation					
36. Your selected area of specialisation					

Additional question

In your opinion what changes would you suggest to the JIC course of study that might lead to a better graduate? Please arrange your ideas in points starting with the most important as you see it.

1. ______________________________

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2. ______________________________

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3. ______________________________

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4. ______________________________

____

5. ______________________________

____

APPENDIX D

Covering Letter for Questionnaire No. 1

بسم الله الرحمن الرحيم

عزيزي خريج كلية الجبيل الصناعية **المحترم**

السلام عليكم ورحمة الله وبركاته:

إن هذه الإستبانة هي جزء من دراسة أكاديمية لنيل درجة الدكتوراه تهدف إلى تقييم كفاءة خريجي كلية الجبيل الصناعية توطئة للخروج بتوصيات من شأنها العمل على تقديم برامج تعليمية أفضل.

أرجو الإجابة على جميع الأسئلة بكل دقة والإحاطة بأن هذه الدراسة قد صممت لتتناول خريجي الكلية في التخصصات التقنية دون سواهم ، وعليه فإنها لا تشمل بقية الخريجين من التخصصات الإدارية.

شاكراً لك سلفاً الجهد والوقت ،،، والسلام عليكم ورحمة الله وبركاته ،،،

خليفة بن سباع الخالدي
كلية الجبيل الصناعية

APPENDIX D (Questionnaire No. 1)

إستبانة رقم (١)

لخريجي كلية الجبيل الصناعية العاملين في الصناعة

الجزء ١: معلومات عامة عن الخريج:

يرجى قراءة كل سؤال بعناية ثم وضع علامة " ✓ " في المربع المناسب.

١- كم عمرك؟

١. ☐ ٢٠ - ٢٤ عاماً　　٢. ☐ ٢٥ - ٢٩ عاماً

٣. ☐ ٣٠ - ٣٤ عاماً　　٤. ☐ ٣٥ - ٣٩ عاماً

٥. ☐ ٤٠ عاماً أو أكثر

٢- ما هي حالتك الاجتماعية؟

١. ☐ أعـزب　　٢. ☐ متزوج

٣- ما هي منطقتك الأصلية؟

١. ☐ المنطقة الشمالية　　٢. ☐ المنطقة الجنوبية

٣. ☐ المنطقة الغربية　　٤. ☐ المنطقة الشرقية

٥. ☐ المنطقة الوسطى　　٦. ☐ أخرى (فضلاً أذكرها) ____

٤- ما نوع المدرسة الثانوية التي تخرجت منها قبل التحاقك بالكلية؟

١. ☐ مدرسة ثانوية (علوم طبيعية)　　٢. ☐ مدرسة ثانوية (علوم تقنية)

٣. ☐ معهد ثانوي صناعي　　٤. ☐ اخرى (فضلاً أذكرها) ____

APPENDIX D (Questionnaire No. 1)

٥- ما هو التقدير النهائي في شهادة الثانوية العامة؟

١. ☐ ممتاز (٩٠% - ١٠٠%) ٢. ☐ جيد جداً (٧٥% - ٨٩%)

٣. ☐ جيد (٦٠% - ٧٤ %)

