AN EVALUATION OF THE ROLE OF INFORMATION TECHNOLOGY IN PREPARING BARBADIAN SCHOOL-LEAVERS FOR EMPLOYMENT

A Thesis

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of the

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LIST OF ABBREVIATIONS

ACEIT	Advisory Committee for Education and Information Technology
BARTEL	Barbados Telephone Company
BET	Barbados External Telecommunications
BIMAP	Barbados Institute of Management and Productivity
CAL	Computer-assisted learning
CARNEID	The Caribbean Network of Educational Innovation for Development
CEC	Chinese educational computer
CRT's	Computer resource teachers
CXC	Caribbean Examinations Council
GII	Global Information Infrastructure
ICL	Committee for Information Literacy and Computer Literacy
ILO	International Labour Organisation
I.T.	Information Technology
MEP	Micro-electronics Education Programme
N.E.A.B.	Northern Examinations and Assessment Board
SPA	Software Production Associates
TVEI	Technical and Vocational Education Initiative
U.K.	United Kingdom
UNESCO	United Nations Educational Scientific and Cultural Organisation

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The research would not have been possible without the permission of the Ministry of Education, Barbados and those teachers in the many educational institutions both in Barbados and in the U. K. who so willingly facilitated the distribution and collection of the various research instruments.

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All of this would not however have been possible without the strength obtained from the Almighty, in whose debt I eternally remain.

ABSTRACT

Barbados, like other countries, has been influenced by the introduction of the computer in the education system. Much has been invested in this new 'tool' in education. The local industrial sector in its quest to keep abreast of world-wide technological developments, is increasingly making use of computer technology and so in turn, is making certain demands on the education system, about the way in which it is preparing young people for work in modern business organisations.

This study seeks to examine the wide-ranging influence of Information Technology in education and its role in preparing school-leavers for employment in the business environment in Barbados. It also analyzes the need for the implementation of meaningful I. T. programmes as an integral part of the school curriculum in the light of the technological developments which obtain in the business environment worldwide.

This was done by analyzing the views of students, educators and employers in Barbados and a small cohort of secondary school teachers in the U.K..

It is anticipated that the recommendations made as a result of the outcomes of the study will be useful in assisting in the establishment and implementation of effective I.T. programmes in the Barbadian school system.

PREFACE

I declare that this research is an original study undertaken solely by me over the past four years.

BScantlebury

Signature

95-05-05

Date

DEDICATION

To

Rhodri

CHAPTER 1

INTRODUCTION

1.1 Foreword

The task of preparing young people for work in today's business environment is a mammoth one. This task becomes even more daunting when one considers that the business world revolves around a vast amount of information which, if not handled properly, can be very debilitating.

It is therefore important that prospective employees be adequately trained to competently manipulate the ever increasing amount of information which comes into existence. In order to achieve this goal, the educational system must ensure that there is a well developed curriculum which incorporates the delivery of Information Technology (I.T.). This study endeavours to evaluate the role of I.T. in preparing young people for work in Barbados, a small Third World country, and examine its place in the Business Education curriculum, by 'systematically collecting and analyzing information in order to form value judgements based on firm evidence which should then guide decision-making for (further) development' (Rogers & Badman, 1992).

1.2 Definition of the Term

What is Information Technology? The term Information Technology (I.T.) has evolved recently. It has only been used in the Education Research Information Centre (ERIC) database since 1986. The Department of Education and Science (DES) defines I.T. as 'the technology associated with the handling of information: its storage, processing and transmission in a variety of forms by electronic means and its use in controlling the operation of machines and other devices' (DES, 1989).

Information Technology involves not only the science of electronic systems, computer science and information science but also aspects of the Arts and the Humanities because of the facility it offers in the handling, presenting, designing and communicating of information. Its involvement with the sciences makes the term 'technology', which could be considered as the practice of an applied science, quite appropriate.

Information Technology (I.T.), according to Webster and Robins (1986), is a neologism coined to describe a tendency for computing and telecommunications technologies to integrate and converge. They contend that I.T. is a generic term which encompasses word processors, office equipment, electronic mail, cable T.V., videotex, robotics, T.V. games, computer networks and satellite communications.

They have identified the following sectors as central constituents to I.T.:

* data/text processing equipment (computers, peripherals);
* data/text processing (software houses);
* data/text communications carriers (chiefly telecommunications authorities outside the U.S.A.);
* data/text communications equipment manufacturers (exchanges, satellites, etc.);
* significant parts of consumer electronics (e.g., video, television);
* electronic components (T.V. tubes, integrated circuits, etc.);
* office equipment (copiers, typewriters, word processors, etc.); and
* information suppliers (online databases, broadcasting organisations, etc.).

Aleksander (1986), considers Information Technology to be 'a phenomenon of the 80's'. He defines Information Technology as 'a collection of machinery which enhances communication between people, between people and processes, between organisations and between nations.'

CXC (1991) and Forte (1993) define I.T. as a merging of computer science, telecommunications and office automation. They state that it involves the collection, storage, accessing, processing and dissemination of vocal, pictorial, textual and numerical information by a microelectronic-based combination of computing and telecommunications and impacts on both work and leisure activities.

Wellington (1989), suggests a working definition of Information Technology as any activity connected with the collection, processing, communication and presentation of information using electronic systems. This includes word processing, Desk-top publishing, the use of databases and spreadsheets, artificial intelligence, telecommunications, robotics, software engineering and systems analysis. It is expected that new branches of Information Technology will emerge as computing and communication systems develop.

The general consensus arrived at after interviewing Barbadian and U.K. educators (see question 1 Appendix F) is that they understand the term 'Information Technology' to mean the use of computers for the purposes of data processing and problem solving; and for the storing and accessing of information quickly and efficiently.

For the purposes of this study, the term 'Information Technology' will be considered as an umbrella one embracing a variety of activities which facilitate the efficient storage, processing and retrieval of data using computer hardware and software.

In the literature, such terms as 'technology', 'computing' or 'computer-based instruction' are sometimes used to refer to aspects of Information Technology. It must be acknowledged however, that sometimes the use of the term 'technology' also refers to the development and use of robotics and artificial intelligence.

In education specifically, I.T. has a two-fold purpose. Firstly, it can be studied as an individual subject on the curriculum. In this respect, it is sometimes referred to as Computing, Computer Awareness, Computer Studies, Computer Science or in as in the case of the Caribbean Examinations Council (CXC) - Information Technology.

Conversely, I.T. may be used as a learning tool, to enable teachers to make the execution of their lessons more meaningful. This involves the use of computer-assisted learning (CAL) techniques.

1.3 Considerations for I.T. in Education

If one were to agree with Meighan and Reid (1982), that the structure of society is undergoing a major revolution which can be characterised as a move from an energy-rich to an information-rich economy, then one can conclude that all students should be trained in Information Technology. This skill is of particular importance in world economies for 'both employment and citizenship will increasingly require everyone to know how to process information' (Jessel & Hill 1992).

Undoubtedly, in a world characterised by technological innovation and computerized responses to situations in the workplace, school and the wider society, all citizens will eventually need to interface with the techniques of I.T.. Land (1986), argues that the utilisation of Information Technology principles and techniques is of key importance for the success of individual enterprises and for the industrial future of nations. He posits that the technology has facilitated new industrial developments and provided new services for the consumer.

Indeed Wellington (1989), posits that future employment prospects would be greatest in I.T.-based industry and commerce. Therefore it is imperative that students become educated about the technological society which will continue to impact on their lives. They must be taught how to live with and manage technology without becoming enslaved by it (Oaks and Pedras 1992).

James Callaghan, a former Prime Minister of Great Britain, in his now famous Ruskin College Speech questioned the function of schooling by suggesting that schools were not providing their graduates with the necessary skills which would enable them to move comfortably and efficiently into the world of work. He said:

> 'There is no virtue in producing socially well-adjusted members of society who are unemployed because they do not have the skills' (Wellington, 1989).

The acquisition of competence in I.T. will help to bridge the widening gap between Third World nations and the developed countries and provide our citizens with chances for survival and growth in this new technological age. Since only a small percentage - less than 10% - of school leavers are exposed to tertiary level education, the secondary school system is therefore expected to prepare the young to take their rightful place in society (CXC 1991).

Consequently, I.T. training must be an integral part of the secondary school curriculum. This situation has important implications for the educational system in Barbados. On the one hand it has the responsibility to produce graduates who will be prepared for, and feel comfortable with this kind of technology in their everyday life and/or their chosen career.

On the other hand, as in the case with every other sector, educational administrators must seek out the benefits of I.T. and thus introduce it with a view to improving the efficiency and quality of the educational system with special emphasis on teaching and learning strategies. For, given the versatility of the computer and the availability of sophisticated software, I.T. can be introduced in the form of computer awareness, quizzes and drills as well as for more profound learning experiences across the curriculum.

The education system in Barbados will have to reflect the change needed in order to deliver meaningful education to its students. There is need for a radical re-grouping of knowledge and action. The subjects taught should not be ends in themselves as they are now; but should be means to an end - understanding and action, work and satisfaction (Nuttgens 1986). It is only then that an effective I.T. programme can take root in the education system.

The question arises therefore as to how can a small developing country in the Third World most effectively introduce and utilise Information Technology in its education curriculum in order to ensure that its school-leavers are properly prepared to take their place in an ever-changing, technological, business environment.

CHAPTER 2

THE NATURE OF THE ENQUIRY

2.1 The General Purpose of the Enquiry:

This enquiry seeks to examine the wide-ranging influence of Information Technology on the education curriculum and its importance in preparing school-leavers for work in the business environment in Barbados.

Barbados is a small Caribbean country, with an area of approximately one hundred (100) square miles, which enjoys a democratic, Westminster-type government. It is the most easterly of all the Caribbean islands and there is easy access to other regional and international countries. Its population of approximately 260,000 boasts a literacy rate of 98%. Education is free from primary to university level and compulsory to age 16.

The unit of currency is the Barbados dollar which is linked to the U.S. dollar at a rate of fifty (50) U.S. cents to one (1) Barbados dollar. The Central Bank of Barbados is the regulating monetary authority. The economy is stable though fragile and vulnerable. Tourism has superseded sugar as the main industry and foreign exchange earner. This has given rise to the development of a number of tourism-linked service industries, which now dominate the industrial and commercial sector.

In general, the study evaluates the effect of I.T. focused activities on the development of higher level thinking and performance. The acquisition of these attributes is necessary for the realisation of the school-leaver's full potential and the prospering of the business environment which leads to the economic prosperity of the whole country. The substantive objective is to determine whether I.T. is beneficial to student progress and to student employability.

The fundamental purpose of educational research is to develop a new knowledge about educational phenomena (Borg & Gall, 1989). This study aims to collect knowledge which will support or refute the knowledge claim that young people who are competent in Information Technology are better prepared for work in business organisations and so obtain white collar jobs before those who do not possess such competencies. It is further claimed that possessing skills in Information Technology affords young people in Barbados increased career opportunities and flexibility in the world of business.

Many countries recognise the need to train their young people in information handling techniques. Kenneth Baker, a former British Minister responsible for Information Technology typified the political mood of the time by stating that 'kids of today urgently need modern up-to-date skills analogous to those skills that had gained their ancestors employment' (Wellington, 1989). Mr. Baker desired that school leavers be skilled in operating computers. To this end he organised programs to introduce computers in schools in both England and Wales.

Barbados too, recognises the need for training in Information Technology. The Ministry of Education recognises that it has a major responsibility to ensure that the nation's children are prepared for their technologically oriented future by acquiring a new proficiency in this Information Age. To this end it promises to enrich the educational environment 'to provide the opportunity for students to master the skills necessary for success' (SUNDAY ADVOCATE newspaper, 6 November 1994a).

Wellington (1989), contends that it is this optimism for the vocational significance of the computer which accelerated its acceptance in both social and educational circles. This connection between I.T. and the world of work has been the subject of discussion in many educational fora worldwide and there is no doubt that the general consensus is that students should be equipped with the type of skills which they can immediately use for gainful employment on leaving school.

2.2 The Need for the Enquiry

It is without doubt that technology is re-defining and re-designing our personal and professional lives by reshaping how we think and how we communicate with each other. Information Technology training is concerned not only with the preparation of technicians or experts, but also with the guidance of potential users of I.T. towards informed and effective decision-making about the particular requirements.

The global development in electronics has stimulated the search for common international standards in data processing and telecommunications. This development, catalyzed by the availability of complex, reliable and cost-effective microelectronic components and equipment, has had a profound effect on business operations and has emphasised the need to prepare school leavers, particularly business students, in I.T. applications.

Oaks and Pedras (1992), posit that we (the world) are now completely enveloped by technological systems and (so) have become dependent upon the products and services technology provides. They believe that all industries and all people will continue to be greatly affected by new technological developments.

The Vice President of the United States Al Gore (1994) believes that an essential prerequisite to sustainable development is the creation of a Global Information Infrastructure (GII) which will help educate our children and facilitate the exchange of ideas both within their local communities and among nations.

He contends that this 'information superhighway' will transcend the barriers of time and distance and establish a global marketplace. He continues that the Global Information Infrastructure will enhance the participation of citizens in decision making and that it is the key to economic growth for both national and international economies.

He maintains that the integration of computing and information networks into the economy makes the U.S. manufacturing companies more productive, more competitive and more adaptive to changing conditions. He argues that if this transformation can take place in the U.S. economy, it can also take place in the economies of other nations.

More and more Barbadian businesses have their accounting, stock-control and personnel systems computerised. Banking, airline ticketing, supermarket checkouts, minimarts, advertising, printing, newspaper publishing and public utilities are just a few sectors that depend heavily on Information Technology in the form of computerised systems and communication aids.

The latter includes the fax and various telephone-computer communication links that enable Barbadian enterprises to be in contact with international companies as easily as with the building next door (Burton et al 1989). The introduction of computer communication links such as INTERNET, Caribbean On-line and other international databases enables Barbados to become part of the Global Information Infrastructure.

Barbados is caught up in the international microelectronics revolution and at the moment is only a pedestrian along the 'information superhighway'. These technological developments have placed tremendous pressure on the Barbadian society in its quest to keep in step with the global economic community. As Barbados becomes part of the Global Information Infrastructure, it must prepare its young people to face the concomitant challenges.

It is therefore understandable that the Business environment is demanding that its employees have some knowledge of the use of the computer in business organisations. If the Barbadian educational system is to be relevant and meaningful to the needs of its young people, it can be argued that the subject, Information Technology, must be made an integral part of the curriculum.

2.3 The Barbadian Educational System

In order to fully comprehend the target population it is necessary to include some information about the educational system in Barbados.

Since 1962, education in Barbados was made free to all who attended government-run educational institutions. It is compulsory from age five to sixteen. This is delivered in more than one hundred (100) primary, twenty-two (22) government-run secondary schools and fourteen (14) privately owned secondary schools spread across the island.

The system is divided into three (3) sections namely primary, secondary and tertiary. Children may enter the system from age three-and-a-half (3 1/2) in the Nursery classes and continue to university uninterrupted if they so desire provided they meet the required levels of academic achievement.

The Primary system, which includes the Nursery section, accommodates pupils from age three-and-a-half (3 1/2) to eleven (11). The Nursery section which accommodates pupils from age three-and-a-half (3 1/2) to five (5), is optional depending on the facilities available at the particular primary school.

Upon reaching their fifth birthday however, according to the law of the land, all children must be enroled in school. From age five (5) to eleven (11) pupils pursue a basic curriculum which concentrates mainly on the acquisition of competence in the basics of Reading, Writing and Arithmetic. Elementary Science, Social Studies, Singing, Art and Craft and Physical Education are also done.

Children who have their eleventh birthday on or before August 31st of the current year, take the Secondary School Entrance Examination - a national examination which is also known as the '11+' or Common Entrance Examination for Secondary School selection. Approximately four thousand (4000) children take this examination each year.

The Common Entrance Examination consists of the writing of three (3) papers: a composition paper, for which the candidate is given a grade from A (very good) to E (poor); and two other papers, one in English Language and the other in Mathematics. Each of those papers consists of one hundred (100) items and is marked out of 100 per cent. The final mark (see Table 1) is the result of the average mark of the English Language and Mathematics papers. The Grade (A to E) which is shown in the Table, represents the candidate's score on the Composition paper.

Before the examination, parents are given a document on which they indicate the secondary school to which they would prefer their child to attend (see Appendix T). Of the twenty-two (22) government-owned secondary schools, parents may choose fifteen (15) in descending order of preference. If parents prefer to send their children to a private school, they may tick the box marked 'bursary'. To parents who prefer this option, the Government currently provides $125.00, per term, of the fees which would be required at the private school.

After taking the Secondary School Entrance Examination, the students are ranked according to their performance and then allocated to the school of their parents' choice according to the mark obtained. Each school admits a specified number of students as determined by the Ministry of Education according to the space available at the particular school. The mark obtained by the last student allocated to a particular school is known as the 'cut-off' mark for that school. For example, in the following table, the Boys' Scores for the Alexandra School are 81.5B to 69.5C. The 81.5 is the mark gained by the first boy admitted to the school for that academic year, and the 'B' is the mark he gained on the composition paper. The 69.5 is the mark gained by the last boy on the admission's list for that year and the 'C' is the mark he gained on the Composition paper. Thus '69.5 C' is termed the 'cut-off' mark for boys allocated to The Alexandra School for the year 1994.

The results of the examination for the year 1994 are shown in Table 1 which illustrates the 'cut-off' marks for the schools.

Table 1.

Barbados Secondary Schools Entrance Examination - 1994

Name of School	Boys' Scores	Girls' Scores
Alexandra *	81.5B-69.5C	85.5A-76.0A
Alleyne *	70.0C-59.5B	70.5B-67.0A
Coleridge & Parry *	79.0C-64.5C	78.0C-71.0B
Combermere	91.5A-83.0C	88.5B-86.0C
Ellerslie	75.0B-57.5C	83.0A-65.0C
Christ Church Foundation	80.5C-75.0C	82.5C-79.5C
Garrison *	72.0C-50.0D	77.0B-53.5C
Harrison College	97.0A-89.0A	98.5A-90.0A
The Lodge	81.0B-72.5C	84.0A-77.0B
Parkinson *	52.5B-35.0C	61.0C-31.0C
Princess Margaret *	64.5C-28.0C	62.5B-26.5D
Queen's College *	94.0B-85.5C	93.5A-88.0B
Louis Lynch *	80.0B-64.0C	82.0C-71.5B
St. George *	57.5D-18.0E	57.0C-15.0D
St. James	64.0D-41.0C	70.0B-51.0D
St. Leonard's Boys' *	60.5D-36.0D	
St. Leonard's Girls'		75.0C-32.0C
St. Lucy *	60.5C-20.0D	70.5C-15.5E
St. Michael's *	96.0C-80.5B	89.5A-83.5A
Springer Memorial (Girls')		74.5B-39.5D
Grantley Adams	58.5C-21.0D	67.0C-15.5E
Deighton Griffith	79.5B-56.5B	76.0B-62.0C
Bursary for Private School *	80.5B-0.5E	90.5C-2.5E

* Denotes schools which were used in the research.

The government-run secondary schools consist of nine (9) older secondary schools which were initially established to educate children of those classes in society which could afford to pay for their children's secondary education.

These schools include:
Combermere School founded in 1695,
The Lodge School founded in 1721,
Harrison College founded in 1733,
The Alleyne School founded in 1785,
The Christ Church Foundation School founded in 1809,
The Coleridge and Parry School founded in 1881,
Queens' College founded in 1883,
The Alexandra School founded in 1894 and
The St Michael School founded in 1928.

The other thirteen (13) secondary schools known as newer secondary schools were established between 1952 and 1990. The majority of newer secondary schools were established after 1962, when secondary education was made free to all. It then became necessary to establish more secondary schools to accommodate the increased secondary school population.

The private schools follow a similar curriculum. However facilities differ from one school to the other mainly due to the availability of finance and managerial expertise.

The schools cater to students of all academic levels, from the high academic achievers to the less academically able. All secondary schools offer the same basic curriculum and prepare students for the CXC and O'level examinations.

However, Harrison College, Queen's College, Combermere and The Lodge have sixth forms and so prepare students for A'Level examinations as well.

Tertiary education in Barbados is offered at the Barbados Community College - a sixth form college, the Samuel Jackman Polytechnic which concentrates on technical-vocational education, the Erdiston Teachers' Training College and the University of the West Indies.

There is also a Continuing Education Programme offered by the Ministry of Education at the Barbados Community College and also at four secondary school centres. Many privately owned colleges and institutes also offer the opportunity to continue ones's education.

These institutions offer 'O' and 'A' level subjects to adults who are desirous of acquiring further academic or vocational training, or who want to resit subjects in which they were unsuccessful during their secondary school career. In total, it is estimated that there are about 70,000 Barbadians enroled in educational institutions in an academic year.

2.4 Information Technology in Barbadian Schools

The Barbados Government has introduced computers in all secondary schools. Although it is desirable that the benefits of I.T. use extend to all levels of the system: Tertiary, Secondary and Primary; physical, financial and human resource constraints suggest that a phasing-in approach and the setting of priorities be adopted. (Burton et al 1989).

Even though there seems to be an order of decreasing priority - tertiary, secondary and then primary, it is generally agreed that a 'well-structured programme in I.T. develops computer related skills and encourages the development of analytical and design skills which are applicable in all areas of the curriculum' (CXC 1991).

To this end, certain general principles have been established regarding the introduction of I.T. in the school system. The Ministry of Education provides general support, but schools are encouraged to marshall their own resources as they desire. The Ministry's Advisory Committee has circulated general guidelines and each school is encouraged to establish its own Information Technology Committee from a representative cross-section of its staff to ensure that the computers are being used to help the particular institution achieve its educational goals.

One function of the committee is to ensure that there are adequate training and staff development programmes in place at their particular institution. These could be organised in collaboration with the Information Technology Centre at Erdiston Teachers' Training College.

Computer usage in Barbadian schools can be divided into two broad categories. The first category relates to teaching **about** computers, i.e. learning how to use a computer, computer literacy or awareness, learning specific applications, Information Technology and higher studies in Computer Science, computer programming and business information systems.

The second category relates to teaching **with** computers, i.e. employing the techniques of computer-assisted-learning (CAL) in an effort to improve the quality of teaching and learning. The actual use of I.T. tools to achieve an educational task such as a word processor to produce a document is interwoven in these two broad areas.

The Ministry of Education will also recommend appropriate software packages and provides, to a limited extent, in-service training to enable teachers to learn how to use these packages in the execution of their lessons.

2.5 I.T. Strategy

The Ministry of Education has established certain strategies for the implementation of I.T. in the schools under its jurisdiction.