٦- ما هو النظام الذي اتبعته أثناء دراستك في الكلية؟

١. ☐ منتظم ٢. ☐ متفرغ جزئياً ٣. ☐ كلاهما

٧- ما هو تخصصك الدراسي؟

١. ☐ تقنية الأجهزة الدقيقة والتحكم ٢. ☐ تقنية هندسة القوى الكهربائية

٣. ☐ تقنية المختبرات الصناعية ٤. ☐ تقنية الهندسة الكيميائية

٥. ☐ تقنية هندسة التكييف والتبريد ٦. ☐ تقنية هندسة التصنيع

٧. ☐ تقنية الهندسة الكهروميكانيكية

٨- ما هو معدلك التراكمي النهائي في الكلية؟

١. ☐ ٢و٠ - ٢و٤٩ ٢. ☐ ٢و٥ - ٢و٩٩

٣. ☐ ٣و٠ - ٣و٤٩ ٤. ☐ ٣و٥ - ٤و٠

٩- كم راتبك الشهري؟

١. ☐ أقل من ٣٠٠٠ ريال سعودي ٢. ☐ ٣٠٠٠- ٤٩٩٩ ريال سعودي

٣. ☐ ٥٠٠٠- ٦٩٩٩ ريال سعودي ٤. ☐ ٧٠٠٠- ٨٩٩٩ ريال سعودي

٥. ☐ ٩٠٠٠ ريال سعودي أو أكثر

استبانة (١) صفحة ٢

١٠- كيف يمكن تصنيف الشركة / المؤسسة التي تعمل فيها من حيث الإنتاج؟

١. ☐ بترول	٢. ☐ إسمنت
٣. ☐ بتروكيماويات	٤. ☐ تكييف وتبريد
٥. ☐ كيماويات	٦. ☐ ورق
٧. ☐ حديد وصلب	٨. ☐ زجاج
٩. ☐ أجهزة كهربائية / إلكترونية	١٠. ☐ أغذية
١١. ☐ غاز	١٢. ☐ أخرى (فضلاً أذكرها) ______

١١- كان التحاقك بكلية الجبيل الصناعية بسبب: (فضلاً أختر إجابة واحدة تكون هي الأقرب إلى رأيك).

١. ☐ رغبتك في أن تكون فنياً مؤهلاً

٢. ☐ حاجتك إلى وظيفة

٣. ☐ عدم قبولك في الجامعات

٤. ☐ تأثير الآخرين عليك (الوالدين/ الأقارب/ الأصدقاء ..إلخ)

٥. ☐ أخرى (فضلاً أذكرها) ______________

الجزء ٢: العوامل المتعلقة بالبرنامج الدراسي:

يرجى الإشارة إلى مدى رضاك عن جودة المهارات و المعارف والإجراءات والخدمات التي قدمت لك من خلال البرنامج الدراسي في كلية الجبيل الصناعية. ضع علامة " ✓ " في الخانة التي تعبّر عن رأيك بجانب كل فقرة في الجدول التالي:

APPENDIX D (Questionnaire No. 1)

الأسئلة	راض جداً	راض	غير متأكد	غير راض	غير راض أبدا
	٥	٤	٣	٢	١
A . <u>المهارات العملية:</u> **مدى رضاك عن جودة المهارات العملية التالية التي تضمنها البرنامج الدراسي:** ١- المهارات اليدوية الأساسية (المهارات الحرفية)					
٢- المهارات الفنية (خبرة الورش و المختبرات)					
٣- المهارات المهنية (إجراءات الصيانة وتحديد الأعطال)					
B . <u>المهارات التحليلية:</u> **مدى رضاك عن جودة المهارات التحليلية التالية التي تضمنها البرنامج الدراسي:** ٤- العلـوم (الكيمياء والفيزياء)					
٥- الرياضيات					
٦- المقررات الدراسية الفنية المساندة للتخصص					
C . <u>الإلمام باللغة الإنجليزية:</u> **مدى رضاك عن جودة مهارات اللغة الإنجليزية التالية التي تضمنها البرنامج الدراسي:** ٧- مهارة المخاطبة					
٨- مهارة الاستيعاب					
٩- مهارة القراءة					
١٠- مهارة الكتابة					
D . <u>الإلمام باستخدامات الحاسب الآلي:</u> **مدى رضاك عن جودة استخدامات الحاسب الآلي التالية التي تضمنها البرنامج الدراسي:** ١١- استخدام الحاسب الآلي لمعالجة البيانات (التصنيف ، الحفظ .. الخ) data processing					
١٢- استخدام الحاسب الآلي لمعالجة الكلمات word processing					
١٣- استخدام برامج الحاسب الآلي المتعلقة بالمهنة					
E . <u>الدراية بالتقنية:</u> **مدى رضاك عن تركيز البرنامج الدراسي على التقنية وأهميتها في الجوانب التالية:** ١٤- التشابه بين التقنية المستخدمة للتدريب في الكلية وتلك المعمول بها في الصناعة					
١٥- الدراية بأهمية التقنية المذكورة					
١٦- الإلمام بالتقنيات الأخرى ذات الصلة بالتخصص					
F . <u>الدراية بالسلامة وممارستها:</u> **مدى رضاك عن تركيز البرنامج الدراسي على السلامة فيما يختص بالجوانب التالية:** ١٧- سلامة الفرد(السلامة الشخصية)					

استبانة (١) صفحة ٤

APPENDIX D (Questionnaire No. 1)