2.5.1 Objectives for I.T. in the Primary School

Although it is not intended that I.T. be a subject on the primary school timetable, yet the Ministry of Education is concerned that the computer should be used to help achieve the desirable aims of primary education. For example in Language Arts, I.T. can be used to aid language development, creative writing, word processing and simple desk-top publishing, drills and remedial work. In Mathematics and Science, I.T. could be used for drills, simulations, data interpretation and project work. In Social Studies, it could be used for project work and simulations and in Art, for the creation and manipulation of images using simple graphic packages. Software packages will also be available to support revision and remedial work.

Objectives related to the development of I.T. skills, e.g. keyboarding, computer usage, understanding the principles of information handling, information processing, communication and computer applications, will be covertly rather than overtly achieved.

2.5.2 Objectives for I.T. in the Secondary School

By 1989, there were at least six teachers in the secondary school system, who had some familiarity with computers (Burton et al, 1989). Bourne (1994) reports that by 1994, there were two hundred (200) teachers in secondary school who had some computer training.

All secondary schools were provided with at least one computer in 1985 when the local chapter of the Rotary Club of Barbados donated a computer to each secondary school. Since then, the Ministry of Education has embarked on a project to provide each secondary school with a computer network.

In the secondary schools the computer is used not only for I.T. and CAL but also for administrative purposes. Although the use of I.T. in most schools is at a very elementary stage, there some schools which try to expose all or most of their senior students to I.T. training before they leave school.

The Caribbean Examinations Council has introduced an examination in Information Technology and this was tested in 1993 for the first time. A total of 134 Barbadian students wrote the examination at that time. The statistics for 1994 reveal that 243 Barbadian candidates took the examination in 1994. This shows an increase of approximately 55%.

Burton et al (1989), in their report which was sponsored by the Barbados Ministry of Education, have stated that the objectives for the secondary school are as follows:

'By the time they leave secondary school, ALL students should:

a) understand the main features of a computer system - including the concept of a program (but not familiarity with a language),
b) be aware of the wide range of applications of computers in modern life, both world-wide and in Barbados - at present and what are likely in the future,
c) be aware of the important advantages and disadvantages (including social ones) of the use of computers,
d) be aware of appropriate developments in the communications field,
e) be familiar with the following types of program: word-processing, database, simulation, spreadsheet, design (graphics or Computer Aided Design etc.). computer-assisted learning in the different subject areas, and
f) have had first hand experience of how the computer can enhance teaching and learning.'

These are very extensive objectives. It is clear that not all of them can be achieved in every case, thus each school will have to determine its own priorities.

2.5.3 Information Technology in Tertiary Education

All tertiary institutions in Barbados now have fairly extensive programmes in Information Technology but, since they have different needs, they have developed their own individual plans. Sixth form schools offer advance courses in I.T. and also use I.T. in the teaching of other subjects.

At the Samuel Jackman Polytechnic I.T. is used in the business and technical courses and for administrative purposes.

The Barbados Community College has a Computing Division. It offers I.T. awareness courses to the general public, elective courses to its day students as well as the Associate Degree in Computing.

In the Computer Training and Resource Centre at Erdiston Teachers' College, practising teachers and teachers-in-training receive training in the use of educational software and CAL. Awareness courses are also offered to members of the public in its Continuing Education programme.

The Computer department of the University of the West Indies offers some undergraduate courses in Computer Science. The Faculty of Education, when it offered the Diploma in Education course ensured that all graduate teachers were given some training in using I.T. in their lessons. This course has now been transferred to Erdiston Teachers' Training College and training in I.T. continues to be an integral part of it.

2.6 The Research Questions and Hypotheses

The research questions and hypotheses were identified and developed in the early stages of the research, out of an extensive investigation into current literature (see Chapter 5) and out of discussions with key educators and business personnel. These questions and hypotheses were used to guide the direction of the research and to aid in the formulation of the questionnaires and interview schedules.

2.6.1 The Research Questions

1. Does the introduction of I.T. enrich the curriculum in Barbados by:
   a) enabling young people to acquire competencies in I.T. which will prepare them for work in a technological business environment and
   b) providing employers with the type of employee who will be an asset to their various organisations?

2. Does the acquisition of competencies in I.T. enable the young person to become more self-confident, competent and socially adaptable in the classroom and in the business environment?

3. Is the school-leaver who possesses an I.T. capability in a more advantageous position in the world of business than the one who does not possess such a capability?

2.6.2 The Hypothesis

It is hypothesised that young people who are competent in Information Technology are better prepared for work in business organisations, obtain white collar jobs ahead of those who do not possess such competencies and enjoy increased career opportunities and flexibility.

White collar jobs include not only those routine jobs performed by the office worker, but also those jobs related to the functions of management and advancement in occupations related to the office.

It is further hypothesised, that in order to achieve the goal of better preparing our young people for work in the business sector, it is necessary to establish **how** to effectively introduce and implement Information Technology programmes in the curriculum in Barbados.

2.6.3 The detailed Hypotheses

1. The business environment in Barbados is leaning towards the increasing use of I.T., especially in the major industries of tourism and light manufacturing. Since school leavers will undoubtedly come in contact with the world of business, it is necessary to prepare them so that they will be able to function competently in an ever-changing technological business environment.

2. The inclusion of I.T. in the curriculum will benefit the students because it will:
   a) enrich and extend their learning environment by promoting collaborative working habits and independent study, thus developing in them that spirit of co-operation and responsibility needed for successful work in a business environment;

   b) enhance their problem-solving and decision making abilities. The acquisition of these skills are of paramount importance to the continued development and prosperity of the business organisations;

c) promote their self-esteem by enabling them to acquire self-confidence and encouraging that flexibility and openness of mind which will allow them to adjust to and take advantage of the ever-changing technology in the business world;

d) increase their understanding and enhance the knowledge needed for handling their personal affairs;

e) enable them to take advantage of the services of the business world;

f) give them an added advantage when seeking employment because they will be equipped with I.T. skills which will be useful in a modern economy; and

g) enhance their performance in their jobs, thus increasing their productivity. This will in turn give their employers that competitive edge which can be translated into increased profits and company prosperity.

The data gained from the research instruments which developed out of these questions and hypotheses are analyzed in Chapter 6 and discussed in Chapter 7.

CHAPTER 3
THE RESEARCH METHOD

3.1 Introduction

This chapter looks at the methodology used in the study. The writer has undertaken this research in order to investigate and evaluate the need for the inclusion of Information Technology (I.T.) in the Barbadian education curriculum and to examine the necessity for it in preparing Barbadian school-leavers for the world of work.

3.2 The Aims of the Research

The study aims to:

a) examine various aspects of Information Technology in education and its influence on the wider community;

b) examine the experiences of both developed and developing countries in their quest to introduce Information Technology in their educational curriculum;

c) evaluate gender differences in attitudes to the acquisition of skills in Information Technology;

d) examine the influence of Information Technology on educational management and change, the social implication and the problems experienced in implementing Information Technology in education in Barbados;

e) obtain a detailed description of the views of educators and students regarding the inclusion of I.T. in the vocational preparation of young people;

f) evaluate the benefits derived from the students having acquired skills in Information Technology;

g) determine the I.T. needs and requirements of a range of employers;

h) obtain from employers and their associations:
   1) their views on the desired qualifications and competencies in Information Technology of prospective employees;
   2) a detailed description of their views on the role that schools should play in the vocational preparation of students;

i) assess the existing and planned provision of I.T. in the curriculum in order to determine its appropriateness and suitability;

j) compare the I.T. skills and requirements of employees with what is offered in the schools; and

k) make appropriate recommendations to the relevant authorities regarding the place of I.T. education and training in the Barbadian education system in the light of I.T. developments in education and employment.

3.3 The Methodology

Research of this type can employ both qualitative and quantitative methods. Borg & Gall (1989), have identified different types of quantitative educational research. These include survey, observational, historical, causal-comparative, correlational and experimental research and involves the use of statistical tools in the analysis of the data.

Qualitative research, on the other hand, involves the use of participant observation and the ethnographic interview. Hopkins (1989), posits that qualitative methods are especially suited to educational evaluation (particularly) when the phenomena to be studied are complex human and organisational interactions and therefore not easily translated into numbers. These methods are largely subjective in that much emphasis is placed on the researcher's skills of observation and interpretation in order to provide valid information (Borg & Gall, 1989).

Another type of research which educators are increasingly making use of is termed by Elliot (1991), as 'educational' action research. According to him, this type of research implies the study of curriculum structures, not from a position of detachment but from a commitment to effect worthwhile change. Elliot (1991) continues that 'action research integrates teaching and teacher development, curriculum development and evaluation, research and philosophical reflection into a unified conception of a reflective educational practice.'

Borg & Gall (1989), acknowledge that although some research designs allow for more rigorous investigation of causal relationships than do others, yet the level of control required for the more rigorous designs is often impossible to achieve in educational research. Furthermore, they contend that as the control of the research situation increases in rigor, it usually becomes more difficult to generalize the findings to real-life situations. Considering this, it is hoped that even though the methods used in this study are rigorous, yet the generalisations arrived at can be extended to real-life situations.

The writer reviewed a number of studies which are closely, if not directly related to the subject of the study, in order to ascertain what methods would gain the best results, decide why these methods would be better than other possible ones, and also to avoid any pitfalls which may have been experienced by other researchers. Following is a review of those studies.

3.3.1 Previous research

In Canada, Chomienne (1988), conducted an extensive field study on the impact of the computer on primary and secondary school teaching in the province of Quebec. The study was executed in two phases in which the first phase was a quantitative survey carried out on 5000 teachers in 1985, and the second phase was a qualitative follow-up designed to studying a specific situation in depth without attempting to generalize.

Wellington (1989), did a very comprehensive overview of the connection between I.T. education and the needs of the business community. This study, carried out in the United Kingdom, reflected the emphasis then placed on the acquisition of Information Technology skills as they relate to the workforce. He used various methods to collect his data. Firstly, he used exploratory interviews and discussions to establish the parameters and scope of the enquiry and to produce a general design for the enquiry (Wellington, 1989). He envisaged that the methods he devised could be of later benefit to him and to others who may want to do similar research at a later date. His final data collection instruments were the interview and the questionnaire.

The interview schedule was used flexibly and always allowed for open-ended discussion. The interviews were carried out on the employers' premises where possible as this allowed the interviewer to gain some impression of the context in which the operation was carried out. The questionnaire, which was distributed through the mail, was intended as a follow-up which would generalize the issues which emerged from the interviews.

Here it is noted that two researchers in two different countries have used similar instruments in different ways. In Chomienne's (1988) case, he used the questionnaire to gather the basic data and the interview schedule as a follow-up, while Wellington (1989) did the reverse and used the qualitative methods to produce the general design and the questionnaire as the follow-up.

In the Netherlands, Pelgrum (1992), carried out a longitudinal study, known as the Computers in Education Study (COMPED), which aimed to describe cross-nationally the ways in which computers have been introduced in schools. The study was done in twenty-one countries around the world. It was divided into two stages. The first stage: 1987-1990, and the second stage: 1991-1994.

Data was collected by means of a questionnaire which was given to 70 000 educators in the primary and secondary school systems. In the second phase, the measures from the first stage were revised along with actual tests of computer knowledge and hands-on use by students (Pelgrum, 1992).

Kimbell et al (1991) reported on their study carried out in the U.K. between 1986 and 1990. This study, which assessed the performance capability of students in Design and Technology, utilised such instruments as the questionnaire, student project work and classroom tests.

Margaret Cox and David Johnson (1993), reported on a study begun in 1989, which evaluated the impact of Information Technology on children's achievements. Known as the ImpacT report, this project, based at King's College, London, was commissioned by the DES. The sample was taken from four subject areas: English, Mathematics, Science and Geography in primary, middle and secondary schools in England and Wales.

Five instruments were used to collect the data. These included three questionnaires, a teachers' record book and a pupils' record sheet. Some data was also collected through the use of the case study method. Here classroom observation and pupil interviews were included. Cox and Johnson (1993) found that a complexity of design and a plurality of method were necessary to provide the variety of data required to underpin the research analysis.

Oliver (1993), did a comparison of Information Technology programmes in Australian secondary schools. The target population consisted of three secondary schools in western Australia with differing Information Technology programmes.

Both qualitative and quantitative methods were used to gather the data. The Computing Coordinator was interviewed on information relating to the use of computers in the school, while the questionnaires were used to collect data from the students on such subjects as computer use, their attitudes to computers and their knowledge of computers.

The studies of the foregoing researchers indicate that this type of research is most effectively done by utilising a plurality of methods and by employing such research instruments as interview and observation schedules and the questionnaire.

3.4 The Barbadian Study

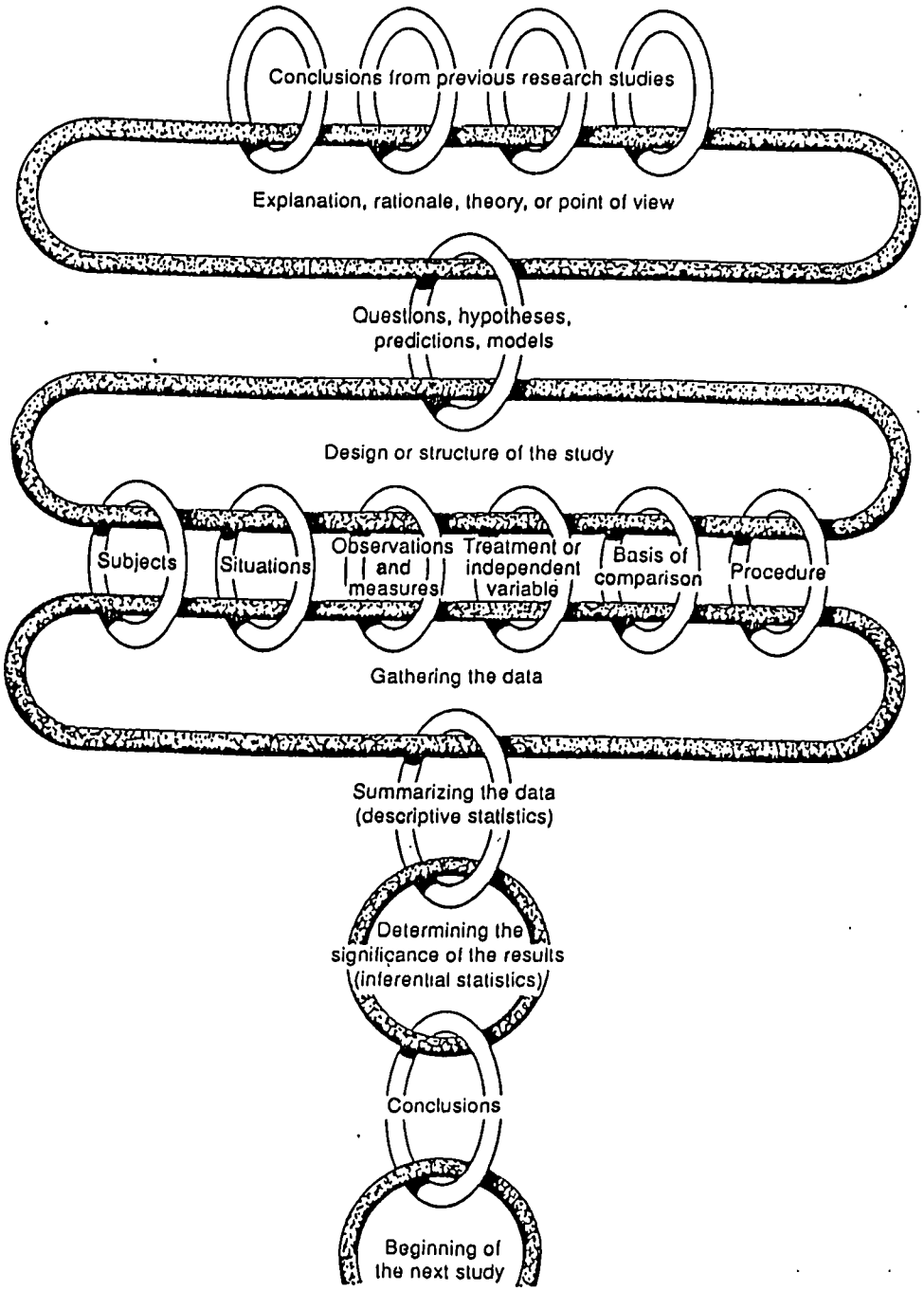
3.4.1 Research Strategies

The nature of the study strongly supports the utilisation of a range of methodologies. The humanistic approach adopted is fully consistent with the aspects of quantitative, qualitative and action research which were used in gathering the data. Like Cox and Johnson (1993), the writer found that a plurality of methodologies was necessary in order to collect the information required as this facilitated the collection of a greater amount of data from diverse sources. Walker (1985) contends that the power of multiple methods flexibly used should not be underestimated (since) 'what might at first sight appear to be not very rigorous methods...become much more powerful when used in conjunction with each other.'

Although the study is not a purely quantitative one, aspects of Krathwohl's model of the chain of reasoning (See Figure 1) which demonstrates the critical importance of each step in the execution of a study which uses quantitative methods are evident in this study. The model demonstrates that the process of formulating and testing knowledge claims involves personal judgement, interpretation, creativity and rational persuasion at each stage and is not a mechanical process in which impersonal data-collection instruments are used to collect numerical data (Borg & Gall, 1989).

Figure 1.

Krathwohl's model of the chain of reasoning in quantitative studies



Taken from Borg & Gall (1989) pp.326

The aspect of quantitative research which was utilised was that of the survey. Three different groups were surveyed. These include the students, the educators and the employers. The student survey was a longitudinal one in which a follow-up survey was done on that cohort in order to determine how successful/unsuccessful they were in acquiring employment after leaving school.

This research project, which mirrors the tenets of action research, can be termed an 'illuminative evaluation' of the role of Information Technology in Barbadian education as it relates to the preparation of young people for work in the Barbadian business environment.

The involvement of the writer in the actual education process and the emphasis of the research on curriculum development and educational evaluation reflects aspects of action research. West-Burnham (1990), argues that to be effective, the school, (the educational system) must make full use of action research combining rigorous analysis with implementation and evaluation.

A key role of action research is to effect a change of attitudes. Evidence of such change in attitudes towards I.T. has already been observed in both educators and educational authorities. A case in point is where in the early stages of the research the writer was discussing with a fellow colleague the perceived benefits of I.T. in education. The colleague stubbornly replied, 'Don't talk about it, I am definitely not interested in that.'

However, at the beginning of the current academic year, that same colleague asked if she could attend some classes along with the students in order to acquire some I.T. skills.

Another case is where Barbadian educational authorities now consider I.T. training as their number one priority in the allocation of student loans for university training overseas. Four years ago, the writer was told by a key educational administrator that I.T. was 'too high for Barbados'. What reasons could there be for the paradigm shift in education which is now evident? It might be suggested that a lack of knowledge of I.T. and its benefits as well as a change of political thinking may be responsible for this shift. Or as Donavan Merck, as cited in Reinhardt (1995) contends, '..education was not really ready for this (I.T.) more than a year ago.'

Parlett and Hamilton (1972), have described illuminative evaluation as a general research strategy which as an alternative to traditional forms of evaluation takes into account the wider contexts in which educational programmes function. They contend that this form of evaluation is concerned with description and interpretation rather than with measurement and prediction.

It is anticipated that the results of the findings of this study will positively affect the educational change process in this small Third World country, by providing a comprehensive understanding of the complex realities (Hopkins, 1989) which are involved in the implementation of Information Technology in the curriculum in Barbados.

Since observation occupies a central place in illuminative evaluation (Parlett & Hamilton, 1972), (Hopkins, 1989), the use of the technique of performance observation as well as the interview are methods of qualitative research which were also employed to collect data. The use of qualitative methods in educational research, Walker (1985) argues, stems more from their flexibility than from any other intrinsic merit they possess; for unlike most quantitative methods, they can be adapted and changed as the project progresses.

3.4.2 Methods of Data Collection

One method of data collection utilised, was that of the documentary or literature review. This is a comprehensive survey on the development of various aspects of I.T. in developed and developing countries. This survey was initiated through various library searches including the online ERIC database and manual searches of journal issues.

The initial review provided the background information and catalysed the development of the basic ideas, issues and hypotheses which form the foundation of the study. In addition, an ongoing review of the relevant research literature was maintained over the research period in order to keep abreast of recent developments in the field of study. The availability of INTERNET in Barbados towards the end 1994, facilitated online searches of international databases and the subsequent downloading of relevant files. The results of the literature survey are found in Chapter five.

Another method of data collection employed was that of the use of the instrument of the questionnaire. This was employed to collect data on the opinion and evaluations of respondents. General data such as age, gender, etc of respondents was also collected by this instrument.

The questionnaire was used to collect data from employers, educators and students. It was chosen for this part of the research because it enabled the researcher to contact many respondents without much difficulty and facilitated the eliciting of a range of views and general information.

This instrument was widely distributed. Although the sample was not meant to be a purely statistical one, every effort was made to obtain a wide cross-section of respondents in order to gain a representative sample of opinion.

The direct interview was also employed to sample the opinions of educators and employers. The aim in each situation was to get close to the operating processes and to share with both educators and employers their plans, experiences and concerns. The interview enabled respondents to be less structured in their responses and so provide a wide variety of opinion. Hopkins (1989), contends that interviews allow for depth of response and provide a chance to discover and explore subjective meanings. The follow-up telephone interview was employed to obtain information from students about their employment and academic activities since leaving school.

Yet another method of data collection employed was that of classroom observation in which teachers were asked to observe a sample of the four categories of students over the period of one academic year and record their progress on an Observation Schedule. Hopkins (1989), terms this method 'focused observation' because it utilises observation schedules to observe and record the results of a particular situation. Since the Observation Schedule utilised a standardized coding scale to analyze classroom interaction, Hopkins (1989), calls this aspect 'systematic observation'.

One drawback of this method, Hopkins (1989) argues, is that the element of statistical rigour involved in it may lead to abstraction rather than reflection or action. However, in this study, any element of abstraction which may evolve was counteracted by other research strategies which were used.

Another drawback of this method of data collection is that it leads to subjectivity and role conflict. Another disturbing tendency which may evolve in this method is that of Observer Bias. Borg and Gall (1989) describes this as the inclination of human beings 'to see what they want to see, hear what they want to hear and remember what they want to remember.' One may argue, however, that given the fact that the teachers involved in the project are all trained professionals, their judgement should be trusted. It is also recognised that in any method of data collection which requires skilled human judgements (Parlett & Hamilton, 1972) there exists some element of subjectivity.