الأسئلة	راض جدا	راض	غير متأكد	غير راض	غير راض ابدا
	٥	٤	٣	٢	١
١٨- سلامة المعدات والمرافق					
١٩- سلامة الآخرين					
٢٠- سلامة البيئة					
G. <u>السلوك والأداء الوظيفي:</u> **مدى رضاك عن جودة إجراءات ومحتوى البرنامج الدراسي فيما يختص بتعزيز الجوانب السلوكية التالية:** ٢١- السلوك (التقيد بالتعليمات واحترام الآخرين).					
٢٢- الدقة في المواعيد وإدارة الوقت					
٢٣- الاستعداد لتعلم المزيد					
٢٤- القدرة على أداء مهام العمل بأقل قدر من الإشراف والتوجيه (التحفيز الذاتي).					
H. <u>العلاقة بين الوظيفة والبرنامج الدراسي:</u> **مدى رضاك عن:** ٢٥- علاقة الوظيفة بالبرنامج الدراسي					
I. <u>الدراية بمتطلبات الوظيفة:</u> **مدى رضاك عن جودة الخدمة التي قدمتها الكلية للتعريف بمتطلبات الوظيفة الحالية في الجوانب التالية:** ٢٦- مهام ومسئوليات الوظيفة					
٢٧- المهارات والمعارف المطلوبة للوظيفة					
J. <u>اللياقة البدنية:</u> **مدى رضاك عن جودة أنشطة الكلية الرياضية وخدماتها في مجال :** ٢٨- اللياقة البدنية					
K. <u>الصلة بين الكلية والصناعة:</u> **مدى رضاك عن الصلة بين الكلية والصناعة في الجوانب التالية:** ٢٩- برنامج التدريب التعاوني Co-operative Training					
٣٠- زيارات الطلاب الميدانية للصناعة					
٣١- مشاركة الفنـيين من الصـناعات في تقديم المحاضرات والتدريب لطلاب الكلية					
٣٢- إقبال الصناعات على توظيف خريجي الكلية					

APPENDIX D (Questionnaire No. 1)

الأسئلة	راض جداً	راض	غير متأكد	غير راض	غير راض أبداً
	٥	٤	٣	٢	١
٣٣- مشاركة الفنيين من الصناعات في تطوير المناهج ومرافق التدريب في الكلية					
L. اختيار التخصص الدراسي: **مدى رضاك عن اختيارك للتخصص الدراسي والخدمات والإجراءات التالية:** ٣٤- التوجيه المهني وخدمات الإرشاد الطلابي					
٣٥- إجراءات اختيار التخصص					
٣٦- مجال التخصص الذي قمت باختياره					

- **سؤال إضافي**

ما هي المقترحات التي تود إضافتها على البرنامج الدراسي الحالي في كلية الجبيل الصناعية والتي تؤدي إلى تخريج نوعية أفضل من الطلاب؟ فضلاً رتب مقترحاتك على شكل نقاط بدءاً بالأهم حسب ما تراه مناسباً.

١- ______________________________

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٢- ______________________________

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٣- ______________________________

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٤- ______________________________

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٥- ______________________________

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APPENDIX D

Covering Letter for Questionnaire No. 2

بسم الله الرحمن الرحيم

عزيزي الرئيس المباشر لخريج كلية الجبيل الصناعية المحترم

السلام عليكم ورحمة الله وبركاته:

إن هذه الإستبانة هي جزء من دراسة أكاديمية لنيل درجة الدكتوراه تهدف إلى تقييم كفاءة خريجي كلية الجبيل الصناعية توطئة للخروج بتوصيات من شأنها العمل على تقديم برامج تعليمية أفضل.

أرجو الإجابة على جميع الأسئلة بكل دقة والإحاطة بأن هذه الدراسة قد صممت لتتناول خريجي الكلية في التخصصات التقنية دون سواهم ، وعليه فإنها لا تشمل بقية الخريجين من التخصصات الإدارية.

شاكراً لك سلفاً الجهد والوقت ،،، والسلام عليكم ورحمة الله وبركاته ،،،

خليفة بن سباع الخالدي
كلية الجبيل الصناعية

إستبانة رقم (٢)

للرؤساء المباشرين في الصناعة

الجزء ١: معلومات عامة عن الرئيس المباشر:

إن الهدف من الأسئلة التالية هو الحصول على معلومات عامة عنك تساعدنا على تحليل هذه الإستبانة. يرجى الإجابة عن الأسئلة التالية وذلك بوضع علامة "✓" في المربع المناسب.