In spite of the identified drawbacks of the methods chosen, they seemed, drawing upon the experience of previous researchers, the most appropriate ones for this type of study since they are the basic methods used in most educational research studies. Other reasons for the choice of methods include the fact that the writer felt more comfortable and competent in executing them than with those methods which were purely statistical in nature and also that these methods seemed the most appropriate ones given the nature of the target population and the conditions under which the study was executed. This study is an aspect of social research and social scientists tend to lean towards the qualitative rather than the purely statistical type of study.

One method which was not utilised in this study was that of the 'case study'. It was thought that given the nature and scope of the research, this method would have been too limiting.

The data was collected over a three-year period from Barbadian students, educators and employers and a small sample of educators in the United Kingdom. This facilitated the comparison of the views of educators in Barbados and the United Kingdom. Unlike the researchers Kimbell et al (1991), who did not know the participants in their survey, given the nature of this research project and the size of its target population, this researcher is aware of the respondents and/or the institutions which participated in the study.

It must be emphasised however, that the study conforms to a high standard of professional ethics and so the identity of the respondents is not revealed in any way. In addition, the study satisfies the four important criteria - utility, feasibility, propriety and accuracy - of a good evaluation study as stated by Borg and Gall (1989). They contend that 'a study has **utility** if it is informative, timely, and useful to the affected persons. **Feasibility** if the evaluation design is appropriate to the setting in which the study is conducted and if the design is cost-effective. Thirdly, an evaluation study has **propriety** if the rights of the persons affected in the evaluation are protected and finally **accuracy** if the study has produced valid, reliable and comprehensive information about the entity being evaluated.'

3.5 Problems encountered

Not many problems were encountered during the collection of the data. The Barbadian respondents were generally very cooperative. However, some of the U.K. respondents were somewhat apprehensive. This therefore limited the U.K. response to a small secondary educators cohort as only two of the four schools solicited responded to the questionnaire.

The response from the tertiary sector was even more disheartening with only one institution out of three which were solicited returning the questionnaires. This resulted in the analysis of this cohort being eliminated from the study. This however did not pose a great problem since the essence of the study is to analyze the response of secondary school educators.

Although the U.K. secondary educators cohort is small (n=30), when compared to that of the Barbadian secondary educators (n=60), yet it is thought to be useful in giving some insight into the opinions and attitudes of secondary school educators as they operate in different economic and cultural situations.

3.6 Conclusion

The research was carried out over a three-year period from 1991 to 1994. The findings are reported in Chapter six and the Discussion of the Findings follows in Chapter seven.

CHAPTER 4
THE RESEARCH DESIGN

4.1 Introduction

The research questions and hypotheses have guided the research design. The main instruments used are those of the literature survey, the questionnaire, the interview schedule and classroom observation.

The structure of the research instruments followed the principles and guidelines as described in Tuckman (1978), Borg and Gall (1989), Cohen and Manion (1989), Moser and Kalton (1989) and Bell (1992).

4.1.1 The Literature Survey

In this survey many sources were investigated in order to gain insight into the magnitude of the problem at hand. Information was gained from such sources as recent textbooks, journals, newspapers and discussions with key personnel. Many ideas were brought to light from the literature and personal discussions and ideas from many of these provided the spring board for the construction of the questionnaires, interview and observation schedules which were subsequently developed.

4.1.2 The Questionnaires and Interview Schedules

Three questionnaires for the students, educators and employers respectively and two interview schedules for the educators and employers respectively were developed. Provision was made at the end of the students' and educators' questionnaires, for the respondents to write their name, address, telephone number and school, should the need arise for them to be contacted at a later date.

A follow-up telephone interview schedule instrument which monitored the progress of the school leavers who responded to the questionnaires in the student cohort was also developed.

Pilots for the questionnaires were carried out using four to six respondents. The appropriate covering letters, assuring the respondents of total anonymity, were attached to each questionnaire (see Appendices A, D, E, J, L).

Generally, a great effort was made to obtain a broad selection of respondents to ensure a representative sample of the target population. Teachers were asked to select interested students from all subject options at the particular school for the student cohort. For the educators' survey, teachers from educational institutions across the island, from all levels of education were invited to fill in the questionnaires.

For the employers' survey, an attempt was made to obtain a sample of employers in the main employment sectors on the island.

4.1.3 Classroom Observation

This aspect of the research involved the use of the Observation Schedule instrument where teachers reported on the progress of their students as observed over the period of one academic year. At the beginning of the academic year the teachers were given Observation Schedule-1 (see Appendix H) and were invited to complete and return it. Towards the end of that academic year, they were given Observation Schedule-2 (see Appendix I) which they would then complete and return.

4.2 The Elements of the Investigation

There are three main elements of the investigation - the students, the educators and the employers.

4.2.1 The Students

The student cohort is divided into two sections: The first section consisted of a group of students presently enrolled in the following programmes:

a) Business Education AND Information technology (BUS+I.T.),
b) Business Education BUT NOT Information Technology (BUS-I.T.),
c) Information Technology BUT NOT Business Education (-BUS+I.T.),
d) NEITHER Business Education NOR Information Technology (-BUS-I.T.),

- who are studying at the following institutions:

1) secondary schools,
2) The Barbados Community College (sixth form college),
3) The Samuel Jackman Prescod Polytechnic (post secondary institution).

These groups were chosen so as to effect the clearest comparison of the performance and the opinions of a wide range of students. A follow-up study of these students was conducted when they moved into employment, further education or training schemes.

The second cohort consisted of a group of students whose personal and academic development was observed by their teachers over the period of one academic year.

The schools in the survey were so selected in order to ensure a representative sample of the academic ability, school tradition, location and socio-economic background of the target population. The students range in age from fifteen (15) to adulthood, but the greater majority of them are in the fifteen (15) to seventeen (17) age group.

4.2.2 The Educators

This cohort consisted of a group of educators from all educational levels in Barbados: namely a sample of primary and secondary school teachers and a sample of lecturers and other educators in tertiary education; as well as a small sample of teachers in the U.K. The U.K. cohort was used to complement the Barbadian one by allowing for a comparison of teachers' expectations, attitudes to and knowledge of I.T..

4.2.3 The Employers

The general survey consisted of a sample of employers in the main employment segments in Barbados i.e. tourism, retail, manufacturing, agriculture, civil service. Employers of students involved in the cohort were interviewed on the performance of those students in an effort to determine whether or not their I.T. competence was influential in their level of performance.

4.3 The Surveys

4.3.1 The Employers' Survey

The Employers' questionnaire (see Appendix B) consists of nine questions which are designed to ascertain the views of employers on the use of I.T. applications in business; the problems encountered when implementing I.T. programmes and the performance of workers with I.T. capability versus those who have not. The Employers' interview schedule (see Appendix C), was designed to give the respondents the opportunity to express themselves as fully as they desired. The questionnaire and the interview schedule were successfully piloted with six employers in March 1992. The main thrust of the questionnaire and interview schedule was executed during the years 1992 - 1994.

4.3.2 The Barbadian Educators' Survey

The Educators' questionnaire (see Appendices E,K) comprised of fifteen (15) questions which are designed to determine the views of educators on the use and suitability of Information Technology (I.T.). in education; the factors which hinder the implementation of I.T. at the institution; the performance of students with I.T. skills versus those without and the ways in which the educator would like to improve his or her I.T. capability.

The first nine questions sought to acquire basic statistical information about the respondent's professional background. Questions ten to fourteen sought to measure teacher attitudes and opinions on various aspects of computer use, applications and the problems encountered with the implementation of computer applications in the curriculum using a Likert-type scale. The final question sought to gain information on the type of course teachers would like to embark upon in order to further their I.T. capability.

Like the Employers' interview schedule, the Educators' interview schedules (see Appendices D, J) were designed to give educators the opportunity to express themselves as fully as possible on their views on the inclusion of Information Technology in the school curriculum. The two instruments evolved after many refinements. The Barbadian Educators' questionnaire (see Appendix E), was piloted in February 1992 and no major problems were encountered.

The full Educator's survey was embarked upon during the academic year 1992-93 and the first term of the academic year 1993-94. More than one hundred educators from all sectors of the education system were targeted.

4.3.3 The United Kingdom Educators' Survey

This survey consists of a sample of educators from various educational institutions in the United Kingdom. The survey instrument is similar to that used in the Barbadian Educators' survey. The study compares as far as possible the views of secondary school educators in the United Kingdom with those in Barbados.

4.3.4 The Students' Survey

This is a longitudinal survey which follows closely the Solomon four-group pattern (Borg and Gall, 1989). The questionnaire is designed to determine the level of I.T. competence that students possess; their conception of how Information Technology would or would not influence their development and their views on how Information Technology would or would not influence lives in particular and the society in general in the future.

After being researched and refined, this questionnaire (see Appendix M), was piloted in February 1992. The questionnaire targeted the students in their final year at secondary school and then again about six months after they left school to determine how successful they were in acquiring employment and to ascertain how they perceived the value of their work with I.T. in the school environment.

Follow-up questionnaires (see Appendices O,P) were designed to determine the views of students on the effectiveness of Information Technology in their school career and its relevance and usefulness in helping young people to gain employment upon leaving school. This follow-up was towards illumination rather than measurement or statistical representation (Kimbell, 1991).

No interview schedule was planned for the Student survey. In this case observational techniques and informal discussions were carried out during the follow-up period.

4.3.5 The full Students' Survey

The full survey was conducted in two (2) privately-owned secondary schools, twelve (12) government-owned secondary schools, and two (2) post-secondary institutions which offer academic and technical training. Appendix S shows the location of the schools on the island.

These schools were selected because Information Technology is part of their curriculum. This enabled responses to be obtained from students who were exposed to the technology as well as from those who were not. They were also representative of the range of academic levels and prestige of schools on the island.

The full student survey was done during the first four weeks of the third term in 1992. In Barbados, fifth form students begin their final examinations about the middle of May. Therefore it was necessary to target them early in the third term otherwise it would be very difficult to contact them once examinations had begun.

Groups of students in final-year programmes in these institutions were asked to complete the questionnaires giving their names, addresses and telephone numbers at the end so as to facilitate my contacting them towards the end of the year for a follow-up.

This survey was very successful in that both teachers and students were very accommodating and so there was a response rate of more than 80%. One teacher from each school was asked to be responsible for distributing and collecting the questionnaires from the students. They - students and teachers alike - were reasonably co-operative.

A total of 405 questionnaires were distributed in the first instance and 324 were returned, thus giving a response rate of 80%. However 38 (12%) of those returned were unusable for analysis since those students either did not fully complete the questionnaire or did not write their names, addresses or telephone numbers so that they could be contacted in the future. This gives a final response rate of 68%. Even though a normal acceptable response rate of 70% is usually required, in view of the scope of the study, a response rate of 68% can be seen as acceptable.

It was discovered that the Business and Information Technology option was the most popular among the students sampled, and the Information Technology but not Business option was the least popular. *In order to obtain a more* even distribution, in 1993, an additional survey in the Information Technology but not Business option was undertaken in order to increase the numbers in that category. The follow-up for this group of students was adjusted accordingly.

4.3.6 The Educators' Observation Schedule

This instrument was employed in Barbados where teachers from eight secondary schools observed the development of particular attributes of their students over the period of an academic year (see Appendices H,I).

This schedule employed a Likert-type scale in which teachers were asked to evaluate the students' development over the academic year. In the survey, there are 209 students who had some skill in Information Technology and 159 who were not I.T. literate.

4.4 The Data Analysis

To validate the data from the research instruments, descriptive and inferential statistical tools are employed. The program MINITAB version 8 was initially used to codify the data and produce the basic counts and percents and the measures of central tendency. However, it was discovered that this version of the program was too limited to accommodate the sample in a single file and so the extended version of the program had to be utilised. This extended version was able to facilitate the production of the analysis of variance which was used to make inferences from the sample statistics to the population parameters.

The analysis of variance was used to analyze questions 7 to 12 of the Student questionnaire, questions 12 to 14 of the Educators' questionnaire and questions 5 and 9 of the Employers' questionnaire. A significance level of .1 was used in all cases. The degrees of freedom were determined by the program.

A quantitative measure of improvement was used to aid the discussion of the Teachers' Observation Schedule.
As will be seen in the Teachers' Observation Schedule-2, the students were classified as having shown 'marked improvement', 'satisfactory improvement', 'no improvement', or 'some deterioration'. In the cases where the teachers were unsure, they indicated 'uncertain'.

After discussion, it was decided to assign values of '+1' to those students who showed positive improvement and values of '-1' were assigned to those who showed some deterioration. A value of '0' was assigned to those who showed 'no improvement'. When the sum of those showing positive improvement was subtracted from the sum of those who had regressed and the number divided by the total in the group, a simple numerical measure of improvement resulted. A positive result indicates improvement and a negative result indicates decline (see Table 4).

An indication of relative improvement was obtained when that result was divided by the result for the -BUS-IT control group. A result of more than '1' indicates that the group improved more than average, while a result of less than '1' indicates that the group did not improve as much as the average group (see Table 5).

4.5 Conclusion

This design proved to be very appropriate for it facilitated the sampling of a wide cross-section of respondents and the gathering of a wide range of views and opinions.

CHAPTER 5

THE LITERATURE SURVEY

5.1 Introduction

In this chapter, an attempt is made to examine the various aspects of Information Technology in education and society and look at the experiences of countries in their quest to introduce Information Technology in their education curriculum. The relationship between Information Technology and work is also examined as well as the issue of Gender and I.T. and the relationship between I.T., Management and change.

Many countries - both developed and developing, are becoming aware of the need for a more adequate output of highly educated personnel and skills aligned to industry's needs. The industrialised countries understandably are further ahead in the process of introducing computers and computer related subjects into their school curriculum. The governments of these countries realised long ago the need for the development and assessment of viable 'high-tech' education programmes in an effort to prepare their young people for the world of work. It must be realised also that teachers too, will have to be trained and retrained in the new technology in order for the programmes to be effective and successful.

5.2 The United Kingdom

The United Kingdom has over the years been in the forefront of the development of Information Technology in education. Since 1981, the U.K. government has committed more than forty million pounds to the introduction of micro-computers and associated resources in the school system (Conlon and Cope, 1989). For example, the Micro-electronics Education Programme (MEP) was designed to put computers into schools, train staff in applying I.T. and create relevant software for use in schools.

The Technical Vocational Educational Initiative (TVEI) programme, announced by the then Prime Minister Mrs Thatcher (now Lady Thatcher), in 1982, was designed to stimulate the provision of technical education, including Information Technology, in schools. Its goal was to enhance the curriculum in the area of the new technology and to provide pupils with skills which would be directly appropriate to the world of work (Conlon and Cope, 1989). This programme aimed to provide 14-18 year olds with the learning opportunities which would equip them for the demands of working life in a rapidly changing society. It affected the whole curriculum and related it to the world of work by concretising educational examples and making them as real as possible. This was done through work experience, work-shadowing, and community projects.

Dale et al (1990), state that TVEI emerged against a background of prolonged debate about the relationship between education and the economy. Jones (1989), states that TVEI aims to equip young people with the knowledge, skills, competencies qualifications and attitudes which they will need at work in a rapidly changing highly technological society. She sees TVEI as helping to redress the imbalance between the oversupply of unskilled workers and the paucity of people with professional, managerial and technical skills. This is very necessary if students are to be equipped with the skills which will enable them to find work. She contends that TVEI will prevent students from going into dead-end jobs with little prospect of promotion, progression or training for TVEI aims not at producing factory fodder, but at increasing young people's capability.

These ideas are supported by Holt (1987b), for he agrees that transferable skills and experiential learning are trademarks of TVEI and represents a whole new approach to curriculum planning and implementation.

More recently, the introduction of the new English and Welsh National Curriculum, has given prominence to technology as an integral part of the curriculum. Specific objectives are set out specifying attainment for Information Technology capability. These objectives include the criteria that students upon completion of the course in Information Technology should be able to make informed judgements about the application and importance of Information Technology and its effect on the quality of life.

The report by Kimbell et al (1991) on the assessment of performance in Design and Technology, has given much insight into what constitutes performance and provided educators with much of the criteria required for assessing capability.

In Scotland, several factors have been influential in stimulating the development of educational computing. Of these, political and educational factors are the most significant. Since the 1980's computing and computer technology have become ubiquitous for high technology is seen as one of the keys to the future economic well-being of the country (Conlon and Cope 1989).

A National Plan for Scottish Educational Computing was proposed as early as 1982. However, according to Conlon and Cope (1989), the impact of the recommendations is not apparent, as it is impossible to determine the true effect of this since many of the recommendations were not implemented and it is not clear whether the plan has been the instigator of the change or merely the predictor of it. Scotland also has a parallel programme to TVEI which is controlled by SCOTVEC.

5.3 The Continental European Countries

5.3.1 France

In Europe, France launched a programme called 'Information Technology for all' which includes putting computers in schools, and training teachers. It aims to increase the number of technical students at all levels and so increase the number of young people qualified in I.T..

5.3.2 The Netherlands

The Netherlands and other Nordic states are also establishing I.T. training programmes. The Dutch Government's Ministry of Education and Science appointed in 1981, a Special Advisory Committee for Education and Information Technology (ACEIT) was created. This committee in turn advised the Committee for Information Literacy and Computer Literacy (ICL) to prepare objectives for computer and information literacy courses and to advise the committees for other subject areas on how to incorporate information technology in their particular subject area, (Weering & Plomp, 1991).

By 1986 approximately 63% of the lower secondary schools were using CAL, while a national plan of action will result in all of the schools being equipped with computers by 1989 (Plomp et al, 1990).

5.3.3 The Scandinavian Countries

At the beginning of the 1980's the Norwegian Parliament issued a declaration concerning the use of computers in schools. This declaration investigated the possibilities of data technologies in schools. The Ministry of Church and Education then presented a four-year plan of action based on the findings of the declaration. A computer centre called the Datasecretariat, an autonomous unit in charge of research and development work, was established. Its mandate was to initiate and manage activities in the Program of Action. (Welle-Strand, 1991).

In Sweden a comprehensive programme of teacher-training to provide computer-resource teachers (CRT's) was introduced. The Swedish government recognises that teacher competence is one or perhaps the most important factor in ensuring the successful implementation and utilisation of computers in schools. (Makrakis, 1991).

5.3.4 Germany

West Germany has employed similar approaches to introducing I.T. in the schools as have other Western European countries (Gorny, 1991). The Federal Ministry of Education and Science coordinated many conferences in its effort to establish an efficient and effective I.T. programme.

5.4 The Soviet Republics

Jessell and Hill (1992), narrate the circumstances surrounding the introduction of computers in schools in what was known as Soviet Armenia. In 1985, a new course - Principles of Informatics and Computer Technology - was introduced into the curriculum.

They contend that Mr. Gorbachev, President of the Union at the time, argued that informatics was required to improve quality control in manufacturing. Despite this, the wider community, concerned about the effects of I.T. on their culture, was apprehensive that its introduction would contribute to the liberalisation of their closed society.

5.5 Australia

Burke (1987), states that the government in Australia has developed its education policy in response to the changing economic environment. One of its goals is to stimulate technological change to promote a more internationally competitive economy.

Even though proposed changes give increased emphasis to the sciences and technologies in both secondary and tertiary education, there seems to have been a more conservative approach to the introduction of the technology in education than is evident in other countries. That zest for change and the burning desire to grapple with the new technologies seem to be missing from the Australian debate.

Ashenden (1987), contends that the contemporary years of schooling should be concerned mainly with general education rather than cultural work and that technology should not loom large but should be merely one of the things to be borne in mind when trying to make the curriculum better able to connect the direct and experienced world of children with knowledge which explains its larger origins and meanings.

With regard to the point of the school being an agent in the preparation of young people for the world of work, Ashenden (1987), argues that in Australia the consensus is that schools cannot undertake occupational training, and so should blend any vocational emphases present in the curriculum with a general education for all students. He believes that Australia's response to a 'technological future' should have a more explicit role in the post-school sector than in the actual school curriculum.

5.6 North America

5.6.1 The United States

In the U.S. some writers have discussed the impact of the technology on the skill requirements of future jobs. Rumberger (1987), argues that the application of the new technologies in the workplace is raising the average skill requirements of jobs. To this end, society is demanding sweeping improvements in the school curriculum in order to better prepare students for the demands of their future work roles. The business community too, is developing its own training programmes to provide employees with I.T. skills.

More recently, the results of the SPA Report on the Effectiveness of Technology in Schools 1990-1994, as cited in Reinhardt (1995), found that 'educational technology clearly boosted student achievement, improved student attitudes and self-concept, and enhanced the quality of student-teacher relationships.'

There is a school of thought as mentioned by Grubb (1987), which believes that the acquisition of specific skills should be left to on-the-job training or to private informal mechanisms for non-vocational skills. On the other hand, another school of thought is arguing that an educational system which only strengthens itself in Maths, Science and basic skills risks producing a generation of technopeasants.

5.6.2 Canada

The Canadian response varies according to the particular province. In Quebec for example, Chomienne (1988), found that even though many teachers were interested in adopting I.T. and related technologies in their teaching, the current economic context made the implementation of the computer based technologies difficult because resources were limited, good software was scarce, equipment was insufficient and institutional support was deficient.

Further west in Alberta, however, there has been a concerted effort to introduce a branch of Curriculum Studies entitled Career and Technology Studies. This programme which is to be phased in during the period 1992-96, recognises the increased significance of secondary education as it sets new directions to meet students' needs, helping young people develop daily living skills and nurturing a flexible, well-qualified workforce.

The programme aims to help students manage technology efficiently and effectively and to develop knowledge, skills and attitudes to meet with confidence the challenges of daily living and the world of work.

Ontario too, has implemented a very vibrant I.T. programme in both primary and secondary schools. This programme has enjoyed widespread support from business organisations.

5.7 The Far East

5.7.1 China

China, in 1984 earmarked about 50 million pounds sterling to support its policy on the introduction of computers in schools (Hawkridge, 1990b). The State Education Commission held two working conferences on computers in secondary schools in 1983-84. The Commission declared that 'education must face the modernization (of China), the world and the future' and released bulletins on policies, purposes and requirements of computer education, including teacher education, equipment and the establishment of computer education centres (Hawkridge, 1990b).

The State Commission on Education, in association with the State Commission for Science and Technology, has sponsored the development of a Chinese-manufactured microcomputer - The Chinese Educational Computer (CEC) - that can handle Chinese characters.

Today, China continues to upgrade its educational plant. Current developments are closely tied to economic reforms (Carter, 1994b). As these reforms continue, education is expected to adopt a strong vocational thrust.

5.7.2 Fiji

The introduction of computer education in Fiji began in 1984, with the government placing high priority on the development of computer programmes in secondary schools.