١- كم عمرك؟

١. ☐ ٢٥ عاما أو أقل
٢. ☐ ٢٦ - ٣٥ عاماً
٣. ☐ ٣٦ - ٤٥ عاماً
٤. ☐ ٤٦ - ٥٥ عاماً
٥. ☐ ٥٦ عاما أو أكثر

٢- ما جنسيتك؟

١. ☐ سعودي
٢. ☐ غير سعودي

٣- كم عدد سنوات عملك مع الشركة / المؤسسة؟

١. ☐ ٥ سنوات أو أقل
٢. ☐ ٦ - ١٠ سنوات
٣. ☐ ١١ - ١٥ سنة
٤. ☐ ١٦ - ٢٠ سنة
٥. ☐ أكثر من ٢٠ سنة

٤- ما هو أعلى مستوى تعليمي حصلت عليه؟

١. ☐ الثانوية العامة أو أقل
٢. ☐ شهادة أو دبلوم فني / مهني بعد الثانوية العامة
٣. ☐ الشهادة الجامعية
٤. ☐ درجة الماجستير أو الدكتوراه

٥- كم عدد الموظفين الذين تشرف عليهم حاليا؟

١. ☐ ١ - ١٠ موظفين
٢. ☐ ١١ - ٢٠ موظفاً
٣. ☐ ٢١ - ٣٠ موظفاً
٤. ☐ ٣١ - ٤٠ موظفاً
٥. ☐ ٤١ - ٥٠ موظفاً
٦. ☐ أكثر من ٥٠ موظفاً

٦- كم عدد سنوات الإشراف على خريج / خريجي الكلية؟ فضلاً أذكر أطول فترة أشراف في حالة وجود أكثر من خريج.

١. ☐ سنتان أو أقل
٢. ☐ ٣ - ٤ سنوات
٣. ☐ ٥ - ٦ سنوات
٤. ☐ ٧ - ٨ سنوات
٥. ☐ ٩ - ١٠ سنوات

٧- كيف يمكن تصنيف الشركة / المؤسسة التي تعمل بها من حيث الإنتاج؟

١. ☐ بتـرول
٢. ☐ إسمنت
٣. ☐ بتروكيماويات
٤. ☐ تكييف وتبريد
٥. ☐ كيماويات
٦. ☐ ورق
٧. ☐ حديد وصلب
٨. ☐ زجاج
٩. ☐ أجهزة كهربائية / إلكترونية
١٠. ☐ أغذيـة
١١. ☐ غـــاز
١٢. ☐ أخرى (فضلا أذكرها) _______

٨- ما هو مجموع عدد العاملين في الشركة / المؤسسة التي تعمل بها؟

١. ☐ ٢٠٠ موظف أو أقل
٢. ☐ ٢٠١ - ٤٠٠ موظف
٣. ☐ ٤٠١ - ٦٠٠ موظف
٤. ☐ ٦٠١ - ٨٠٠ موظف
٥. ☐ ٨٠١ - ١٠٠٠ موظف
٦. ☐ أكثر من ١٠٠٠ موظف

٩- ما هي نسبة السعوديين العاملين في الشركة / المؤسسة حالياً؟

١. ☐ ٢٠% أو أقل
٢. ☐ ٢١% - ٤٠%
٣. ☐ ٤١% - ٦٠%
٤. ☐ ٦١% - ٨٠%
٥. ☐ ٨١% - ١٠٠%

١٠- ما هو العمر الزمني للشركة / المؤسسة منذ إنشائها؟

١. ☐ ٥ سنوات أو أقل
٢. ☐ ٦ - ١٠ سنوات
٣. ☐ ١١- ١٥ سنة
٤. ☐ ١٦ - ٢٠ سنة
٥. ☐ ٢١- ٢٥ سنة
٦. ☐ ٢٦ سنة أو أكثر

الجـزء ٢: العوامل المتعلقة بالبرنامج الدراسي

بناء على معرفتك بخريجي الكلية وملاحظاتك كرئيس مباشر ، يرجى الإشارة إلى مدى رضاك عن نوعية المهارات و المعارف والإجراءات والخدمات التي قدمت للخريج من خلال البرنامج الدراسي الذي تلقاه في كلية الجبيل الصناعية. يرجى وضع علامة " ✓ " في الخانة التي تعبّر عن رأيك بجانب كل فقرة في الجدول التالي:

الأسئلة	راضٍ جداً	راضٍ	غير متأكد	غير راضٍ	غير راضٍ أبداً
	٥	٤	٣	٢	١
A. المهارات العملية: **مدى رضاك عن جودة المهارات العملية التالية التي تضمنها البرنامج الدراسي:** ١ - المهارات اليدوية الأساسية ((المهارات الحرفية)					
٢ - المهارات الفنية (خبرة الورش و المختبرات)					
٣ - المهارات المهنية (إجراءات الصيانة وتحديد الأعطال)					
B. المهارات التحليلية: **مدى رضاك عن جودة المهارات التحليلية التالية التي تضمنها البرنامج الدراسي:** ٤ - العلـوم (الكيمياء والفيزياء)					
٥ - الرياضيات					
٦ - المقررات الدراسية الفنية المساندة للتخصص					

APPENDIX D (Questionnaire No. 2)

الأسئلة	راض جداً	راض	غير متأكد	غير راض	غير راض أبداً
	٥	٤	٣	٢	١
C. الإلمام باللغة الإنجليزية: **مدى رضاك عن جودة مهارات اللغة الإنجليزية التالية التي تضمنها البرنامج الدراسي:** ٧ - مهارة المخاطبة					
٨ - مهارة الاستيعاب					
٩ - مهارة القراءة					
١٠- مهارة الكتابة					
D. الإلمام باستخدامات الحاسب الآلي: **مدى رضاك عن مستوى معرفة خريج الكلية باستخدامات الحاسب الآلي التالية :** ١١- استخدام الحاسب الآلي لمعالجة البيانات (التصنيف ،الحفظ الخ) data processing					
١٢- استخدام الحاسب الآلي لمعالجة الكلمات word processing					
١٣- استخدام برامج الحاسب الآلي المتعلقة بالمهنة					
E. الدراية بالتقنية: **مدى رضاك عن تركيز البرنامج الدراسي على الدراية بالتقنية وأهميتها في الجوانب التالية:** ١٤- التشابه بين التقنية المستخدمة للتدريب في الكلية وتلك المعمول بها في الصناعة					
١٥- الدراية بأهمية التقنية المذكورة					
١٦- الإلمام بالتقنيات الأخرى ذات الصلة بالتخصص					
F. الدراية بالسلامة وممارستها: **مدى رضاك عن تركيز البرنامج الدراسي على السلامة فيما يختص بالجوانب التالية:** ١٧- سلامة الفرد (السلامة الشخصية)					
١٨- سلامة المعدات والمرافق					
١٩- سلامة الآخرين					
٢٠- سلامة البيئة					
G. السلوك والأداء الوظيفي: **مدى رضاك عن جودة إجراءات ومحتوى البرنامج الدراسي فيما يختص بتعزيز الجوانب السلوكية التالية:** ٢١- السلوك (التقيد بالتعليمات واحترام الآخرين)					
٢٢- الدقة في المواعيد وإدارة الوقت					
٢٣- الاستعداد لتعلم المزيد					
٢٤- القدرة على أداء مهام العمل بأقل قدر من الإشراف والتوجيه (التحفيز الذاتي)					

إستبانة (٢) صفحة ٤

APPENDIX D (Questionnaire No. 2)

الأسئلة	راض جداً	راض	غير متأكد	غير راض	غير راض أبداً
	٥	٤	٣	٢	١
H. **العلاقة بين الوظيفة والبرنامج الدراسي:** **مدى رضاك عن:** ٢٥- علاقة الوظيفة بالبرنامج الدراسي					
I. **الدراية بمتطلبات الوظيفة:** **مدى رضاك عن جودة الخدمة التي قدمتها الكلية للتعريف بمتطلبات الوظيفة الحالية في الجوانب التالية:** ٢٦- مهام ومسئوليات الوظيفة					
٢٧- المهارات والمعارف المطلوبة للوظيفة					
J. **اللياقة البدنية:** **مدى رضاك عن :** ٢٨- اللياقة البدنية للخريج					
K. **الصلة بين الكلية والصناعة:** **مدى رضاك عن الصلة بين الكلية والصناعة في الجوانب التالية:** ٢٩- برنامج التدريب التعاوني Co-operative Training					
٣٠- زيارات الطلاب الميدانية للصناعة					
٣١- مشاركة شركتك في تقديم المحاضرات والتدريب لطلاب الكلية أثناء الدراسة					
٣٢- إقبال الصناعات على توظيف خريجي الكلية					
٣٣- مشاركة شركتك في تطوير مناهج ومرافق التدريب في الكلية					
L. **إختيار التخصص الدراسي:** **مدى رضاك عن اختيار الطالب لتخصصه الدراسي:** ٣٤- بناء على ملاحظاتك ، إلى أي مدى أنت راض عن إختيار الطالب لتخصصه الدراسي؟					