5.7.3 Japan

In 1993, Japan introduced the New National Curriculum of Industrial Arts Education under whose umbrella Information Technology falls. Okuya et al (1993), state that the main objective of this programme is to make students understand the utilisation and function of the computer through computer operations and to develop a fundamental ability to apply the information properly.

5.7.4 Korea

Information Technology forms part of the technology education curriculum in Korea. Kim and Land (1994), informs that technology education has been offered as a general compulsory subject in secondary schools since 1970. They posit that the primary objective of technology education in Korea is to increase students' technological knowledge and skills for living in a changing world.

5.8 The Third World

Hawkridge (1990), discusses the response of approximately twenty-three (23) Third World countries he evaluated. He contends that Third World countries face a dilemma on the purpose for which computers and computer related technology should be introduced into the schools. He states that many well-meaning people in industrialised countries question whether Third World countries need computers at all, due to the existence of a lack of infrastructure and lack of certain basic amenities.

On the other hand, Rada (1985), sees this situation as a challenge to the developing countries requiring them to put in place a more active policy in terms of training and education in the new technology. He contends that developing countries can obtain immense benefits from technology if it is applied in the context of a development strategy.

Marshall (1984), supports this view to a certain extent for he maintains that the effect of computers in Third World schools on the social, political and economic spheres of the society will depend totally on the implementation strategies used. Third World governments believe that they are under great pressure to computerize in order to enable their school leavers to cope in the modern world. Marshall (1984) and Singh (1985), argue that it is only natural that as industrialised countries move rapidly towards a computerised society and computerised schools, the less-industrialised 'developing' nations will begin to feel some panic at being left behind.

Rada (1985), outlines many areas in which I.T. can impact positively on the Third World. He sees the greatest impact to be in the area of services because he argues that in the long run I.T. will create entirely new possibilities that are different from past activities. He maintains that one of the most important effects of I.T. is that it leads to the optimization of business activities as a result of rapid and timely processing of information and the relative ease of communications.

5.8.1 Latin America

Most of the Latin American countries, with the exception of Brazil, Cuba, Mexico and Venezuela do not have a national policy on computers in schools, (Sanchez, 1991). Yet there is evidence of the existence of some computer literacy programmes in Latin American countries. The lack of systematic training programmes in computer education, for teachers, students and the wider community; the shortage of good quality educational software which caters to the idiosyncrasies, interests and general culture of the people as well as the lack of up-to-date compatible machines are some of the constraints which hinder the development of I.T. in the school curriculum in Latin America.

5.9 The Influence of I.T. on Work

There has been much discussion that the introduction of I.T. will have a serious effect on jobs and employment. At the primary school level, Garland (1982), argues that students should be exposed to computer use as this familiarity will lead to a greater likelihood of them accepting the role of the computer i.e. I.T. as an aid in the world of work which they will inevitably enter in the future.

More and more emphasis has been placed on the utility of education. This view which stipulates that education should be useful and be geared towards jobs and employment (Wellington, 1989) is gaining more support than the view which supports the intrinsic value of education mainly because of the impact that I.T. has on the business environment.

Burgess (1986), contends that a well-balanced education should embrace analysis and the acquisition of knowledge, and include the exercise of creative skills, the competence to undertake and complete tasks and the ability to cope with everyday life. He continues that if educators spend more time preparing young people for a life outside the educational system, the country would benefit significantly in economic terms.

Weaver (1986), queries the reason for education. After much discussion, he identifies six attributes which he contends, if they are combined in high degree and appropriate balance in any one person, would represent educational excellence. These attributes include cultivation, comprehension, competence, capability, creativity and communion.

Of these attributes, Capability is the one which describes the ability to apply one's general stock of knowledge and manifold skills for the benefit and use of society. He describes competence as the power to harness specialised knowledge to the solution of the practical problems of life - whether personal, professional or social.

One must realise, that the fundamental principle however, is that the computer should not be seen as a replacement for the teacher, but as a tool that enriches the teacher's communication with his pupils, (Aleksander, 1986).

Brady and Liff (1985), conclude from their study which outlines some of the complexities of the job creation and displacement process, that even though jobs may be created through new technology, it will be a long time before the gains offset the losses from traditional industries.

They argue that there may be significant job losses resulting from the failure of firms to adopt the new technology in products or processes. They found also that technologies that result in large productivity have implications for the number of firms that can survive even if they invest in the new technology.

It is clear then that the job-displacing effects of a particular technology may vary from sector to sector depending on its applications. It seems that not only the quantity of jobs, but also the quality of jobs will be affected by the advent of new technology. Brady and Liff (1985) define quality of employment as the skill content of jobs and the control that job holders have over working practices.

Sarfati & Cove (1986) believe that computerisation creates new services and makes new demands on the workforce. Child et al (1985) contend that technology has been regarded as an important instrument of erosion in the quality of employment. They state that Merton commented as early as 1947 that 'labour-saving technology (and I.T. certainly falls into that category) creates the forced obsolescence of skills.' They have cited examples of the deskilling effects of new electronics-based technology in the office.

More recent studies have indicated that I.T. use is more beneficial and efficient than the traditional methods of information handling. From their research in the Banking industry, Child et al (1985), discovered that the use of newer technology has improved the quality of staff employment. The new technology also permitted staff to have greater control over the pace and timing of their work.

Many studies conclude that employment implications of technology cannot be separated from the broader questions of economic and social policy. In a period of jobless growth radical policies will be needed to counter the job-eroding effects of new technologies, (Sarfati & Cove, 1986).

As far as the retailing industry is concerned, they found that the use of bar coding instead of individual item pricing affects staff economies and reduces the number of employees who have personal contact with customers.

It is clear that I.T. has a significant impact on work affecting all types of employment. This raises fundamental questions about its effect on the society in general.

5.10 Gender and I.T.

Davidson and Cooper (1987), conclude from their research that it is evident that the occupations and industries in which women workers are concentrated are areas which are increasingly becoming affected by the introduction of technology especially new information technology.

Their research also revealed that the majority of British women workers are in information processing ranging from banking, finance, insurance, travel agencies, publishing and consumer industries in the private sector to administrative jobs in education, local government and health services.

Sarfati & Cove (1986) and Liff (1990), note that clerical work is the highest occupational level achieved by any significant proportion of women. Since more than one third of women workers are employed in office jobs, and 90% of these are in routine clerical jobs, one notes the impact of information technology on women's jobs.

Huggett, as cited in Davidson and Cooper (1987), suggests that with the adoption of microelectronics, technology in the office and male advantages regarding technological knowledge and training, the new job opportunities are being appropriated by men rather than by women. He maintains that unless there are radical changes these new technology jobs are in danger of becoming 'masculinized' and contributing to yet another facet of gender segregation in the workforce.

The proposal has been tabled that besides women's jobs being deskilled, their jobs are also at risk since according to a report by the International Federation of Commercial, Clerical and Technical employees, technical change in offices will lead to the displacement of 20-30% of clerical staff - which consists mainly of women workers - in Western Europe.

However, there were quite high hopes earlier that the introduction of Information Technology studies into the school curriculum would result in a less sex-stereotyped response.

The new technology came with an image of being more suited to females, especially in regard to computing. The equipment seems related to office equipment such as typewriters, which are predominantly used by women. That computers are clean, is an idea which moved technology away from the image of using greasy machines to be operated and serviced by large men in boiler suits (Chivers,1987).

Nevertheless, the rapid introduction of micro-computers in schools, has not led to a cross-over effect, where the new technology is seen as a major study for girls, as observed by Whyte and cited in Davidson and Cooper (1987).

Underwood et al (1990), maintain that girls tend to be dominated by boys in computer based tasks which require co-operative work, even though girls have no disadvantages in these tasks when tested individually or in single-gender groups.

The field has rapidly become boy dominated right across the spectrum, from the use of computers for game playing, designing, calculating, generation of data banks, programming, systems design and development to electronics theory and practice. Computing has the aura of a 'difficult' subject as well as a 'boys' subject and this generates a double reason why some girls in mixed sex schools will not try to achieve successful learning outcomes (Chivers, 1987) in this subject.

The Department of Trade and Industry advocated that I.T. companies can no longer afford to ignore the intellectual resources offered by females and recommended that both teachers and employers make positive efforts to encourage girls and women to train in computer and technical skills. The marginalisation of girls in regard to I.T. education and training is apparent from informal discussions with teachers and trainers (Chivers, 1987).

In 1986 the U.K. Equal Opportunities Commission report which aimed at evaluating guidelines for good practice in the I.T. curriculum in schools, showed that sex stereotyping led to boys dominating Computer Studies classes in spite of the fact that girls are capable. Chivers (1987), found that in Britain the percentage of girls entering for the O'level exam in Computer Studies at age 16 was 29.2% and for A'level at age 18 was 21.9%. Whyte (as cited in Chivers, 1987), notes that these statistics have remained virtually static in recent years.

Reports indicate that three times as many elementary school boys attend summer school computer camps as girls. Chivers (1987) and Simard (1991), argue that this observation reflects the importance parents place on computer education for boys as compared with such education for girls.

This tendency follows through to higher education, for the statistics show that in 1979 only 28% of the new graduates in Computer and Information Sciences and only 12.7% of new PhD's in this area were women. A survey in the U.S. showed that almost half of the boys, but virtually no girls used the schools computer centre outside the required class-time. Apparently, the computer rooms were designated as 'male' areas by the girls.

Voogt (1987), also found that girls perform lower and are less engaged in computer literacy than boys. Generally it seems that women and girls are alienated from these new technologies and girls take less interest than boys in using computers both at home or at school.

Girls are also less likely than boys to opt for Computer Science at GCSE or 'A'level. The statistics have also shown that less than one third of the candidates in the U.K. Government Youth Training Scheme trainees at Information Technology Centres were female (Davidson & Cooper, 1987, Chivers, 1987).

Regarding the employment of women, it can be agreed that the possibility of homeworking, which means working remotely from their employing organisations in their homes or in local centres, will augur well for females as it will allow those with young children at home to keep up their computer skills while earning a living. 95% of the homeworkers interviewed gave this as their reason for choosing this type of employment.

The development of telematics opens up new possibilities for the extension of homework into non-traditional areas. The introduction of home computer terminals and portable microcomputers, the use of modems, permitting growth of telework either at home or in neighbourhood 'telecentres' has important implications both positive and negative for women's work.

Zimroczek and Henwood (1983), as cited in Greve (1987), stipulate that the actual and potential application of the technology in Europe suggests that 'new information technologies are affecting precisely those areas of work where large numbers of women are employed.' Therefore I.T. is likely to have its strongest and immediate impact on women's employment.

Since many women workers are usually found in lower status, lower-skilled occupations, this has made them particularly vulnerable to the new wave of technological change which is directed mainly at the service sector and the rationalisation of the more routine clerical, secretarial, bookkeeping, typing and sales jobs which women occupy (Greve, 1987).

Much pessimism colours the literature which deals with the impact of new technologies on women's employment and working conditions. Fears of unemployment, deskilling, stressful working environments, poor career development possibilities and further deterioration of the position of women on the labour market in the wake of technological change appear to haunt trade unions and women's groups and the women workers themselves. This situation has important educational and social implications for the society.

It seems however, that the involvement of women in the new technologies is greater in Eastern Europe than it is in the U.K. or in the U.S.A.. Greve (1987), cites the International Labour Organisation (ILO) as stating that the need to create vigourous new industries to counteract the effects of the economic recession and to improve their position on the international market has forced European countries to turn increasingly to microelectronics based technologies.

Chivers (1987), cites two main reasons for I.T. becoming male dominated. He believes that the relationship between male-dominated physics and the newer developments in electronics has always made it likely that girls would not get involved in the 'hardware' aspects of I.T., without special encouragement.

He also believes that the predominance of male teachers and aggressive boys in I.T. classes, push girls aside. This is coupled with their lack of confidence in confronting the unfamiliar and in carrying out practical tests under the eyes of others.

Simard (1991) has identified three (3) additional reasons why women are afraid of using the computers:

a) they are turned off by the computer because their husbands spend long hours playing with their new toy,
b) they are afraid to be distracted by the computer and are concerned about not attending to the household chores, and
c) they do not have good computer-literate role models and are not aware of the importance of the computer in today's business environment.

Researchers like Croydon as cited in Davidson and Cooper (1987), are working to develop systems of computing and ways of teaching computing which cater to the strengths of girls and women in ways that they compared with boys and men.

Strang (1990), devised a rationale for the use of CAL in preparing women who were returning to work in the office environment. He argues that by careful introduction of the equipment, clear hand-outs on the functioning of the software and effective teaching strategies, the participants would:

1. overcome their fear of computers,
2. learn the elements of basic computer competence fairly quickly, thus giving the lie to their fears about their inability to learn, and
3. consider some of the implications of new technology on work, on the home environment, on education and on life.

Renee Hable in Holland, as cited in Chivers (1987), focuses on the differences between male and female thinking processes and what this should mean for science and technology education. Chivers (1987) prefers a curriculum which recognises the considerable diversity in the interests of students, their motivations, ways of thinking and speed of learning. He cites ten extrinsic factors which affect girls' underachievement in computing.
These could be summarised as follows:

1. Parental attitude and home environment:
   It was found that parents paid more attention to boys' involvement in computing. Home computer manufacturers are designing computer games in accordance with the perceived interests of boys rather than girls.

2. Peer group pressures at home and at school:
   These are important issues in sex-role stereotyping. They act to ensure that deviant behaviours are modified. Once an activity becomes stereotyped as being appropriate for one sex only, peer group pressures make it difficult for a member of the other sex to take part in the activity.

3. Teacher attitude and behaviour:
   The sexist classroom behaviour of many teachers can be typified in six main ways:

   a) asking more questions of boys than of girls - generally interacting more with boys than with the girls and allowing the boys to dominate classroom discussions,

b) telling boys how to carry out more difficult tasks but actually doing them for the girls,

c) telling boys to try harder while praising girls for hardly trying at all,

d) praising boys for intellectual competence and criticising them for messiness and laziness while praising girls for neatness and criticising them for intellectual inadequacy,

e) asking boys to carry out heavier tasks like carrying out computer equipment while asking girls to do housekeeping tasks like watering the plants, and

f) allowing boys to dominate problem solving discussions; asking boys more higher order questions which involve more abstract ideas.

4. Classroom interactions between boys and girls. Girls are generally afraid of being labelled 'clever' especially in regard to 'boys' subjects and so quite often refrain from actively participating in class and so become passive. Boys tend to be more assertive in class and so, to the under-assertive girl, the boys appear to be aggressive.

5. School books and computer resource materials: A serious concern is the extent to which computer and I.T. texts are depersonalised. Another concern is the overwhelming orientation of computer software for educational and training purposes toward male culture and interest.

6. Media influence:
   The media tends to perpetuate outmoded sex stereotypes. One notes that computer experts are usually portrayed in the popular media as male, narrow in outlook and interests, power seeking and lacking in emotions. This type of image is unlikely to attract girls to the study of computing and I.T..

7. Lack of role models at school:
   Since many schools have very few women teachers with competence and confidence in computing, the tendency is to train male Mathematics and Science teachers in computing. This has resulted in the reinforcement of the 'women can't do technology' attitude.

8. Career considerations:
   Information Technology is rapidly changing the nature of many fields of work, and career entry and progress will be more likely for those with competence in Information Technology.

The promotion of Information Technology to schoolgirls should stress its relationship to careers in public administration, business, the media, the Arts etc. instead of its relationship to the so-called 'male oriented' subjects.

9. The position of computing in the curriculum:
   In this respect, the cross-curricular importance of Information Technology should be emphasised. Young people should gain computer experience in the context of studying many other subjects, for computers can offer great assistance to providing a new forum for children to develop process skills such as problem definition and problem solving, team working, communication of ideas etc.

10. Girls' lack of confidence to try new things:
    Chivers states that some researchers in the field of girls and science and technology consider that girls are socialised into a reluctance to take on new challenges. The researchers state further that this attitude is supported by parents, other adults and the wider society. Thus the introduction of girls to unfamiliar challenges in regard to Information Technology must be handled carefully.

Greve (1987) cites another study - one done by ICFTU in 1983, which suggests that 'what is revolutionary about the new I.T. is the way it is being applied to every sector of the economy and to almost every occupation and the potential it offers for the reorganisation and transformation of work.' He believes that this will undoubtedly affect women's jobs in the workplace.

Many industries have already been affected by the introduction of I.T.. Greve (1987) argues that the scope for continuous production processes has led to the hiring of men to take over traditional women's jobs. The reduction in the number of components for assembly and the subsequent simplification of assembly processes in the electronic and electrical engineering industries where as much as 90% of assembly line workers were women, have already resulted in a high level of job loss among women workers.

In the clothing industry however, the automation of the cutting room where men predominated, has worked to the advantage of women who have taken over these jobs. The banking and sales distribution industries have also been affected by the new information technology.

The greatest impact of the new information technology has been in the hitherto labour-intensive service sector. This section has become a prime target for automation.

The labour intensive office has been the main target for change. The concept of the 'paperless office' though still in the future, the new approaches to the handling of information made possible by I.T. could eliminate many administrative and support functions (Greve, 1987).

The proponents of technological change suggest that while unemployment is rising in Europe, there is no real evidence that the introduction of the information technologies have contributed significantly to that unemployment. They argue that, in terms of human impact, the most severe effects are not from technology which moves too fast, but from technology that is introduced too late or never adopted (Greve, 1987).

5.11 I.T., Management and Change

Information Technology poses many challenges both to general management and to the Information Technology industry itself. Some of the main challenges include the need to develop local and national I.T. strategies and the need to understand the managerial environment in which I.T. is used. Wilson (1991), quotes Michael Potter's definition of a strategy as being a route to competitive advantage which will determine performance.

Holtham (1989), argues that one of the key issues to be addressed in management education in Information Technology is precisely how much knowledge general managers need of the actual Information Technology itself in order to be able to manage their organisation's use of Information Technology.

He identifies some technological challenges facing I.T. managers in the 90's. These include parallel processing, network proliferation, work-stations, optical storage, and the human computer interface.

Another important challenge of the 90's is the use made of people who will be developing and using I.T.. Enhancing the I.T. skills of the current workforce at all age levels need to be given a high priority by employers, training boards and professional bodies. The development of an I.T. strategy should embody a sense of vision, competitive advantage and implementation capability.

Aleksander (1986) states that, in a business environment, Information Technology has the power of enhancing human resources, particularly management. It can affect the classical feedback loop between policy making at the board level, the evaluation of operations and the final re-introduction of such evaluation to the policy-making part of the organisation. He maintains that the fact that Information Technology can alter management dynamics is one of many indications that educational attitudes will have to be brought to bear in the training of managers so as to enable them to handle such technical concepts.

I.T. offers management opportunities for being flexible and releases it from the strangle-holds of an inflexible and rigid management system. Willocks (1991), contends that Information Technology possesses transformative capacities within an organisation. He is of the opinion that organisations need to develop their ability to utilize database technologies, telecommunications networks as well as other developing technologies.

Every organisation needs to evaluate its progress. Hocstrasser (1990), argues that in order for evaluation techniques to be of value, they need to be embedded within an overall framework of a corporate information and I.T. strategy. He continues that, as changes in market conditions accelerate, the need for an I.T. strategy becomes more acute. He contends that a formalised I.T. strategy enables flexibility to be built in so that the needs of the company and of managers are always the main focus. While the information strategy delineates those information needs that are critical for a company's successes an I.T. strategy specifies how some of these needs are to be fulfilled.

Holtham (1989), contends that one of the consequences of rapid technological change is that it provides new business opportunities achievable through technology. He gives four (4) reasons why organisations need to develop an I.T. strategy. They are:

1. to harness I.T. organisational vision,
2. to provide one input to creating competitive advantage,
3. to improve the potential for utilising technological innovation for business opportunities, and
4. to ensure I.T. plans are realistic from an implementation viewpoint, and that there is commitment within the organisation to implementing these plans.

When considering the effect of change on any organisation one must also examine any barriers which may effect the strategies or innovations which bring about the change. Wilson (1991), cites in rank order the following barriers to the implementation of Information Technology strategies.
They are:

1. the measuring of benefits received from I.T. implementation,
2. the nature of the business enterprise,
3. difficulty in recruiting appropriate staff,
4. political conflicts,
5. existing I.T. investment,
6. user-education resources,
7. doubts about benefits,
8. telecommunications issues,
9. middle management attitudes,
10. senior management attitudes,
11. technology lagging behind needs.

This ranking is based on the proportion of companies citing a barrier as a major impediment to I.T. implementation.

Many of the social problems which will impact on the society when I.T. is introduced, stem from the fact that the advent of the new technology according to Meighan & Reid (1982), will force a new role on the school. Sarfati and Cove (1986) note that automation is affecting all aspects of industry and commerce.

This has caused a major revolution in the structure of society which Meighan & Reid (1982) see as a move from an energy-rich to an information-rich economy. They also contend that with the shift from scarce to abundant information, people will become more enlightened and independent and will no longer have to depend on an all powerful employer to make decisions for them.

Boden (1985), discusses the social implications of the new technology and identifies some general social trends brought about by the use of I.T. applications. She identifies changes in the proportion of the workforce in service and leisure industries, changes in the division of labour, sexual roles and changes in the general lifestyles and patterns of interaction.

The introduction of the new technologies has opened up new industries, new types of jobs and an even greater growth in services associated with technological innovation (Sarfati and Cove, 1986). However, Aleksander (1986), argues that although Information Technology offers new opportunities to users, the recognition of these opportunities is not a function of the technology but a function of the ability among those who plan to use it of having a clear view of their own aims and desires.

5.12 Conclusion

This literature survey is an overview of the attempt of countries to introduce I.T. in their curricula and an examination of how certain aspects of I.T. have impacted on society. It is noted that invariably, regardless of the developmental level of the particular society, I.T. has made a significant impact on the political, economic, educational and social spheres of the society.

CHAPTER 6

THE SUMMARY OF THE RESEARCH FINDINGS

6.1 Introduction

In this chapter, the results of the survey instruments are analyzed. The response to the Employers' questionnaire (see Appendices A,B) is examined first. This is followed by the analysis of the Educators' questionnaires (see Appendices D,E,J,K) which precedes the analysis of the response of the Educators' Observation Schedules (see Appendices G,H,I). Finally, the Students' questionnaire (see Appendices L, M) and the Students' Follow-up questionnaire (see Appendices O,P) are analyzed.

The results of the questions are given in percentages depicted in tables in order to facilitate easy comparison of the groups in the various cohorts.

6.2 The Employers' Response

The Employers' questionnaire (see Appendix B) was conducted over a period of eighteen (18) months between 1992 and 1994. It consists of nine questions.

Each employer was visited and help given in completing the questionnaire if necessary.

Thirty seven (37) businesses were surveyed. They consisted of construction, manufacturing, food and service industries. There was also one import/export distributor and one company which engaged in experimental research.

6.2.1 Question 1:

What type of business do you operate?

Type of Industry	%
Construction	5
Food	19
Manufacturing	22
Service	49
Other	5

Almost half of the businesses were service industries. This reflects the make-up of the business community in Barbados which is mainly service oriented. It is significant to note that a very small number of construction industries were included. This too is a reflection of the composition of the types of industries on the island.

6.2.2 Question 2:

How many persons do you employ?

a) Part-time

No. of Persons	%
Fewer than 50 persons	97
More than 50 persons	3

b) Full-time

No. of persons	%
Fewer than 50 persons	61
50 - 100 persons	17
100 - 200 persons	11
More than 200 persons	11

Most of the business organisations were small businesses as they employed fewer than fifty (50) persons.

6.2.3 Question 3:

Are you currently using I.T. applications in your organisation?

Response	%
Yes	81
No	19

In spite of their size, the majority of business organisations were using some type of I.T. application.

6.2.4 Question 4

How many people are currently using any of the following computer-based/Information Technology systems/applications in your Organisation?

The following table shows the percentage of businesses which had one or more persons using I.T. applications.

Application/System	% Using	% Not Using
a) Computer-aided design	14	86
b) Computerised accounting	54	46
c) Computerised payroll	41	59
d) Computerised pricing/ticketing	14	86
e) Credit card validation systems	5	95
f) Databases	35	65
g) Desk-top publishing	27	73
h) Electronic cash register	22	78
i) Electronic typewriter	41	59
j) Spreadsheets	57	43
k) Stock control system	32	68
l) Word processing	65	35
m) Other..specify	8	92

All of the applications/systems stated here were used by some of the businesses surveyed. Word processing programs especially WORDPERFECT 5.1; Spreadsheet programs including LOTUS 123 and EXCEL; and Computerized accounting programs such as SUPER STARS, SYGMA and ALCIE were the most commonly used. The other packages specified were customised in-house ones specifically designed for the particular business organisation, e.g. specialised software packages used by the broadcast industry for the electronic media and a general insurance package for the insurance industry.

6.2.5 Question 5:

How would you rate workers with I.T. skills, as compared to those without I.T. skills?

KEY
1. Much higher
2. Higher
3. About the same
4. Not as good as
5. Much poorer than
6. Uncertain

Attribute	1	2	3	4	5	6
a) Performance in teamwork	14	30	16	0	0	40
b) Ability to work independently	11	27	22	3	0	37
c) Possession of self-confidence	14	30	19	2	0	35
d) Ability to think creatively	5	33	16	8	0	38
e) Effective evaluation of situations	11	24	24	3	0	38
f) Overall job performance	8	41	16	0	0	35
g) Perform given tasks efficiently	8	27	22	3	0	40
h) Use of initiative	8	24	24	0	3	41
i) Possession of leadership qualities	8	14	38	0	0	40
j) Use of effective problem-solving skills	8	27	19	3	0	43
k) Make appropriate decisions when necessary	0	30	27	0	0	43
l) Possession of positive work attitudes	8	27	16	5	0	44
m) Easily adapt to different situations	5	35	16	0	3	41
n) Level of dependability	6	35	24	0	0	35
o) Willingness to try something new	19	35	11	0	0	35
p) Level of responsibility	3	27	27	5	0	38
q) Level of motivation	11	35	16	3	0	35

From their response to this question, employers generally agreed that workers with I.T. skills performed at a higher level than those workers without such skills.

Attributes such as 'Overall job performance'; 'Level of motivation'; 'Performance in teamwork'; 'Possession of self-confidence'; 'Level of dependability' and 'Easily adapt to different situations' received the highest ratings.

A high percentage of employers however indicated that for such attributes as 'Possession of leadership qualities', 'Make appropriate decisions when necessary' and 'Level of responsibility', workers with I.T. skills performed 'about the same' as those without such skills.

Although very few employers indicated that workers with I.T. skills performed 'not as good as' or 'much poorer than' workers without such skills, yet there was a very high percentage of employers who indicated that they were 'uncertain/unable to comment' on the various attributes.

6.2.6 Question 6:

What difficulty(ies), if any, in introducing computer-based or Information Technology systems have you encountered, or do you anticipate, you would encounter while introducing I.T. in your organisation?

Difficulty	%
a) Deciding on suitable applications or equipment	43
b) Obtaining finance	27
c) Obtaining suitable training	25
d) Recruiting suitably trained personnel	22
e) Persuading staff to adopt new methods	30
f) Other...please specify	8

The most common difficulty experienced by organisations when introducing computer-based I.T. systems was deciding on the type of application which would be suitable for the particular business organisation. The problem of persuading staff to adopt new methods was also paramount. Obtaining finance and suitable training for staff as well as recruiting suitably trained staff posed lesser problems than the other difficulties.

One reason for this was that organisations saved and budgeted for their computing equipment. Many businesses also have overseas contacts and so were able to reduce the cost of the equipment: coupled with that was the fact that the government removed the duty on imported computers. Many companies also used in-house programs and so trained their employees on the job. In some cases trained personnel from the parent company located overseas came into the local company and provided the training necessary.

6.2.7 Question 7:

If you are considering introducing I.T. in your organisation within the next two years, please indicate what application(s)/system(s) you are planning to use. If you are already using some computer-based applications/systems, please indicate what new application(s)/system(s) you are hoping to introduce.

Application/System	%
a) Computer-aided design	11
b) Computerised accounting	16
c) Computerised payroll	14
d) Computerised pricing/ticketing	14
e) Credit card validation systems	8
f) Databases	14
g) Desk-top publishing	8
h) Electronic cash register	8
i) Electronic typewriter	5
j) Spreadsheets	5
k) Stock control system	8
l) Word processing	8
m) Other..specify	14

The highest percentage of businesses indicated that would like to introduce computerised accounts in their organisations within the next two years. Computerised payroll, computerised pricing/ticketing and databases were the second most popular choice for businesses to introduce within the next two years.

Other applications specified include voice-mail, voice-messaging and automatic response systems and the introduction of a network system. A manufacturing concern indicated that it would like to introduce a customised manufacturing program.

6.2.8 Question 8:

Of the following I.T. skills, which THREE, in order of preference (first, second, third), would you prefer prospective employees to acquire BEFORE they are recruited in your organisation?

Skill	First	Second	Third	Not Chosen
a) Word processing	41	16	16	27
b) Spreadsheets	16	25	16	43
c) Databases	11	16	19	54
d) Computerised accounting	19	16	24	41
e) Computerised Stock-control	0	16	3	81
f) Computerised Payroll	0	0	8	92
g) Other...Specify	5	0	0	95

Some knowledge of word processing was required by most of the organizations surveyed. A significant percentage of businesses surveyed indicated that a knowledge of spreadsheets and computerised accounting was also desirable in order to gain employment in their organisations.

A very small percentage of the cohort indicated that they would like their prospective employees to have a knowledge of DOS skills.

6.2.9 Question 9:

In order to be successful in Business in today's world, how important is it for prospective employees to possess the following attributes?

KEY
1. Very Important
2. Important
3. Not important

Attribute	1	2	3
a) Ability to adapt to different situations	73	24	3
b) Ability to communicate	73	23	5
c) Ability to work with others	54	41	5
d) Ability to work unsupervised	54	41	5
e) General fitness	11	73	16
f) Good I.T. skills	41	51	8
g) Good level of numeracy	30	56	14
h) Good English language skills	46	46	8
i) Neat and tidy appearance	27	59	14
j) Mature/stable outlook	19	65	16
k) Positive attitude to work	78	16	6
l) Willingness to work	70	27	3

Four attributes were given high ratings in this response. They include, 'the ability to adapt to different situations', 'the ability to communicate', 'positive attitude to work' and 'a willingness to work'. Next came the 'ability to work unsupervised' and 'good language skills'. In seventh position was 'good I.T. skills'.

6.3 The Educators' Response

A total of 120 Barbadian educators across the educational spectrum and thirty (30) secondary school teachers in the U.K. were surveyed.

The Barbadian cohort comprised of sixty (60) secondary school teachers, forty (40) primary school teachers and twenty (20) tertiary education tutors/lecturers. For the survey in Barbados, the questionnaires (see Appendix E) were distributed to the various schools and institutions across the island and completed by educators who volunteered to fill them in.

For the survey in the U.K, the questionnaire (see Appendix K) was distributed to two secondary schools, one in Manchester and the other in the town of Kettering. They were completed by teachers who volunteered to fill them in. This questionnaire was similar to the one completed by the Barbadian educators, with adjustments to questions 10, 11 and 15 where necessary according to the subjects offered in the U.K. curriculum.

In general there was an enthusiastic response from the primary and secondary sectors in the Barbadian cohort, while the tertiary section seemed somewhat reluctant - hence the small number of responses. In the U.K. survey an effort was made to get a larger sample of responses, but replies were only received in from two secondary schools. The figures representing the U.K. cohort are shown in parentheses() in the tables.

6.3.1 Question 2:

How long have you been teaching?

Teachers	1-10 years experience	11-20 years experience	21+ years experience
Primary	20	40	40
Secondary	42 (33)	27 (23)	31 (44)
Tertiary	20	30	50

In the U.K. cohort, nearly half of the respondents had more than twenty years' teaching experience, whereas for the Barbadian cohort, just under one-third of the respondents had as much experience.

The situation is reversed for the group of educators with one to ten years' experience. For one third of the U.K. secondary educators who responded to the questionnaire fall into this category while nearly half of the Barbadian secondary educators who responded to the questionnaire fall into this category.

About one quarter of the secondary educators who have responded to the questionnaire have between eleven and twenty years' experience.

6.3.2 Question 3:

Gender

Teachers	% Male	% Female
Primary	33	67
Secondary	37 (37)	63 (63)
Tertiary	70	30

Except for the tertiary cohort, there was a predominance of female teachers in the sample. This reflects the composition of the teaching fraternity on the island. Statistics from the Ministry of Education in Barbados reveal that for the academic year 1992 to 1993, there were twice as many female teachers as there were male teachers in the system. It is noteworthy that the statistics for the U.K. secondary teachers are similar to those of the Barbadian secondary cohort.

6.3.3 Question 4:

What is your present position?

%	Teacher	Head of Dept.	Deputy Principal	Principal	Lecturer	Other
Primary	90	0	5	2	0	3
Secondary	77 (56)	13 (37)	0 (7)	0	0	10
Tertiary	0	10	0	0	90	0

Most of the primary teachers who responded were classroom teachers while 10% were administrators such as principals and deputy-principals. Of the secondary teachers 77% were subject teachers while the other 23% were either Heads of Department or Senior teachers. Although more than half of the U.K. cohort were classroom teachers, yet there was an encouraging response from senior administrative staff. 90% of those surveyed at the tertiary level were lecturers while the other 10% were Heads of Departments.

6.3.4 Question 5:

What knowledge of microcomputers do you have?

%	Basic Knowledge	Much (not certified)	Very Much (Certified)	None
Primary	70	0	5	25
Secondary	47 (67)	8	16 (20)	28 (13)
Tertiary	35	20	30	15

The majority of all educators surveyed had a basic knowledge of computers.

It is heartening to note that more than two-thirds of the secondary school respondents in the U.K. had at least a basic knowledge of computers, this compares with less than half of the Barbadian secondary respondents who have similar knowledge of computers. No one in the U.K. cohort indicated that they had 'much - not certified' knowledge of the computer, but in the Barbadian cohort eight percent thus scored.

In the 'very much - certified' category a higher percentage of the U.K. cohort than the Barbadian one indicated that it was so qualified. Approximately one quarter of the Barbadian cohort had no knowledge of computers at all, while only thirteen percent of the U.K. cohort indicated that it had no knowledge of computers.

It is noteworthy that many (30%) of the tertiary educators indicated that they were certified, while a very small number (5%) of the primary educators polled were so certified.

6.3.5 Question 6:

How often do you use computer-based Information Technology?

%	Very Regularly (Daily)	At least once per week	Occasionally	Never
Primary	8	12	47	32
Secondary	18 (27)	20 (13)	24 (43)	38 (17)
Tertiary	40	25	15	20

It is noted that a very small percentage of both primary and secondary educators in Barbados use Information Technology on a regular basis while more than one-quarter of the U.K. respondents indicated that they use I.T. on a regular basis. Almost one half of those surveyed in the primary school use Information Technology occasionally while almost one third of them have never used it at all.

At the secondary level, the situation is even more acute in the case of Barbados, with more than one-third never using Information Technology at all, while only seventeen percent of the U.K. cohort indicated that it had never used I.T. Just under half of the U.K. cohort compared to just under a quarter of the Barbadian secondary educators cohort used I.T. occasionally. Even though only thirteen percent of the U.K. respondents indicated that they used I.T. at least once a week compared to twenty percent of the Barbadian secondary educators cohort, the fact remains that overall, the extent of I.T. usage is greater in the U.K. cohort than in the Barbadian one.

In the tertiary sector, 40% used Information Technology daily while 15% have never used it.

6.3.6 Question 7::

In order to further your I.T. capability, which ONE of the following would you need most?

%	More Equipment	More Software	More Training	Not Interested
Primary	8	5	87	0
Secondary	22 (33)	5 (7)	70 (60)	3 (0)
Tertiary	15	10	65	10

In all the categories surveyed, both in the U.K. and in Barbados, the majority of educators identified training as their greatest need. The need seemed to be most acute in the primary sector. The second greatest need was for more equipment while a small percentage identified more software as their greatest need.

Three percent of the secondary educators and 10% of the tertiary educators surveyed were satisfied with their level of training and equipment availability.

6.3.7 Question 8:

In this question educators were asked to indicate on a scale of 1 (most preferred) to 10 (least preferred), what aspect of Information Technology they would like to know more about. They were given nine (9) choices and a tenth category 'Other ... Specify' required them to state in which other area not already mentioned they would like training. A score of '0' indicated that the respondent had absolutely no interest in this aspect of Information Technology. The main focus will be on the first and second choices.

What aspect of Information Technology would you like to know more about?

a) Computer-assisted learning

Choice	% Primary	% Secondary	% Tertiary
0.	23	13 (16)	25
1.	40	25 (37)	35
2.	18	30 (10)	15
3.	5	7 (20)	5
4.	10	5 (3)	10
5.	2	8 (7)	5
6.	2	0 (0)	0
7.	0	0 (0)	5
8.	0	2 (2)	0
9.	0	8 (0)	0
10.	0	2 (0)	0

Notice should be taken of the large number of primary and tertiary educators who indicated that CAL was their first choice. Most secondary educators made CAL their second choice. In the U.K. cohort, more than one-third made CAL their first choice.

b) Computer literacy

Choice	% Primary	% Secondary	% Tertiary
0.	28	12 (33)	30
1.	25	18 (17)	10
2	15	28 (13)	25
3.	12	13 (10)	10
4.	5	3 (10)	5
5.	5	3 (3)	0
6.	3	3 (3)	5
7.	2	2 (4)	0
8.	0	12 (7)	5
9.	0	8 (0)	5
10.	5	3 (0)	5

In the Barbadian cohort, of the three categories of educators, the primary educators have shown the greatest interest in this area as their first choice. A large number of Barbadian secondary educators (28%) chose it as their second choice, while one-third of the U.K. cohort, like the Barbadian primary and tertiary educators expressed no interest in this area.

c) Computers in school administration

Choice	% Primary	% Secondary	% Tertiary
0.	28	12 (47)	30
1.	5	9 (0)	10
2.	5	8 (10)	5
3.	15	8 (0)	10
4.	10	20 (10)	10
5.	20	13 (0)	20
6.	5	5 (7)	5
7.	5	7 (3)	5
8.	2	5 (7)	0
9.	5	13 (10)	0
10.	0	0 (3)	5

Here it is noted that a very small number of educators from either cohort was interested in this area as a first or second choice. One possible reason for this may be that educators generally regard aspect of I.T. as being associated with office administration.

d) Computerised accounting

Choice	% Primary	% Secondary	% Tertiary
0.	30	15 (57)	35
1.	0	8 (0)	0
2.	2	3 (7)	10
3.	0	3 (3)	5
4.	8	3 (0)	5
5.	5	13 (3)	5
6.	10	13 (7)	15
7.	8	12 (0)	5
8.	8	12 (7)	15
9.	22	15 (16)	5
10.	8	2 (0)	0

This is not a popular first choice in any area with only 8% of secondary educators making it their first choice and no primary or tertiary educators making it theirs.

As in the U.K. cohort, a large percent of both primary and tertiary Barbadian educators also indicated absolutely no interest in this area.

e) Curriculum development

(as in the teaching of a specific subject)

Choice	% Primary	% Secondary	% Tertiary
0.	27	15 (33)	30
1.	8	18 (23)	5
2.	17	9 (13)	15
3.	20	18 (7)	5
4.	10	7 (7)	20
5.	3	7 (7)	15
6.	5	10 (7)	0
7.	5	10 (3)	5
8.	2	3 (0)	5
9.	0	3 (0)	0
10.	3	0 (0)	0

Of the number who indicated an interest in this area, the Barbadian secondary cohort showed more interest than the primary or tertiary cohort in making it their first choice, while almost one-quarter of the U.K. cohort indicated this as its first choice.

f) Databases

Choice	% Primary	% Secondary	% Tertiary
0.	27	17 (54)	25
1.	3	2 (0)	10
2	3	8 (0)	5
3	0	8 (3)	5
4	12	12 (3)	10
5	10	8 (17)	10
6	15	22 (10)	10
7	17	13 (7)	20
8	10	8 (3)	5
9	3	0 (3)	0
10	0	2 (0)	0

This was not a popular choice in either cohort. Less than five percent of the Barbadian primary and secondary cohort, and no one in the U.K. cohort made it their first choice.

In the majority of cases, Databases occupied fourth place or lower with approximately one quarter of the respondents in the Barbadian primary and tertiary sectors and more than half og thre U.K. cohort not interested in this aspect at all.

g) Desk-top publishing

Choice	% Primary	% Secondary	% Tertiary
0.	28	13 (23)	25
1.	3	5 (7)	0
2.	5	5 (23)	5
3.	7	10 (14)	15
4.	5	13 (10)	0
5.	5	7 (10)	0
6.	12	14 (10)	0
7.	8	7 (3)	15
8.	17	8 (0)	15
9.	10	17 (0)	20
10.	0	0 (0)	5

This is clearly not a popular choice with the respondents. Fewer than ten percent of the Barbadian primary and secondary and the U.K. cohorts and no one in the tertiary cohort made it their first choice.

In the Barbadian primary and tertiary cohorts and the U.K. cohort, about one quarter of the respondents did not chose it at all.

h) Spreadsheets

Choice	% Primary	% Secondary	% Tertiary
0.	30	17 (53)	30
1.	0	5 (0)	0
2.	3	3 (0)	5
3.	5	7 (7)	10
4.	0	10 (7)	0
5.	12	10 (0)	10
6.	10	10 (3)	10
7.	20	17 (20)	10
8.	12	13 (10)	15
9.	8	8 (0)	10
10.	0	0 (0)	0

This is another unpopular first choice where only 5% of the Barbadian secondary cohort made it their first choice and no one in the Barbadian primary or tertiary cohorts or in the U.K. cohort so chose it.

It should be noted that almost one-third of the Barbadian primary and tertiary cohort and more than half of the U.K. cohort were not at all interested in this aspect.

i) Word processing

Choice	% Primary	% Secondary	% Tertiary
0.	30	14 (30)	25
1.	3	5 (13)	10
2.	5	5 (10)	0
3.	5	10 (17)	5
4.	10	14 (10)	10
5.	10	6 (3)	5
6.	8	14 (0)	20
7.	5	8 (7)	0
8.	12	8 (7)	0
9.	12	16 (3)	15
10.	0	0 (0)	10

Another unpopular first choice especially among the Barbadian primary and secondary respondents with at least one quarter of the Barbadian primary and tertiary cohort and the U.K. cohort not interested in it at all. This is probably because teachers who have a knowledge of I.T. already possess some word processing skills.

j) Other...Specify

Choice	% Primary	% Secondary	% Tertiary
0.	32	22 (67)	40
1.	0	3 (0)	10
2.	0	0 (3)	0
3.	0	0 (0)	5
4.	0	0 (0)	0
5.	0	0 (0)	0
6.	0	2 (0)	0
7.	0	0 (0)	0
8.	3	0 (0)	0
9.	8	2 (0)	5
10.	57	71 (10)	40

In the Barbadian cohort, a few respondents in the secondary cohort indicated they would also like to know more about graphics and CAD programs, while 10% of the tertiary respondents would like to learn more about CAD and statistical programs. In the U.K. cohort, a few respondents would like to know more about control technology.

No one in the primary cohort indicated an additional choice.

In general, however, it appears as with the exception of Desk-top publishing, that U.K. teachers are only marginally interested in I.T. applications apart from Computer-assisted learning. This is evident in the fact that very high percentages recorded no interest in most of the I.T. applications surveyed. When compared to the Barbadian cohort, it seems as if there was a greater percentile distribution in the choices of the various applications.

6.3.8 Question 9:

What subjects are you presently teaching?

Subjects	% Primary	% Secondary	% Tertiary
English	0	10 (17)	10
Maths	0	12 (7)	5
Foreign Languages	0	10 (14)	15
Technical/ Vocational	0	10 (20)	5
Business Studies	0	13 (0)	40
Science	3	10 (14)	10
General Studies	0	15 (10)	10
Combination	92	20 (20)	0
No Response	5	0 (1)	5

Generally, the teachers in the Barbadian primary cohort teach a combination of subjects - Language Arts, Mathematics, Science and Social Studies. In addition, there were three Science specialists and five administrators who do not engage in classroom teaching.

As expected, there is a greater distribution of subject teachers in the Barbadian secondary and tertiary cohort and in the U.K. cohort.

In the Barbadian and U.K. secondary cohort, teachers who indicated that they taught two or more subjects were scored as 'combination'.

Although no specific sampling method was used to collect data from the educators, yet a fairly even distribution of teachers in the various subject areas was achieved.

In the U.K. cohort, it is noted that no teachers indicated that they taught Business Studies. However it is believed that because of the structure of the British education curriculum, some of those teachers who indicated that they taught Technical/Vocational subjects also taught Business Studies.

In the Barbadian tertiary cohort there was a high response from teachers of Business Studies.

The 'no response' entries were made by principals and other education administrators.