- سؤال إضافي

ما هي المقترحات التي تود إضافتها على البرنامج الدراسي الحالي في كلية الجبيل الصناعية والتي تؤدي إلى تخريج نوعية أفضل من الطلاب؟ فضلاً رتب مقترحاتك على شكل نقاط بدءاً بالأهم حسب ما تراه مناسباً.

١. ______________________________

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٢. ______________________________

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٣. ______________________________

إستبانة (٢) صفحة ٥

APPENDIX D

Covering Letter for Questionnaire No. 3

بسم الله الرحمن الرحيم

عزيزي الطالب في كلية الجبيل الصناعية المحترم

السلام عليكم ورحمة الله وبركاته:

إن هذه الإستبانة هي جزء من دراسة أكاديمية لنيل درجة الدكتوراه تهدف إلى تقييم كفاءة خريجي كلية الجبيل الصناعية توطئة للخروج بتوصيات من شأنها العمل على تقديم برامج تعليمية أفضل.

أرجو الإجابة على جميع الأسئلة بكل دقة والإحاطة بأن هذه الدراسة قد صممت لتتناول خريجي الكلية في التخصصات التقنية دون سواهم ، وعليه فإنها لا تشمل بقية الخريجين من التخصصات الإدارية.

شاكراً لك سلفاً الجهد والوقت ،،، والسلام عليكم ورحمة الله وبركاته ،،،

خليفة بن سباع الخالدي
كلية الجبيل الصناعية

APPENDIX D (Questionnaire No. 3)

إستبانة رقم (٣)

للطلاب الذين أتموا جزئيا دراستهم في الكلية واجتازوا برنامج التدريب التعاوني

الجـزء ١: معلومات عامة عن الطالب:

يرجى قراءة كل سؤال بعناية ثم وضع علامة " ✓ " في المربع المناسب.

١- كم عمرك؟

١. ☐ ٢٠ - ٢٤ عاماً
٢. ☐ ٢٥ - ٢٩ عاماً
٣. ☐ ٣٠ - ٣٤ عاماً
٤. ☐ ٣٥ - ٣٩ عاماً
٥. ☐ ٤٠ عاماً أو أكثر

٢- ما هي حالتك الإجتماعية؟

١. ☐ أعــزب
٢. ☐ متزوج

٣- ما هي منطقتك الأصلية؟

١. ☐ المنطقة الشمالية
٢. ☐ المنطقة الجنوبية
٣. ☐ المنطقة الغربية
٤. ☐ المنطقة الشرقية
٥. ☐ المنطقة الوسطى
٦. ☐ أخرى (فضلاً أذكرها)__________

٤- ما نوع المدرسة الثانوية التي تخرجت منها قبل التحاقك بالكلية؟

١. ☐ مدرسة ثانوية (علوم طبيعية)
٢. ☐ مدرسة ثانوية (علوم تقنية)
٣. ☐ معهد ثانوي صناعي
٤. ☐ أخرى (فضلاً أذكرها) ______

٥- ما هو التقدير النهائي في شهادة الثانوية العامة؟

١. ☐ ممتاز (٩٠% - ١٠٠%)
٢. ☐ جيد جداً (٧٥% - ٨٩%)
٣. ☐ جيـد (٦٠% - ٧٤ %)