6.3.9 Question 10:

Please indicate how much use is made of I.T. in the various departments in your school or institution.

a) Administration

KEY	% Primary	% Secondary	% Tertiary
1. Regularly (Daily/a few times a week)	8	38 (77)	55
2. A few times a month	0	8 (0)	0
3. Occasionally	12	4 (3)	10
4. Not at all	45	23 (0)	0
5. Uncertain	35	27 (20)	35

The use of Information Technology applications in Administration in educational institutions in Barbados varies, but seem to be more common in the U.K..
Here it is noted that in administration Information Technology is used regularly in the secondary and tertiary institutions but hardly used in the primary ones.

A large percentage of respondents were also not aware of the extent of the use of Information Technology applications in their institutions.

b) Business Education

KEY	% Primary	% Secondary	% Tertiary
1. Regularly (Daily/a few times a week)	0	28 (43)	25
2. A few times a month	3	2 (0)	5
3. Occasionally	0	11 (3)	10
4. Not at all	60	23 (0)	5
5. Uncertain	37	38 (54)	55

This department does not exist in the primary school and so the ratings in this area are understandable. At least one quarter of the Barbadian secondary and tertiary educators and nearly one-half of the U.K. cohort are aware that Information Technology applications are used regularly in the Business Education Departments.

Once again, the number of 'uncertain' respondents is high in all cohorts.

c) English

KEY	% Primary	% Secondary	% Tertiary
1. Regularly (Daily/a few times a week)	15	2 (27)	10
2. A few times a month	8	6 (33)	5
3. Occasionally	20	13 (13)	5
4. Not at all	37	37 (3)	15
5. Uncertain	20	42 (24)	65

A generally low response has been noted of the use of Information Technology applications in the teaching of English in Barbados, whereas a much greater awareness of the extent of use is noted in the U.K. cohort.

The findings indicate that in the Barbadian educational system, teachers in the primary schools seem to have made the greatest effort to use Information Technology in the teaching of this subject.

d) Foreign Language

KEY	% Primary	% Secondary	% Tertiary
1. Regularly (Daily/a few times a week)	0	0 (13)	0
2. A few times a month	0	2 (23)	5
3. Occasionally	0	6 (27)	15
4. Not at all	70	52 (0)	10
5. Uncertain	30	40 (37)	70

The foreign languages taught in Barbadian schools are mainly French and Spanish. In some schools German and Latin may also be taught.

Foreign languages are not usually taught in the primary school but are an integral part of the curriculum in secondary and tertiary education. However, it is clear that Information Technology applications are hardly used in the teaching of foreign languages in Barbados, but there is a marked difference of the extent of I.T. use in the teaching of foreign languages in the U.K.

e) General Studies (Barbados)

KEY	% Primary	% Secondary	% Tertiary
1. Regularly (Daily/a few times a week)	3	2	10
2. A few times a month	5	0	0
3. Occasionally	7	7	15
4. Not at all	43	45	0
5. Uncertain	42	46	75

General Studies (U.K.)

Department	1	2	3	4	5
Art	20	27	7	6	40
Geography	13	27	20	4	37
History	10	27	20	4	40
Music	3	7	13	20	57
Physical Education	3	0	7	27	63
Religious Studies	3	3	30	20	44

In Barbados, the General Studies department comprises of such subjects as Art, History, Geography, Music, Religious Studies and Physical Education. Since these subjects are placed in separate departments in the U.K. system, they will be discussed at this time.

In comparing the extent of use of Information Technology applications in this department, it is noted that they are hardly used in the Barbadian system except in the Tertiary sector where about one quarter of the respondents use them at some time.

In the U.K. situation, however, it is noted that, generally speaking, I.T. is used more often than it is in the Barbadian system.

f) Mathematics

KEY	% Primary	% Secondary	% Tertiary
1. Regularly (Daily/a few times a week)	18	0 (20)	5
2. A few times a month	5	3 (30)	0
3. Occasionally	18	13 (13)	10
4. Not at all	37	37 (0)	15
5. Uncertain	22	43 (37)	70

In Barbados, Information Technology applications in the teaching of Mathematics are used more often in the primary school than in other levels of education.

No respondents in the secondary cohort reported any knowledge of regular use of Information Technology applications in this subject in their institutions. However, in the case of the U.K. a much wider use of I.T. in the teaching of Mathematics is indicated.

g) Science

KEY	% Primary	% Secondary	% Tertiary
1. Regularly (Daily/a few times a week)	0	3 (17)	5
2. A few times a month	8	7 (40)	0
3. Occasionally	12	15 (7)	10
4. Not at all	42	33 (0)	10
5. Uncertain	38	42 (36)	75

In the teaching of Science in Barbados, there appears to be little use of Information Technology applications especially in the primary sector. In spite of the low percentage of use in the secondary sector, yet there is a greater distribution of the use of Information Technology use in this sector than in any other.

The extent of use in this subject area in the U.K. is significantly greater than it is in Barbados.

h) Vocational Studies

KEY	% Primary	% Secondary	% Tertiary
1. Regularly (Daily/a few times a week)	0	2 (70)	15
2. A few times a month	0	8 (7)	5
3. Occasionally	0	2 (3)	0
4. Not at all	58	40 (0)	10
5. Uncertain	42	48 (20	70

Except for the tertiary sector, the use of Information Technology applications are hardly used in the teaching of the subjects in this department in Barbados.These subjects include Woodwork, electronics, metalwork, technical drawing and home economics, home management, food and nutrition and clothing and textiles.

In the U.K. system, these subjects and I.T. come under the ambit of Technology. The results from the U.K. cohort therefore show a much greater use of I.T. than in its Barbadian counterpart.

It is noted that in general, the statistics show that I.T. is much more widely used in education in the U.K. than it is in Barbados. The teachers in the U.K. also seem more aware of I.T. use than do teachers in Barbados.

6.3.10 Question 11:

In this question educators were expected to use their knowledge about the subject and decide upon the suitability of the use of I.T. applications in the teaching of the subjects. Educators did not have to be actually teaching the subject in order to be able to make a judgement. However, a comparatively small percentage of respondents indicated that I.T. applications were not suited in any way in the teaching of the particular CXC/GCSE subject. Those GCSE subjects which were also offered at CXC were used for comparison.

In the Barbadian cohort, there were four (4) CXC subjects - Information Technology, Physics, Principles of Accounts and Principles of Business - in which no respondents in any of the sectors indicated that those subjects were not suited to the use of Information Technology applications in the teaching of those subjects. In the U.K. cohort, for Physics, Information Technology and Office Practice, no one indicated that those subjects were not suited to I.T. applications. In general, many teachers thought that the majority of subjects offered in their respective curricula were suitable in some way for I.T. applications.

Note must be taken of the large number of respondents who were 'uncertain' in all subject areas even though, in the U.K. cohort, the responses were not as high as those in the Barbadian cohort. One case in point is the number of 'uncertain' responses in the evaluation of the suitability of I.T. applications in the teaching of Information Technology. This reflects the lack of knowledge on the part of Barbadian educators about what I.T. actually is.

How do you evaluate the suitability of Information Technology applications in the teaching of the following CXC/GCSE subjects?

a) Agriculture

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	20	15 (0)	15
2. Fairly well suited	20	30 (27)	15
3. Not suited	3	8 (27)	0
4. Uncertain	57	47 (46)	70

b) Art

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	25	25 (17)	20
2. Fairly well suited	10	23 (47)	10
3. Not suited	3	5 (6)	5
4. Uncertain	62	47 (30)	85

c) Art & Craft

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	22	20	15
2. Fairly well suited	5	29	10
3. Not suited	8	3	5
4. Uncertain	65	48	70

d) Biology

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	20	27 (17)	25
2. Fairly well suited	25	30 (57)	10
3. Not suited	0	5 (3)	0
4. Uncertain	55	38 (23)	65

e) Chemistry

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	22	25 (17)	25
2. Fairly well suited	10	30 (55)	15
3. Not suited	3	3 (4)	0
4. Uncertain	65	42 (24)	60

f) Clothing & Textiles

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	10	17 (7)	10
2. Fairly well suited	17	26 (48)	15
3. Not suited	3	7 (10)	5
4. Uncertain	70	50 (35)	70

g) Craft

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	10	17	10
2. Fairly well suited	13	18	10
3. Not suited	8	10	5
4. Uncertain	69	55	75

h) English Language

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	43	38 (7)	30
2. Fairly well suited	10	24 (55)	10
3. Not suited	0	5 (10)	0
4. Uncertain	47	33 (28)	60

i) English Literature

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	20	26 (7)	10
2. Fairly well suited	12	16 (38)	15
3. Not suited	5	7 (28)	5
4. Uncertain	63	50 (27)	70

j) Food & Nutrition

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	18	20 (4)	65
2. Fairly well suited	22	28 (52)	5
3. Not suited	5	4 (17)	20
4. Uncertain	55	48 (28)	10

k) French

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	22	28 (10)	20
2. Fairly well suited	18	23 (45)	20
3. Not suited	0	7 (24)	0
4. Uncertain	60	42 (21)	64

l) Geography

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	28	38 (17)	25
2. Fairly well suited	20	25 (45)	5
3. Not suited	0	4 (10)	0
4. Uncertain	52	33 (28)	70

m) History

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	17	27 (7)	10
2. Fairly well suited	25	22 (59)	15
3. Not suited	3	5 (7)	0
4. Uncertain	55	46 (27)	75

n) Home Management

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	17	28 (10)	20
2. Fairly well suited	20	27 (45)	15
3. Not suited	3	3 (7)	0
4. Uncertain	60	42 (38)	65

o) Information Technology

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	47	60 (90)	50
2. Fairly well suited	3	5 (3)	0
3. Not suited	0	0 (0)	0
4. Uncertain	50	35 (7)	50

p) Integrated Science

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	27	45 (28)	25
2. Fairly well suited	15	22 (38)	10
3. Not suited	0	2 (10)	0
4. Uncertain	58	31 (24)	65

q) Mathematics

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	45	47 (45)	30
2. Fairly well suited	5	20 (31)	15
3. Not suited	0	3 (3)	0
4. Uncertain	50	30 (21)	55

r) Office Procedures/Office Practice (U.K.)

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	38	56 (59)	30
2. Fairly well suited	15	12 (21)	15
3. Not suited	0	2 (0)	0
4. Uncertain	47	30 (20)	55

s) Physics

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	35	32 (31)	25
2. Fairly well suited	8	27 (52)	20
3. Not suited	0	0 (0)	0
4. Uncertain	57	41 (17)	55

t) Principles of Accounts

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	35	66	40
2. Fairly well suited	15	10	5
3. Not suited	0	0	0
4. Uncertain	50	24	55

u) Principles of Business (Commerce, U.K.)

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	40	58 (55)	30
2. Fairly well suited	12	17 (21)	10
3. Not suited	0	0 (3)	0
4. Uncertain	48	25 (21)	60

v) Social Studies

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	27	27	5
2. Fairly well suited	18	27	25
3. Not suited	5	3	0
4. Uncertain	50	43	70

w) Spanish

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	20	22	20
2. Fairly well suited	12	22	20
3. Not suited	3	8	0
4. Uncertain	65	48	60

x) Technical Drawing

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	25	40	30
2. Fairly well suited	20	15	20
3. Not suited	3	2	45
4. Uncertain	52	43	5

y) Typewriting

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	37	58	40
2. Fairly well suited	12	10	10
3. Not suited	3	2	0
4. Uncertain	47	30	50

z) Woodwork

KEY	% Primary	% Secondary	% Tertiary
1. Very well suited	12	12	10
2. Fairly well suited	5	22	10
3. Not suited	5	8	0
4. Uncertain	78	58	80

6.3.11 Question 12:

This question was designed to ascertain the views of Barbadian educators on the place Information Technology should occupy in the education system.

Do you think the Barbadian education system should aim to achieve the following goals?

a) Every student graduating from secondary school should have a knowledge of I.T.

KEY	% Primary	% Secondary	% Tertiary
1. Strongly agree	62	68 (90)	70
2. Agree	35	27 (7)	25
3. Disagree	0	2 (0)	0
4. Strongly disagree	0	0 (3)	0
5. Uncertain	3	3 (0)	5

b) I.T. should be used ONLY in vocational-oriented subjects

KEY	% Primary	% Secondary	% Tertiary
1. Strongly agree	0	0 (3)	5
2. Agree	5	4 (0)	0
3. Disagree	47	38 (33)	35
4. Strongly disagree	43	48 (47)	40
5. Uncertain	5	10 (17)	20

c) I.T. should be integrated in as many subjects as possible.

KEY	% Primary	% Secondary	% Tertiary
1. Strongly agree	57	75 (54)	60
2. Agree	35	23 (33)	35
3. Disagree	0	2 (0)	0
4. Strongly disagree	0	0 (3)	0
5. Uncertain	8	0 (10)	5

d) Every student in secondary school should receive instruction in word processing.

KEY	% Primary	% Secondary	% Tertiary
1. Strongly agree	42	46 (68)	50
2. Agree	32	40 (20)	25
3. Disagree	8	7 (0)	10
4. Strongly disagree	0	0 (0)	0
5. Uncertain	18	7 (13)	15

Upon examining the responses to this question, it is clear that the majority of Barbadian and U.K. educators surveyed are in favour of the inclusion of some aspect of Information Technology in the curriculum for all students. They do not believe that training in Information Technology should be limited to students studying vocational-oriented subjects.

6.3.12 Question 13:

To what extent are the following factors hindering the implementation of I.T. practices in your school/institution?

a) The lack of computer-literate teachers

KEY	% Primary	% Secondary	% Tertiary
1. Very Much	60	41 (37)	30
2. Not very much	15	27 (30)	20
3. Not at all	3	10 (17)	10
4. Uncertain	22	22 (16)	40

In both the U.K. and the Barbadian survey, the majority of the respondents indicated that the lack of computer literate teachers was a major hindrance to the implementation of Information Technology practices in the school. The problem seems particularly acute in the primary sector.

b) Teacher interest

KEY	% Primary	% Secondary	% Tertiary
1. Very Much	10	9 (20)	5
2. Not very much	23	25 (23)	25
3. Not at all	35	38 (50)	25
4. Uncertain	32	28 (7)	45

It seems that in general educators are interested in implementing Information Technology practices in their teaching. The large percentage of 'Uncertain' respondents however is cause for concern.

c) Pupil interest

KEY	% Primary	% Secondary	% Tertiary
1. Very Much	10	2 (7)	10
2. Not very much	15	8 (20)	15
3. Not at all	35	65 (53)	35
4. Uncertain	40	25 (20)	40

In general, pupil interest, like teacher interest, is not a hindrance to the implementation of Information Technology practices in the school. Pupils - especially those in the secondary school seem particularly interested in acquiring skills in Information Technology.

d) Computer hardware

KEY	% Primary	% Secondary	% Tertiary
1. Very Much	32	47 (17)	45
2. Not very much	30	15 (43)	15
3. Not at all	15	8 (13)	5
4. Uncertain	23	30 (27)	35

e) Instructional software

KEY	% Primary	% Secondary	% Tertiary
1. Very Much	50	43 (33)	35
2. Not very much	22	13 (27)	15
3. Not at all	5	4 (17)	10
4. Uncertain	23	40 (23)	40

The results of the survey show that the need for computer hardware and software is still very real. The Government of Barbados has made a concerted effort to equip all government secondary and some primary schools with computer networks complete with a battery of educational software.

However, the lack of computer hardware and instructional software seems to be a greater hindrance in Barbados than it is in the U.K.

f) Time to develop lessons in which I.T. is used

KEY	% Primary	% Secondary	% Tertiary
1. Very Much	55	43 (70)	30
2. Not very much	10	13 (20)	15
3. Not at all	8	12 (7)	5
4. Uncertain	27	32 (3)	50

g) Space on the timetable for an additional subject

KEY	% Primary	% Secondary	% Tertiary
1. Very Much	47	52 (33)	25
2. Not very much	8	8 (37)	15
3. Not at all	10	10 (10)	10
4. Uncertain	35	30 (20)	50

Making provision for the actual implementation of Information Technology practices in the curriculum seems to be a major problem affecting both the U.K. and the Barbadian cohorts.In order for I.T. to be effectivel delivered, whether as a single subject or as Computer-assi learning (CAL), time must be provided for teachers to plan lessons and develop programmes.

Thus timetabling strategies must be effective and efficient. Adequate space must be provided to accommodate the new subject -Information Technology.

It seems that teachers from all sectors are greatly affected by these two hindrances.

h) I.T. training for teachers

KEY	% Primary	% Secondary	% Tertiary
1. Very Much	52	53 (57)	35
2. Not very much	8	15 (27)	10
3. Not at all	15	9 (3)	10
4. Uncertain	25	23 (13)	45

i) Teacher knowledge on the use of I.T. in the execution of their teaching lessons.

KEY	% Primary	% Secondary	% Tertiary
1. Very Much	62	60 (50)	50
2. Not very much	5	7 (33)	15
3. Not at all	5	7 (7)	30
4. Uncertain	28	26 (10)	5

There is a great need for training in Information Technology for teachers. It has already been established that teachers are indeed interested in implementing Information Technology practices, yet if there are not enough courses of the type which would enable them to develop their Information Technology capability. It is therefore understandable that teachers have viewed, "Teacher Knowledge on the use of I.T. in the execution of their teaching lessons," as a major hindrance to the implementation of Information Technology practices in their particular school or institution.

j) Administrative support

KEY	% Primary	% Secondary	% Tertiary
1. Very Much	8	12 (30)	15
2. Not very much	20	23 (27)	15
3. Not at all	35	22 (17)	5
4. Uncertain	37	43 (26)	65

k) An efficient computer maintenance programme

KEY	% Primary	% Secondary	% Tertiary
1. Very Much	20	28 (17)	20
2. Not very much	12	17 (33)	15
3. Not at all	18	13 (17)	5
4. Uncertain	50	42 (33)	60

l) A comprehensive policy on I.T. implementation

KEY	% Primary	% Secondary	% Tertiary
1. Very Much	35	40 (10)	30
2. Not very much	20	13 (37)	15
3. Not at all	5	7 (30)	5
4. Uncertain	40	40 (23)	50

Administrative support is very necessary in order to effect the implementation of any type of policy or practice in an organisation.

The responses from the Barbadian educators indicate however that there is generally good administrative support, but it seems as if the lack of administrative support is more acute in the U.K. than it is in the Barbadian situation.

There is however, a need for a comprehensive policy on the implementation of Information Technology practices in the schools.

In addition, there is need for an efficient computer maintenance programme. This is another area in which administration can lend its support as teachers experience much computer down-time when a machine malfunctions.

The lack of an efficient computer maintenance programme and the lack of a comprehensive policy on I.T. implementation seem to be of a greater necessity in the Barbadian situation than they are in the U.K situation.

6.3.13 Question 14:

In this question, teachers were required to evaluate (based on a general impression) as distinct from the Observation Schedule, the students' performance according to certain criteria.

How would you evaluate the students with I.T. skills - as compared to those without I.T. skills - in general classroom activity?

a) Performance in teamwork

KEY	% Primary	% Secondary	% Tertiary
1. Much Higher	5	13 (10)	5
2. Higher	10	25 (33)	25
3. About the same	10	15 (33)	10
4. Not as good	3	0 (3)	0
5. Much poorer than	0	0 (7)	0
6. Uncertain/Unable to comment	72	47 (14)	60

b) Ability to work independently

KEY	% Primary	% Secondary	% Tertiary
1. Much Higher	15	22 (27)	25
2. Higher	17	23 (43)	10
3. About the same	8	15 (27)	10
4. Not as good	0	0 (0)	0
5. Much poorer than	0	0 (0)	0
6. Uncertain/Unable to comment	60	40 (7)	55

c) Development of self-confidence

KEY	% Primary	% Secondary	% Tertiary
1. Much Higher	5	20 (20)	15
2. Higher	18	23 (57)	20
3. About the same	5	15 (10)	10
4. Not as good	0	0 (3)	0
5. Much poorer than	0	0 (3)	0
6. Uncertain/Unable to comment	72	42 (7)	55

d) Ability to think creatively

KEY	% Primary	% Secondary	% Tertiary
1. Much Higher	3	17 (10)	10
2. Higher	15	26 (60)	15
3. About the same	5	12 (6)	5
4. Not as good	2	0 (7)	10
5. Much poorer than	0	0 (7)	0
6. Uncertain/Unable to comment	75	45 (10)	60

e) Effectively evaluate situations

KEY	% Primary	% Secondary	% Tertiary
1. Much Higher	3	3 (7)	10
2. Higher	10	22 (60)	20
3. About the same	7	28 (20)	5
4. Not as good	0	0 (3)	10
5. Much poorer than	0	0 (3)	0
6. Uncertain/Unable to comment	80	47 (7)	55

f) Overall performance level

KEY	% Primary	% Secondary	% Tertiary
1. Much Higher	8	10 (0)	0
2. Higher	15	28 (60)	35
3. About the same	0	15 (27)	5
4. Not as good	0	0 (3)	5
5. Much poorer than	0	0 (0)	0
6. Uncertain/Unable to comment	77	47 (10)	55

g) Performance of given tasks

KEY	% Primary	% Secondary	% Tertiary
1. Much Higher	3	7 (3)	5
2. Higher	17	30 (57)	0
3. About the same	10	13 (23)	15
4. Not as good	0	2 (3)	20
5. Much poorer than	0	0 (0)	0
6. Uncertain/Unable to comment	70	48 (14)	60

h) Use of initiative

KEY	% Primary	% Secondary	% Tertiary
1. Much Higher	12	13 (27)	5
2. Higher	15	23 (47)	15
3. About the same	5	17 (13)	15
4. Not as good	0	2 (3)	5
5. Much poorer than	0	0 (0)	0
6. Uncertain/Unable to comment	68	45 (10)	60

i) Development of leadership qualities

KEY	% Primary	% Secondary	% Tertiary
1. Much Higher	5	3 (10)	5
2. Higher	10	18 (60)	5
3. About the same	7	27 (13)	30
4. Not as good	3	2 (4)	0
5. Much poorer than	0	2 (0)	0
6. Uncertain/Unable to comment	75	48 (13)	60

j) Development of problem-solving ability

KEY	% Primary	% Secondary	% Tertiary
1. Much Higher	5	12 (7)	20
2. Higher	17	35 (67)	15
3. About the same	3	10 (13	5
4. Not as good	0	0 (3)	5
5. Much poorer than	0	0 (3)	0
6. Uncertain/Unable to comment	75	43 (7)	55

k) Development of decision-making ability

KEY	% Primary	% Secondary	% Tertiary
1. Much Higher	5	10 (7)	10
2. Higher	10	22 (57)	15
3. About the same	10	23 (26)	15
4. Not as good	0	0 (0)	5
5. Much poorer than	3	0 (3)	0
6. Uncertain/Unable to comment	72	45 (7)	55

l) Development of positive work attitudes

KEY	% Primary	% Secondary	% Tertiary
1. Much Higher	0	12 (13)	10
2. Higher	18	28 (56)	10
3. About the same	10	13 (17)	20
4. Not as good	0	0 (0)	0
5. Much poorer than	0	0 (6)	0
6. Uncertain/Unable to comment	72	47 (7)	60

m) Easily adapt to different work situations

KEY	% Primary	% Secondary	% Tertiary
1. Much Higher	5	12 (17)	5
2. Higher	12	20 (57)	15
3. About the same	8	20 (10)	20
4. Not as good	0	2 (3)	0
5. Much poorer than	0	0 (7)	5
6. Uncertain/Unable to comment	75	47 (6)	55

n) Development of dependable/responsible work habits

KEY	% Primary	% Secondary	% Tertiary
1. Much Higher	2	10 (7)	15
2. Higher	20	28 (63)	5
3. About the same	8	15 (17)	15
4. Not as good	0	2 (0)	5
5. Much poorer than	0	0 (6)	0
6. Uncertain/Unable to comment	70	45 (7)	60

o) Willingness to try something new

KEY	% Primary	% Secondary	% Tertiary
1. Much Higher	22	28 (30)	15
2. Higher	7	20 (53)	25
3. About the same	3	7 (3)	0
4. Not as good	0	2 (0)	0
5. Much poorer than	3	0 (7)	5
6. Uncertain/Unable to comment	65	43 (7)	55

p) Level of motivation

KEY	% Primary	% Secondary	% Tertiary
1. Much Higher	12	20 (40)	15
2. Higher	10	28 (37)	25
3. About the same	10	10 (10)	5
4. Not as good	0	0 (0)	0
5. Much poorer than	0	0 (6)	0
6. Uncertain/Unable to comment	68	42 (7)	55

q) Ability to manage time effectively

KEY	% Primary	% Secondary	% Tertiary
1. Much Higher	0	12 (3)	10
2. Higher	5	23 (70)	5
3. About the same	15	11 (14)	15
4. Not as good	0	2 (3)	5
5. Much poorer than	0	2 (3)	5
6. Uncertain/Unable to comment	80	50 (7)	60

There was a high number of respondents who scored 'uncertain/unable to comment'. In the U.K. cohort, there were not as many 'uncertain/unable to comment' responses to this question as there were in the Barbadian cohort.