٦- ما هو النظام الذي اتبعته أثناء دراستك في الكلية؟

١. ☐ منتظم
٢. ☐ متفرغ جزئياً
٣. ☐ كلاهمـا

٧- ما هو تخصصك الدراسي؟

١. ☐ تقنية الأجهزة الدقيقة والتحكم
٢. ☐ تقنية هندسة القوى الكهربائية
٣. ☐ تقنية المختبرات الصناعية
٤. ☐ تقنية الهندسة الكيميائية
٥. ☐ تقنية هندسة التكييف والتبريد
٦. ☐ تقنية هندسة التصنيع
٧. ☐ تقنية الهندسة الكهروميكانيكية

٨- ما هو معدلك التراكمي الحالي في الكلية؟

١. ☐ ٢و٠ - ٢و٤٩
٢. ☐ ٢و٥ - ٢و٩٩
٣. ☐ ٣و٠ - ٣و٤٩
٤. ☐ ٣و٥ - ٤و٠

٩- كم عدد الساعات المعتمدة التي أتممتها قبل التدريب التعاوني؟ (يستثنى من ذلك الساعات المعتمدة للسنة التحضيرية).

١. ☐ ٥٠ ساعة معتمدة أو أقل
٢. ☐ ٥١ - ٦٠ ساعة معتمدة
٣. ☐ ٦١ - ٧٠ ساعة معتمدة
٤. ☐ أكثر من ٧٠ ساعة معتمدة

١٠- أين تم تدريبك؟

١. ☐ في الجبيل

٢. ☐ في المنطقة الشرقية (خارج الجبيل)

٣. ☐ أخرى (فضلاً أذكرها) ____________

١١- هل أتيحت لك الفرصة أثناء التدريب التعاوني لممارسة المهارات التي تدربت عليها في البرنامج الدراسي؟

١. ☐ نعم ٢. ☐ غير متأكد ٣. ☐ لا

١٢- ما هو التقدير النهائي الذي حصلت عليه في برنامج التدريب التعاوني؟

١. ☐ ممتاز مرتفع (+A) ٢. ☐ ممتاز (A) ٣. ☐ جيدجداً مرتفع (+B)

٤. ☐ جيدجداً (B) ٥. ☐ جيد مرتفع (+C) ٦. ☐ جيد (C)

٧. ☐ مقبول مرتفع (+D) ٨. ☐ مقبول (D) ٩. ☐ راسب (F)

١٣- كيف يمكن تصنيف الشركة / المؤسسة التي تدرّبت فيها من حيث الإنتاج؟

١. ☐ بترول ٢. ☐ إسمنت

٣. ☐ بتروكيماويات ٤. ☐ تكييف وتبريد

٥. ☐ كيماويات ٦. ☐ ورق

٧. ☐ حديد وصلب ٨. ☐ زجاج

٩. ☐ أجهزة كهربائية / إلكترونية ١٠. ☐ أغذية

١١. ☐ غاز ١٢. ☐ أخرى (فضلاً أذكرها) ____________

إستبانة (٣) صفحة ٣

APPENDIX D (Questionnaire No. 3)

الجـزء ٢: العوامل المتعلقة بالبرنامج الدراسي:

على ضوء برنامج التدريب التعاوني ، إلى أي مدى تتوقع أن تفي محتويات وعمق البرنامج الدراسي الحالي بالمتطلبات الوظيفية المستقبلية؟ يرجى وضع علامة " ✓ " في الخانة التي تعبّر عن رأيك بجانب كل فقرة في الجدول التالي:

الأسئلة	راضٍ جداً	راضٍ	غير متأكد	غير راضٍ	غير راضٍ أبداً
	٥	٤	٣	٢	١
A. المهارات العملية: **مدى رضاك عن جودة المهارات العملية التالية التي تضمنها البرنامج الدراسي:** ١ - المهارات اليدوية الأساسية (المهارات الحرفية)					
٢ - المهارات الفنية (خبرة الورش و المختبرات)					
٣ - المهارات المهنية (إجراءات الصيانة وتحديد الأعطال)					
B. المهارات التحليلية: **مدى رضاك عن جودة المهارات التحليلية التالية التي تضمنها البرنامج الدراسي:** ٤ - العلوم (الكيمياء والفيزياء)					
٥ - الرياضيات					
٦ - المقررات الدراسية الفنية المساندة للتخصص					
C. الإلمام باللغة الإنجليزية: **مدى رضاك عن جودة مهارات اللغة الإنجليزية التالية التي تضمنها البرنامج الدراسي:** ٧ - مهارة المخاطبة					
٨ - مهارة الإستيعاب					
٩ - مهارة القراءة					
١٠- مهارة الكتابة					
D. الإلمام باستخدامات الحاسب الآلي: **مدى رضاك عن جودة استخدامات الحاسب الآلي التالية التي تضمنها البرنامج الدراسي:** ١١- إستخدام الحاسب الآلي معالجة البيانات (التصنيف ، الحفظ..الخ) data processing					
١٢- إستخدام الحاسب الآلي لمعالجة الكلمات word processing					
١٣- إستخدام برامج الحاسب الآلي المتعلقة بالمهنة					

إستبانة (٣) صفحة ٤

APPENDIX D (Questionnaire No. 3)

الأسئلة	راض جدا	راض	غير متأكد	غير راض	غير راض أبدا
	٥	٤	٣	٢	١
E. الدراية بالتقنية: **مدى رضاك عن تركيز البرنامج الدراسي على التقنية وأهميتها في الجوانب التالية:** ١٤- التشابه بين التقنية المستخدمة للتدريب في الكلية وتلك المعمول بها في الصناعة					
١٥- الدراية بأهمية التقنية المذكورة					
١٦- الإلمام بالتقنيات الأخرى ذات الصلة بالتخصص					
F. الدراية بالسلامة وممارستها: **مدى رضاك عن تركيز البرنامج على السلامة فيما يختص بالجوانب التالية:** ١٧- سلامة الفرد (السلامة الشخصية)					
١٨- سلامة المعدات والمرافق					
١٩- سلامة الآخرين					
٢٠- سلامة البيئة					
G. السلوك والأداء الوظيفي: **مدى رضاك عن جودة إجراءات ومحتوى البرنامج الدراسي يختص بتعزيز الجوانب السلوكية التالية:** ٢١- السلوك (التقيد بالتعليمات واحترام الآخرين)					
٢٢- الدقة في المواعيد وإدارة الوقت					
٢٣- الإستعداد لتعلم المزيد					
٢٤- القدرة على أداء مهام العمل بأقل قدر من الإشراف والتوجيه (التحفيز الذاتي)					
H. العلاقة بين الوظيفة (مجال التدريب التعاوني) والبرنامج الدراسي: **مدى رضاك عن:** ٢٥- علاقة مجال التدريب التعاوني بالبرنامج الدراسي					
I. الدراية بمتطلبات الوظيفة: **مدى رضاك عن جودة الخدمة التي قدمتها الكلية للتعريف بمتطلبات الوظيفة الحالية في الجوانب التالية:** ٢٦- مهام ومسئوليات الوظيفة					
٢٧- المهارات والمعارف المطلوبة للوظيفة					

إستبانة (٣) صفحة ٥

APPENDIX D (Questionnaire No. 3)

الأسئلة	راض جدا	راض	غير متأكد	غير راض	غير راض أبدا
	٥	٤	٣	٢	١
J. اللياقة البدنية: **مدى رضاك عن جودة أنشطة الكلية الرياضية وخدماتها في مجال :** ٢٨- اللياقة البدنية					
K. الصلة بين الكلية والصناعة: **مدى رضاك عن الصلة بين الكلية والصناعة في الجوانب التالية:** ٢٩- برنامج التدريب التعاوني Co-operative Training					
٣٠- زيارات الطلاب الميدانية للصناعة					
٣١- مشاركة الفنيين من الصناعات في تقديم المحاضرات والتدريب لطلاب الكلية					
٣٢- إقبال الصناعات على توظيف خريجي الكلية					
٣٣- مشاركة الفنيين من الصناعات في تطوير المناهج ومرافق التدريب في الكلية					
L. إختيار التخصص الدراسي: **مدى رضاك عن اختيارك للتخصص الدراسي والخدمات والإجراءات التالية:** ٣٤- التوجيه المهني وخدمات الإرشاد الطلابي					
٣٥- إجراءات اختيار التخصص					
٣٦- مجال التخصص الذي قمت باختياره					

- سؤال إضافي

ما هي المقترحات التي تود إضافتها على البرنامج الدراسي الحالي في كلية الجبيل الصناعية والتي تؤدي إلى تخريج نوعية أفضل من الطلاب؟ فضلاً رتّب مقترحاتك على شكل نقاط بدءاً بالأهم حسب ما تراه مناسباً.

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٥. ______________________________

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إستبانة (٣) صفحة ٦