Of those who were able to comment, most of them indicated that students with Information Technology skills performed higher or much higher than those without such skills in general classroom activity.

In some categories, respondents indicated that a high percentage of students performed "About the same" as students with Information Technology skills.

These categories include, the 'Effectively evaluate situations', where in the secondary cohort more than one quarter of the respondents indicated that students with Information Technology skills performed 'about the same' as those without Information Technology skills in general classroom activity.

Another such category, is that of the 'Development of leadership qualities' where more than one quarter of the Barbadian secondary and the tertiary cohort indicated that students with Information Technology skills performed 'about the same' as those without Information Technology skills in general classroom activity.

In the category, 'Development of positive work attitudes' it is noted that in the tertiary sector it was indicated that the percentage who performed 'about the same' equalled the combined percentages of those who performed 'higher' and 'much higher'. A similar situation obtained in the category 'Easily adapt to different work situations' and 'Ability to manage time effectively'.

Very few respondents indicated that students with Information Technology skills performed 'not as good as' those without Information Technology skills. However, in some categories in the tertiary cohort, about one tenth or more of the respondents indicated that students with Information Technology skills performed 'not as good as' those without Information Technology skills. These categories include: 'Ability to think creatively', 'Effectively evaluate situations' and 'Performance of given tasks'.

A much smaller percentage of respondents indicated that Information Technology students performed 'much poorer than' students without Information Technology skills.

In the primary cohort, a mere 3% indicated that in the categories 'Development of decision-making ability' and 'Willingness to try something new' students with Information Technology skills performed much poorer than those without such skills.

In the secondary cohort, a mere 2% indicated that in the categories 'Development of leadership qualities' and 'Ability to manage time effectively' students with Information Technology skills performed 'much poorer than' those without such skills.

As in the Barbadian cohort, there was a very low percentage of the U.K. respondents who indicated that students with I.T. skills were 'not as good as' or 'much poorer than' those who did not possess such skills.

In the tertiary cohort, 5% indicated that in the categories 'Ability to manage time effectively', 'Easily adapt to different work situations' and 'Willingness to try something new' students with Information Technology skills performed 'much poorer than' those without such skills.

6.3.14 Question 15:

Of the following I.T. training courses, which THREE, in order of preference (first, second, third) would you be interested in attending?

a) School-based computer training, one morning per week

KEY	% Primary	% Secondary	% Tertiary
1. First choice	15	25 (63)	20
2. Second choice	3	10 (7)	5
3. Third choice	22	18 (7)	10
4. Not chosen	60	47 (23)	65

b) University-based, Faculty of Education, summer vacation courses

KEY	% Primary	% Secondary	% Tertiary
1. First choice	3	8 (7)	5
2. Second choice	7	12 (13)	15
3. Third choice	5	5 (3)	15
4. Not chosen	85	75 (87)	65

c) Private Tuition

KEY	% Primary	% Secondary	% Tertiary
1. First choice	7	5 (0)	15
2. Second choice	3	3 (0)	0
3. Third choice	3	12 (10)	0
4. Not chosen	87	80 (90)	85

d) Day-release in-service training

KEY	% Primary	% Secondary	% Tertiary
1. First choice	8	13 (3)	5
2. Second choice	18	18 (10)	0
3. Third choice	12	12 (3)	0
4. Not chosen	62	57 (74)	95

e) Ministry of Education, Continuing Education classes/Evening classes, in-service training, organised by LEA

KEY	% Primary	% Secondary	% Tertiary
1. First choice	0	0 (7)	0
2. Second choice	13	9 (13)	0
3. Third choice	12	8 (13)	0
4. Not chosen	75	83 (67)	100

f) Ministry of Education, Easter vacation classes / Vacation course organised by the LEA

KEY	% Primary	% Secondary	% Tertiary
1. First choice	0	0 (0)	0
2. Second choice	3	7 (10)	5
3. Third choice	5	5 (20)	5
4. Not chosen	92	88 (70)	90

g) Barbados Community College, Continuing Education course

KEY	% Primary	% Secondary	% Tertiary
1. First choice	0	0	0
2. Second choice	3	2	10
3. Third choice	2	10	5
4. Not chosen	95	88	85

h) 3-month full-time course - overseas

KEY	% Primary	% Secondary	% Tertiary
1. First choice	5	2	15
2. Second choice	0	2	0
3. Third choice	10	10	10
4. Not chosen	85	86	75

i) 3-month full-time course - locally

KEY	% Primary	% Secondary	% Tertiary
1. First choice	5	2 (3)	0
2. Second choice	5	3 (17)	10
3. Third choice	7	7 (13)	0
4. Not chosen	83	88 (67)	90

j) 6-month full-time course - overseas

KEY	% Primary	% Secondary	% Tertiary
1. First choice	0	2	0
2. Second choice	12	10	10
3. Third choice	10	3	5
4. Not chosen	78	85	85

k) 6-month full-time course - locally

KEY	% Primary	% Secondary	% Tertiary
1. First choice	5	2 (0)	10
2. Second choice	5	8 (10)	5
3. Third choice	5	0 (7)	0
4. Not chosen	85	90 (83)	85

l) 1-year full-time course - overseas

KEY	% Primary	% Secondary	% Tertiary
1. First choice	38	20	15
2. Second choice	5	0	5
3. Third choice	0	3	10
4. Not chosen	57	78	70

m) 1-year full-time course - locally

KEY	% Primary	% Secondary	% Tertiary
1. First choice	15	13 (7)	0
2. Second choice	25	5 (3)	5
3. Third choice	5	2 (3)	0
4. Not chosen	55	80 (87)	95

n) Other .... Specify

KEY	% Primary	% Secondary	% Tertiary
1. First choice	0	5 (0)	5
2. Second choice	0	0 (0)	0
3. Third choice	0	2 (0)	0
4. Not chosen	100	93 (100)	95

In this question, the popular first choices in the Barbadian cohort were the overseas courses.

In the primary cohort, more than one third of the respondents made the one-year full-time course their first choice. Another popular first choice was the one-year full-time locally and the school-based computer training, one morning per week courses.

In the secondary cohort, one quarter of the respondents chose the school-based computer-training one morning per week course. The one-year full-time course - overseas was the first choice of one fifth of the respondents while the one-year full-time course-locally was the first choice of 15% of the secondary educators.

In the tertiary cohort, the three-month full-time and one-year full-time overseas courses were the most preferred first choices while the six-month full-time locally course was the first choice of one tenth of the tertiary respondents.

The other courses were not very popular except for the Day-release in-service course in which 13% of the secondary educators indicated it as their first choice. No interest was shown by respondents from any category in the Continuation Education classes offered by the Ministry of Education or the Barbados Community College nor in the Easter Vacation courses offered by the Ministry of Education.

In the U.K. cohort, the only popular choice was the option of being trained in school one morning per week.

6.4 The response to the Educators' Observation Schedule

This schedule which was conducted amo r students who were in the 14-16 year age group, was done in two parts. In Schedule-1, (see Appendix H) which was done at the beginning of the academic year, Educators were required to record their opinion of the students' attributes. After observing the students' development for the remainder of the academic year, Educators were then required to record their findings on Schedule-2 (see Appendix I). It must be noted that this cohort consisted of a different group of students from those who were part of the Students' questionnaire survey.

6.4.1 Gender

OPTION	%Male	%Female
Business and I.T.	23	77
Business without I.T.	42	58
I. T. without Business	25	75
Neither Business nor I.T.	25	75

The data was analyzed in four categories: namely students who were studying: a) subject combinations of Business and I.T. (n=61); b) Business subjects but not I.T. (n=62); c) I.T. but no Business Subjects (n=38); and d) students who were not studying any Business nor I.T.(n=8). Difficulty was experienced in acquiring a large number of respondents among the students who were not studying any Business subject nor I.T.. The choice of option among Barbadian students seems to be to take at least one Business subject. Thus the non-Business cohorts recorded small numbers. It is noted that the cohort constituted of a greater number of females than males. That was not intentional as the teachers involved were solely responsible for selecting the students on whom they wanted to report.

6.5 Attributes

In analyzing the attributes, Table A shows the observations of Schedule-1 which was done at the beginning of the academic year, while Table B shows the observations of Schedule-2 which were recorded at the end of the academic year. The results are shown in percentages.

6.5.1 Ability to work in a group

Table A. Instructions for Schedule-1

On the following chart, rate the student from 1 - Very High, to 5 - Very Low, according to your observation.

Indicate your response by ticking (√) in the appropriate box.

OPTION	1	2	3	4	5
Business and I.T.	15	34	31	9	11
Business without I.T.	8	42	34	16	0
I.T. without Business	0	50	50	0	0
Neither Business nor I.T.	5	58	16	16	5

Table B. KEY - for Schedule-2

1. Marked improvement shown
2. Satisfactory improvement shown
3. No improvement shown
4. Some deterioration noted
5. Uncertain/Unable to comment

OPTION	1	2	3	4	5
Business and I.T.	21	26	36	12	5
Business without I.T.	16	39	39	3	3
I.T. without Business	0	50	25	13	12
Neither Business nor I.T.	18	24	55	3	0

When analyzing this attribute, it is evident that a greater percentage of students who studied Business without I.T. seemed to have improved more than those who did not. In addition, more than half of those who did not study any business subject nor I.T., showed no improvement in their ability to work in a group over the period of observation.

6.5.2 **Ability to work independently**

Table A. Instructions for Schedule-1

On the following chart, rate the student from 1 - Very High, to 5 - Very Low, according to your observation.

Indicate your response by ticking (√) in the appropriate box.

OPTION	1	2	3	4	5
Business and I.T.	25	34	23	10	8
Business without I.T.	18	36	32	13	1
I.T. without Business	13	50	25	12	0
Neither Business nor I.T.	16	45	21	8	10

Table B. KEY - for Schedule-2

1. Marked improvement shown
2. Satisfactory improvement shown
3. No improvement shown
4. Some deterioration noted
5. Uncertain/Unable to comment

OPTION	1	2	3	4	5
Business and I.T.	26	30	26	13	5
Business without I.T.	24	36	34	3	3
I.T. without Business	12	50	38	0	0
Neither Business nor I.T.	18	32	47	0	0

In the development of this attribute, it is noted that more students who studied Business subjects showed a 'marked improvement' than those who did not.

In the ratings almost half of those students who did not study any Business subject or I.T., showed 'no improvement' over the period of observation, while just over one third of the I.T. without Business group also showed 'no improvement'.

6.5.3 **Ability to think creatively**

Table A. Instructions for Schedule-1

On the following chart, rate the student from 1 - Very High, to 5 - Very Low, according to your observation.

Indicate your response by ticking (√) in the appropriate box.

OPTION	1	2	3	4	5
Business and I.T.	17	26	39	10	8
Business without I.T.	10	32	39	18	1
I.T. without Business	0	63	12	25	0
Neither Business nor I.T.	5	29	45	11	10

Table B. KEY - for Schedule-2

1. Marked improvement shown
2. Satisfactory improvement shown
3. No improvement shown
4. Some deterioration noted
5. Uncertain/Unable to comment

OPTION	1	2	3	4	5
Business and I.T.	26	20	38	11	5
Business without I.T.	23	32	39	3	3
I.T. without Business	12	50	38	0	0
Neither Business nor I.T.	18	29	39	3	11

When analyzing the development of the 'ability to think creatively', it is noted that at the outset, more than half of the I.T. without Business group, rated highly on this attribute and this trend continued through the period of observation with some of those students showing 'marked improvement'. However, twice as many students who studied Business subjects showed 'marked improvement ' over those who did not study Business subjects. Just over one third of the students in all categories showed 'no improvement'. over the period of observation.

6.5.4 **Ability to evaluate situations**

Table A. Instructions for Schedule-1

On the following chart, rate the student from 1 - Very High, to 5 - Very Low, according to your observation.

Indicate your response by ticking (✓) in the appropriate box.

OPTION	1	2	3	4	5
Business and I.T.	11	28	38	15	8
Business without I.T.	6	37	36	18	3
I.T. without Business	0	50	25	25	0
Neither Business nor I.T.	3	31	45	13	8

Table B. KEY - for Schedule-2

1. Marked improvement shown
2. Satisfactory improvement shown
3. No improvement shown
4. Some deterioration noted
5. Uncertain/Unable to comment

OPTION	1	2	3	4	5
Business and I.T.	21	26	35	13	5
Business without I.T.	20	42	32	3	3
I.T. without Business	12	63	25	0	0
Neither Business nor I.T.	18	34	34	3	11

For this attribute, 'the ability to evaluate situations', one notes that about half of the students in the I.T. without Business group rated very highly at the outset and they continued to perform well over the period of observation, with only one quarter of them showing 'no improvement', and no one was rated as having deteriorated over the period of observation. In the other groupings, approximately one third of those observed showed 'no improvement'.

6.5.5 **Ability to use initiative**

Table A. Instructions for Schedule-1

On the following chart, rate the student from 1 - Very High, to 5 - Very Low, according to your observation.

Indicate your response by ticking (✓) in the appropriate box.

OPTION	1	2	3	4	5
Business and I.T.	20	26	28	16	10
Business without I.T.	6	40	34	18	2
I.T. without Business	0	50	25	25	0
Neither Business nor I.T.	13	24	40	18	5

Table B. KEY - for Schedule-2

1. Marked improvement shown
2. Satisfactory improvement shown
3. No improvement shown
4. Some deterioration noted
5. Uncertain/Unable to comment

OPTION	1	2	3	4	5
Business and I.T.	18	30	35	13	4
Business without I.T.	27	39	26	5	3
I.T. without Business	12	63	25	0	0
Neither Business nor I.T.	16	42	29	3	10

For this attribute, 'the ability to use initiative', once again the greatest improvement was shown in the I.T. without Business grouping. More than one quarter of the Business without I.T. grouping showed 'no improvement' over the period of observation, while a comparatively high percentage of the Business and I.T. grouping showed some deterioration.

6.5.6 **Ability to make decisions**

Table A. Instructions for Schedule-1

On the following chart, rate the student from 1 - Very High, to 5 - Very Low, according to your observation.

Indicate your response by ticking (√) in the appropriate box.

OPTION	1	2	3	4	5
Business and I.T.	12	33	31	16	8
Business without I.T.	7	37	34	19	3
I.T. without Business	0	38	37	25	0
Neither Business nor I.T.	11	18	53	10	8

Table B. KEY - for Schedule-2

1. Marked improvement shown
2. Satisfactory improvement shown
3. No improvement shown
4. Some deterioration noted
5. Uncertain/Unable to comment

OPTION	1	2	3	4	5
Business and I.T.	25	25	36	10	4
Business without I.T.	26	44	23	4	3
I.T. without Business	12	50	37	0	0
Neither Business nor I.T.	18	40	26	5	11

The results for the attribute, 'the ability to make decisions', show that although at least half of those students observed improved over the period of observation, the greatest percent improvement was evidenced in the Business without I.T. group, with the I.T. without Business group following closely behind.

About one third of the Business and I.T. grouping showed 'no improvement' while the same is true for about one quarter of the other groupings.

A comparatively high percentage (10%) of the Business and I.T. grouping showed some deterioration over the period of observation; while four and five percent respectively of the Business without I.T. and the Neither Business nor I.T. groupings, and no one in the I.T. without Business grouping being rated as having deteriorated.

6.5.7 **Ability to adapt to different situations**

Table A. Instructions for Schedule-1

On the following chart, rate the student from 1 - Very High, to 5 - Very Low, according to your observation.

Indicate your response by ticking (✓) in the appropriate box.

OPTION	1	2	3	4	5
Business and I.T.	8	38	33	11	10
Business without I.T.	8	37	40	13	2
I.T. without Business	0	25	50	25	0
Neither Business nor I.T.	8	34	32	21	5

Table B. KEY - for Schedule-2

1. Marked improvement shown
2. Satisfactory improvement shown
3. No improvement shown
4. Some deterioration noted
5. Uncertain/Unable to comment

OPTION	1	2	3	4	5
Business and I.T.	23	34	23	15	5
Business without I.T.	16	33	45	3	3
I.T. without Business	12	50	38	0	0
Neither Business nor I.T.	18	32	39	0	11

The results for this attribute, 'Ability to adapt to different situations', reveal that even though approximately half of all groupings improved, the I.T. without Business grouping once again have showed the greatest improvement over the period of observation. A striking 45% of the Business without I.T. grouping showed 'no improvement', while almost one quarter of the Business and I.T. grouping and one third of the I.T. without Business and the Neither Business nor I.T. groupings had similar ratings.

6.5.8 **Ability to solve problems**

Table A. Instructions for Schedule-1

On the following chart, rate the student from 1 - Very High, to 5 - Very Low, according to your observation.

Indicate your response by ticking (✓) in the appropriate box.

OPTION	1	2	3	4	5
Business and I.T.	5	39	34	15	7
Business without I.T.	5	32	42	18	3
I.T. without Business	0	25	63	12	0
Neither Business nor I.T.	3	24	42	21	10

Table B. KEY - for Schedule-2

1. Marked improvement shown
2. Satisfactory improvement shown
3. No improvement shown
4. Some deterioration noted
5. Uncertain/Unable to comment

OPTION	1	2	3	4	5
Business and I.T.	21	30	33	11	5
Business without I.T.	24	31	37	3	5
I.T. without Business	13	25	50	12	0
Neither Business nor I.T.	13	34	39	11	3

For this attribute, 'the ability to solve problems', the I.T. without Business grouping showed the least improvement, with about half being rated as not having improved, and for the other groups approximately one third showed no improvement.

Except for the Business without I.T. grouping, more than ten percent showed some deterioration over the period of observation. Almost one quarter of the Business without I.T. grouping showed 'marked improvement' over the period of observation.

6.5.9 **Ability to concentrate on a task for a period of time**

Table A. Instructions for Schedule-1

On the following chart, rate the student from 1 - Very High, to 5 - Very Low, according to your observation.

Indicate your response by ticking (✓) in the appropriate box.

OPTION	1	2	3	4	5
Business and I.T.	10	43	25	13	7
Business without I.T.	13	39	31	12	5
I.T. without Business	0	75	13	12	0
Neither Business nor I.T.	24	29	21	18	8

Table B. KEY - for Schedule-2

1. Marked improvement shown
2. Satisfactory improvement shown
3. No improvement shown
4. Some deterioration noted
5. Uncertain/Unable to comment

OPTION	1	2	3	4	5
Business and I.T.	23	34	23	15	5
Business without I.T.	27	34	29	5	5
I.T. without Business	12	25	25	0	38
Neither Business nor I.T.	18	34	37	5	5

For the attribute, 'the ability to concentrate on a task for a period of time', it is noted that the I.T. without Business grouping rated highly in the initial observation, but over the period of observation only about one third of the group showed any improvement. Relative to the other groups, the Business and I.T. grouping had a high percentage of those students who showed some deterioration over the period of observation. More than one quarter of the Business without I.T. grouping showed 'marked improvement' over the period of observation.

6.5.10 **Development of self-confidence**

Table A. Instructions for Schedule-1

On the following chart, rate the student from 1 - Very High, to 5 - Very Low, according to your observation.

Indicate your response by ticking (✓) in the appropriate box.

OPTION	1	2	3	4	5
Business and I.T.	15	38	26	13	8
Business without I.T.	8	47	26	16	3
I.T. without Business	0	50	50	0	0
Neither Business nor I.T.	11	32	29	23	5

Table B. KEY - for Schedule-2

1. Marked improvement shown
2. Satisfactory improvement shown
3. No improvement shown
4. Some deterioration noted
5. Uncertain/Unable to comment

OPTION	1	2	3	4	5
Business and I.T.	30	31	26	8	5
Business without I.T.	36	28	28	4	4
I.T. without Business	13	38	12	0	37
Neither Business nor I.T.	13	42	37	5	3

For this attribute, 'the development of self-confidence', the groups studying Business subjects showed greater improvement than those not studying Business subjects; the Business without I.T. grouping showing the greatest improvement. In the I.T. without Business grouping, the observing teachers were 'unable to comment' on more than one third of the students. It is also noted that in the group which does not study Business subjects nor I.T., more than one third of the students showed 'no improvement' over the period of observation.

6.5.11 **Development of leadership qualities**

Table A. Instructions for Schedule-1

On the following chart, rate the student from 1 - Very High, to 5 - Very Low, according to your observation.

Indicate your response by ticking (✓) in the appropriate box.

OPTION	1	2	3	4	5
Business and I.T.	15	30	33	14	8
Business without I.T.	13	35	29	19	3
I.T. without Business	0	63	12	25	0
Neither Business nor I.T.	13	34	24	21	8

Table B. KEY - for Schedule-2

1. Marked improvement shown
2. Satisfactory improvement shown
3. No improvement shown
4. Some deterioration noted
5. Uncertain/Unable to comment

OPTION	1	2	3	4	5
Business and I.T.	17	31	31	15	6
Business without I.T.	18	39	31	8	4
I.T. without Business	13	12	38	0	37
Neither Business nor I.T.	5	47	45	0	3

For the attribute, 'the development of leadership qualities', although the I.T. without Business grouping rated highly at the outset, yet over the period of observation it showed the least overall percent of improvement with more than one third showing 'no improvement' and a similar percentage on which the observing teachers were 'unable to comment'.

Almost one half of the Neither Business nor I.T. grouping also showed 'no improvement', while the same is true for approximately one third of the remaining groups: Business and I.T. and Business without I.T.. The Business without I.T. grouping showed a slight lead in the overall improvement rating, followed closely by the Business and I.T. grouping.

6.5.12 **Development of positive work attitudes**

Table A. Instructions for Schedule-1

On the following chart, rate the student from 1 - Very High, to 5 - Very Low, according to your observation.

Indicate your response by ticking (✓) in the appropriate box.

OPTION	1	2	3	4	5
Business and I.T.	21	31	23	15	10
Business without I.T.	16	42	24	15	3
I.T. without Business	0	63	25	12	0
Neither Business nor I.T.	21	26	32	13	8

Table B. KEY - for Schedule-2

1. Marked improvement shown
2. Satisfactory improvement shown
3. No improvement shown
4. Some deterioration noted
5. Uncertain/Unable to comment

OPTION	1	2	3	4	5
Business and I.T.	35	23	18	21	3
Business without I.T.	32	37	18	10	3
I.T. without Business	12	25	38	0	25
Neither Business nor I.T.	29	29	26	11	5

The ratings for this attribute, 'the development of positive work attitudes', once again show that the I.T. without Business grouping rated highly at the outset, but showed the least overall improvement over the period of observation with the observing teachers being unable to comment on half of the students and more than one third showing 'no improvement', although in this group no one was rated as having deteriorated over the period of observation. Approximately one third of the students in the Business and I.T. and the Business without I.T. groupings showed 'marked improvement' in this characteristic while just over one tenth showed similar improvement in the I.T. without Business grouping.

6.5.13 **Development of qualities of responsibility**

Table A. Instructions for Schedule-1

On the following chart, rate the student from 1 - Very High, to 5 - Very Low, according to your observation.

Indicate your response by ticking (✓) in the appropriate box.

OPTION	1	2	3	4	5
Business and I.T.	17	38	21	16	8
Business without I.T.	11	41	27	18	3
I.T. without Business	0	63	12	25	0
Neither Business nor I.T.	11	34	26	21	8

Table B. KEY - for Schedule-2

1. Marked improvement shown
2. Satisfactory improvement shown
3. No improvement shown
4. Some deterioration noted
5. Uncertain/Unable to comment

OPTION	1	2	3	4	5
Business and I.T.	26	26	21	20	7
Business without I.T.	26	37	26	8	3
I.T. without Business	13	38	12	0	37
Neither Business nor I.T.	11	45	37	0	7

For the attribute, 'development of qualities of responsibility', the trend continues for the I.T. without Business grouping for which there was a high rating at the outset, but low levels of improvement over the period of observation. Again, even though no one was rated as having deteriorated, the observing teachers were unable to comment on more than one third of the sample. It is noted that more than one half of the Neither Business nor I.T. grouping showed 'some improvement' over the period of observation and a relatively high proportion (one fifth) of the Business and I.T. grouping showed some deterioration.

6.5.14 **Development of competitive attitude**

Table A. Instructions for Schedule-1

On the following chart, rate the student from 1 - Very High, to 5 - Very Low, according to your observation.

Indicate your response by ticking (✓) in the appropriate box.

OPTION	1	2	3	4	5
Business and I.T.	20	26	28	15	11
Business without I.T.	10	32	40	15	3
I.T. without Business	13	50	25	12	0
Neither Business nor I.T.	8	29	26	26	11

Table B. KEY - for Schedule-2

1. Marked improvement shown
2. Satisfactory improvement shown
3. No improvement shown
4. Some deterioration noted
5. Uncertain/Unable to comment

OPTION	1	2	3	4	5
Business and I.T.	25	23	20	26	6
Business without I.T.	18	44	31	4	3
I.T. without Business	12	0	50	0	38
Neither Business nor I.T.	11	34	39	11	5

For this attribute, 'the development of competitive attitude', the Business without I.T. grouping showed the greatest overall improvement over the period of observation. Half of the I.T. without Business grouping showed 'no improvement' while only 12% showed any improvement. The observing teachers were unable to comment on more than one third of the sample.

6.5.15. **Desire to try new things**

Table A. Instructions for Schedule-1

On the following chart, rate the student from 1 - Very High, to 5 - Very Low, according to your observation.

Indicate your response by ticking (✓) in the appropriate box.

OPTION	1	2	3	4	5
Business and I.T.	15	39	28	11	7
Business without I.T.	13	39	27	18	3
I.T. without Business	25	38	25	12	0
Neither Business nor I.T.	24	24	24	23	5

Table B KEY - for Schedule-2

1. Marked improvement shown
2. Satisfactory improvement shown
3. No improvement shown
4. Some deterioration noted
5. Uncertain/Unable to comment

OPTION	1	2	3	4	5
Business and I.T.	31	25	21	18	5
Business without I.T.	27	36	29	5	3
I.T. without Business	12	38	25	0	25
Neither Business nor I.T.	18	32	39	0	11

For this attribute, 'the desire to try new things', the Business without I.T. grouping showed the greatest percent increase of overall improvement, while the Business and I.T. grouping showed the highest percent of students who showed a 'marked improvement'.

Except for the Neither Business nor I.T. grouping of which more than one third showed 'no improvement', approximately one quarter of the other groups also showed 'no improvement' in this characteristic.
The observing teachers were also 'unable to comment' on one quarter of the I.T. without Business grouping.

6.5.16 **Level of motivation**

Table A Instructions for Schedule-1

On the following chart, rate the student from 1 - Very High, to 5 - Very Low, according to your observation.

Indicate your response by ticking (✓) in the appropriate box.

OPTION	1	2	3	4	5
Business and I.T.	18	26	35	13	8
Business without I.T.	18	40	24	16	2
I.T. without Business	0	75	13	12	0
Neither Business nor I.T.	8	32	37	16	7

Table B. KEY - for Schedule-2

1. Marked improvement shown
2. Satisfactory improvement shown
3. No improvement shown
4. Some deterioration noted
5. Uncertain/Unable to comment

OPTION	1	2	3	4	5
Business and I.T.	26	22	21	26	5
Business without I.T.	29	34	24	10	3
I.T. without Business	13	38	37	0	12
Neither Business nor I.T.	13	39	37	8	3

For this attribute, 'level of motivation', the I.T. without Business group continues to be outdone by the other groupings in the final observation after being rated highly at the outset. The groups studying Business have been rated as having a greater percentage of 'improvement' than those not studying Business subjects. More than one third of the non-Business students were rated as not having improved over the period shown. Just over one quarter of the Business and I.T. grouping was rated as having deteriorated over the period of observation. The observing teachers could not comment on more than one tenth of the I.T. without Business grouping.

6.5.17 **Increase in student's productivity**

Table A. Instructions for Schedule-1

On the following chart, rate the student from 1 - Very High, to 5 - Very Low, according to your observation.

Indicate your response by ticking (✓ in the appropriate box.

OPTION	1	2	3	4	5
Business and I.T.	11	38	34	10	7
Business without I.T.	13	27	42	16	2
I.T. without Business	0	50	50	0	0
Neither Business nor I.T.	0	37	39	13	11

Table B KEY - for Schedule-2

1. Marked improvement shown
2. Satisfactory improvement shown
3. No improvement shown
4. Some deterioration noted
5. Uncertain/Unable to comment

OPTION	1	2	3	4	5
Business and I.T.	30	30	11	26	3
Business without I.T.	24	42	23	8	3
I.T. without Business	13	25	25	0	37
Neither Business nor I.T.	21	32	34	11	2

For this attribute, 'increase in student's productivity', the Business and I.T. group showed the greatest percent of 'marked improvement' while the Business without I.T. grouping showed the highest overall improvement over the period of observation. In the non-Business groups there was a high percent of non-improvement with one third of the Neither Business nor I.T. group and one quarter of the I.T. without Business group so rated. The observing teachers of the I.T. without Business group were 'unable to comment' on more than one third of that group.

6.5.18 **Overall personal development**

Table A Instructions for Schedule-1

On the following chart, rate the student from 1 - Very High, to 5 - Very Low, according to your observation.

Indicate your response by ticking (✓) in the appropriate box.

OPTION	1	2	3	4	5
Business and I.T.	23	38	21	10	8
Business without I.T.	10	42	32	16	0
I.T. without Business	13	50	37	0	0
Neither Business nor I.T.	3	39	39	8	11

Table B. KEY - for Schedule-2

1. Marked improvement shown
2. Satisfactory improvement shown
3. No improvement shown
4. Some deterioration noted
5. Uncertain/Unable to comment

OPTION	1	2	3	4	5
Business and I.T.	33	29	20	13	5
Business without I.T.	29	34	27	5	5
I.T. without Business	13	38	12	0	37
Neither Business nor I.T.	37	16	39	0	8

For this attribute, 'overall personal development', in the Business groups there was a higher percentage of overall improvement than in the non-Business groups. However, about one third of the Neither Business nor I.T. and the Business and I.T. groups was rated as having shown 'marked improvement'. More than one third of the Neither Business nor I.T. group also showed 'no improvement' while no one was rated as having deteriorated in the non-Business groups.

6.6 The Students' Response

In the student sample, the respondents were categorised and their responses analyzed in four (4) main groups consisting of students studying:

a) Business subjects and Information Technology, (n=83);
b) Business subjects without Information Technology, (n=81);
c) Information Technology without Business subjects, (n=44); and
d) Neither Business subjects nor Information Technology, (n=78).

For this survey, one teacher in each school took the responsibility of soliciting the students and distributing and collecting the questionnaires.

When the first batch of questionnaires were collected it was found that the number of responses in the non-Business cohorts was quite small and so another batch of questionnaires had to be distributed to other schools. It is noted that a similar situation occurred in the fielding of the Teachers' Observation Schedule, but since that observation was done within a particular time-span, it was not possible to conduct an additional run.

Presented here are the percentage of student responses categorised by option.

6.6.1 Question 1:

Gender

OPTION	%Male	%Female
Business and I.T.	43	57
Business without I.T.	26	74
I.T. without Business	41	59
Neither Business nor I.T.	31	69

In all categories the majority of student responses were from females.

6.6.2 Question 2:

Educational Institution

OPTION	Sec. Sch.	B'dos C.C.	S.J.P.P.
Business & I.T.	70	19	11
Business without I.T.	98	2	0
I.T. without Business	93	7	0
Neither Bus. nor I.T.	96	4	0

The questionnaire targeted mainly school-leavers who were studying at the secondary school level. However, a small cohort was also done at the sixth form college and the Polytechnic.

6.6.3 Question 3:

Which of these subject combinations are you studying?

OPTION	%
Business and I.T.	29
Business without I.T.	28
I.T. without Business	16
Neither I.T. nor Business	27

The Business subjects in the Barbadian curriculum consists of four subjects. They are **Principles of Accounts, Principles of Business, Office Procedures and Typewriting** and in some schools, **Information Technology** is also considered to be a Business subject. In order to be categorised as a business student, respondents had to be studying at least **one** of the subjects.

Of the four categories of students, it was noted that fewer students in the system studied Information Technology and no Business subject and so the percentage of responses from that group was lower than that of the other groups. A similar problem existed with the Neither Business nor I.T. group, but the subsequent fieldings of the questionnaire resulted in an increased number of responses.

6.6.4 Question 4:

How old are You?

OPTION	% 14 - 16	% 17 - 20	% 21+ yrs.
Business and I.T.	39	55	6
Business without I.T.	40	60	0
I.T. without Business	84	16	0
Neither Bus. nor I.T.	68	32	0

Business subjects and Information Technology are done mainly in the senior years of secondary school. It is noted that the majority of respondents in this cohort were between fourteen and sixteen years old.

There is a greater percentage of seventeen to twenty year olds studying business subjects with or without Information Technology than there are fourteen to sixteen year olds.

The reverse is true for those not studying Business subjects.

Those respondents over age twenty-one were students of tertiary institutions.

6.6.5 Question 5:

For how many years approximately, were you exposed to Information Technology?

OPTION	<- 1 yr	1-2 yrs	3-5 yrs	5+ yrs
Business and I.T.	1	80	19	0
Business without I.T.	100	0	0	0
I.T. without Business	7	77	14	2
Neither Bus. nor I.T.	100	0	0	0

Of those students studying Information Technology, the majority was exposed to the subject for one or two years.

6.6.6 Question 6:

What aspect(s) of Information technology are you presently exposed to?

Only those students who are exposed to Information Technology would be able to comment on this question.

a) Computerised Accounting

OPTION	%
Business and I.T.	11
I.T. without Business	2

A very small percentage of the respondents was exposed to.Computerised Accounting.

b) Databases

OPTION	%
Business and I.T.	64
I.T. without Business	73

Databases was a popular option among this group.

c) Desk-top Publishing

OPTION	%
Business and I.T.	25
I.T. without Business	0

About one quarter of the respondents in the Business and I.T. option was exposed to Desk-top publishing - surprisingly no one in the Information Technology without Business option indicated that they were exposed to this aspect of Information Technology.
One reason for this could be the fact the CXC syllabus does not contain a Desk-top Publishing element and so since the students' exposure to I.T. would mainly centre around the CXC syllabus, that could account for the result in this case.

d) Educational Games

OPTION	%
Business and I.T.	34
I.T. without Business	39

Just over one third of the cohort indicated that they were exposed to educational games.

e) Spreadsheets

OPTION	%
Business and I.T.	69
I.T. without Business	68

More than two-thirds of the cohort was exposed to spreadsheets.

f) Word processing

OPTION	%
Business and I.T.	96
I.T. without Business	86

Of all the Information Technology applications, the largest percentage of the cohort was exposed to Word processing.

g) Other

OPTION	%
Business and I.T.	23
I.T. without Business	18

The Business and I.T. students indicated that they had also been exposed to computer programming in BASIC and computer graphics programs. The I.T. without business group indicated that they were also exposed to computer programming in BASIC as well as CAD programs.

It should be noted that the students who responded positively to this question, were exposed to I.T. for more than two years and were all from post secondary institutions.

The last section of this question: 'h) None' - was included as a check.

6.6.7 Question 7:

How do you think the inclusion of Information Technology in the school curriculum influences/would influence your development?

KEY
1. Strongly Agree
2. Agree
3. Disagree
4. Strongly Disagree
5. Uncertain

a) Enrich your learning environment

OPTION	1	2	3	4	5
Business and I.T.	63	30	2	0	5
Business without I.T.	41	43	1	0	15
I.T. without Business	66	32	0	0	2
Neither Business nor I.T.	53	40	2	0	5

It is noted that most students in three out of four categories, strongly agreed that Information Technology could enrich their learning environment. A very small percentage in three of the four categories 'disagreed' while no one 'strongly disagreed'. Of those who indicated they were 'uncertain', the Business without I.T. category has the largest percentage.

b) Promote team work

OPTION	1	2	3	4	5
Business and I.T.	11	58	11	2	18
Business without I.T.	14	51	11	1	23
I.T. without Business	20	41	7	2	30
Neither Business nor I.T.	14	54	8	0	24

About two-thirds of the student respondents agreed that the inclusion of Information Technology in the school curriculum would benefit their development of team work skills. A very small percentage strongly disagreed. Almost one quarter of the respondents were 'uncertain' of the effects Information Technology would have on this aspect of their development, with as many as 30% of these being in the Information Technology without Business group.

c) Promote independent study

OPTION	1	2	3	4	5
Business and I.T.	27	46	8	2	17
Business without I.T.	27	38	0	2	27
I.T. without Business	41	48	7	0	4
Neither Business nor I.T.	18	49	5	4	24

A high percentage of respondents agreed that Information Technology in the school curriculum would help them to develop independent study skills.
As for previous criteria, there was a relatively small percentage of respondents who disagreed, and, except for the I.T. without Business option group, about one quarter of the respondents were 'uncertain' of its effects.

d) Enable you to acquire self-confidence

OPTION	1	2	3	4	5
Business and I.T.	24	48	6	2	20
Business without I.T.	21	42	10	2	25
I.T. without Business	30	50	2	0	18
Neither Business nor I.T.	14	40	13	4	29

More than half of the respondents indicated that the acquisition of Information Technology skills would enable them to acquire self-confidence.

The pattern here reflects that which obtained in previous characteristic, in that there is a relatively small percentage of respondents who 'disagreed' and about one quarter of the respondents who were 'uncertain'.

e) Encourage you to think creatively

OPTION	1	2	3	4	5
Business and I.T.	40	40	7	2	11
Business without I.T.	41	43	3	1	12
I.T. without Business	48	43	0	2	7
Neither Business nor I.T.	22	59	4	2	3

For this characteristic, more than 80% of the respondents in all categories are in agreement that the acquisition of Information Technology skills lends to their development of creative thought.

f) Help you to evaluate situations

OPTION	1	2	3	4	5
Business and I.T.	28	41	7	0	24
Business without I.T.	20	46	4	1	29
I.T. without Business	23	64	0	0	13
Neither Business nor I.T.	23	49	6	0	22

For this characteristic too, most respondents are in agreement that the acquisition of Information Technology skills would influence the development of such skills that would enable them to evaluate situations.

g) Give you an added advantage when seeking employment

OPTION	1	2	3	4	5
Business and I.T.	80	13	0	1	6
Business without I.T.	62	31	0	1	6
I.T. without Business	75	23	0	0	2
Neither Business nor I.T.	65	25	1	0	9

It is noted that the majority of the respondents, including those who do not now study Information Technology, agree - most of them strongly - that the acquisition of Information Technology skills would be an added advantage when seeking employment.

h) Enhance your job performance

OPTION	1	2	3	4	5
Business and I.T.	51	40	1	1	7
Business without I.T.	40	33	5	1	21
I.T. without Business	46	52	2	0	0
Neither Business nor I.T.	44	41	5	0	10

Here it is noted that even though a very high percentage of respondents either agreed or strongly agreed that the acquisition of Information Technology skills would enhance their job performance, the percentage was even higher among the groups who are presently studying Information Technology.

In general, one can conclude that the majority of student respondents who are presently studying Information Technology are in agreement that the acquisition of Information Technology skills positively influences their development.

Those students who are not presently studying Information Technology believe that if they had the opportunity to acquire Information Technology skills, it would positively influence their development as well.

6.6.8 Question 8:

Do you think that Information Technology will strongly influence society in the future?

OPTION	1	2	3	4	5
Business and I.T.	82	16	1	1	0
Business without I.T.	59	27	3	0	11
I.T. without Business	87	11	0	0	2
Neither Business nor I.T.	64	27	4	1	4

From the responses, it is clear that the students of all groups agree overwhelmingly that Information Technology will strongly influence society in the future.

6.6.9 Question 9:

Do you think that the school should directly prepare students for the world of work?

OPTION	1	2	3	4	5
Business and I.T.	69	23	1	1	6
Business without I.T.	69	21	0	1	9
I.T. without Business	73	25	0	0	2
Neither Business nor I.T.	65	29	3	0	3

The response to this question is also overwhelmingly 'yes' with at least 90% of the respondents agreeing that the school should directly prepare students for the world of work.

6.6.10 Question 10:

Do you think that all students should acquire skills in Information Technology before leaving school?

OPTION	1	2	3	4	5
Business and I.T.	59	28	2	1	10
Business without I.T.	58	29	6	2	5
I.T. without Business	64	30	2	0	4
Neither Business nor I.T.	54	37	0	0	9

More than 80% of the total respondents in all categories are in agreement that all students should acquire Information Technology skills before leaving school. The small percentage of students who are studying I.T. and who selected 'uncertain' as their response to this question, may have been those students who were new to the subject and so were unsure of the benefits I.T. offered.

6.6.11 Question 11:

How do you regard the role of Information Technology in the Business world?

KEY
1. Positive
2. Negative
3. No Response

OPTION	1	2	3
Business and I.T.	87	0	13
Business without I.T.	83	2	15
I.T. without Business	91	0	7
Neither Business nor I.T.	82	18	0

In the questionnaire, for this open-ended question, the students were required to write their responses. In order to summarise the responses to this question, a subjective judgement as to whether the response was positive or negative was made.

The respondents gave a very positive response to this question. All categories indicated that Information Technology has a positive role to play in the Business world. This positive response is indicative of the students' opinions:

'Information Technology is an essential part of the business world as more and more companies are utilizing computers for their daily business.'

This example of a negative response shows how the lack of knowledge can influence opinion:

'I don't know anything about I.T., so I don't know if it will be helpful.'

6.6.12 Question 12:

How do you think Information Technology will influence your life in the future?

KEY

1. Positive
2. Negative
3. No Response

OPTION	1	2	3
Business and I.T.	89	0	11
Business without I.T.	81	4	15
I.T. without Business	93	0	7
Neither Business nor I.T.	73	3	24

Most respondents in all categories indicated that Information Technology would have a positive influence on their lives in the future. One student indicates that, 'I.T. will enable (him) to get a job a lot easier especially in a firm.'

Another student states, ' I think that I.T. will be in use everywhere and whether I like it or not I'm going to have to use some form of it.'

There are still a number of respondents who are unsure of how Information Technology will affect them in the future; like this one who in answer to the question stated, 'I am uncertain about this at this time.'
About one quarter of the Neither Business nor I.T. group did not respond to this question.

6.6.13 Question 13:

For this question, the students were required to list the subjects that they are currently studying. This was done to check that the students were placed in the correct category and to serve as a lead-in for question 14.

6.6.14 Question 14:

If Information Technology is used in any subjects you are studying, write a brief description of how the teacher uses it in the lesson.

KEY
1. I.T. is used in the lessons
2. I.T. is not used in the lessons
3. No response

OPTION	1	2	3
Business and I.T.	99	1	0
Business without I.T.	1	99	0
I.T. without Business	89	9	2
Neither Business nor I.T.	19	81	0

This was a free-response question and students' responses were coded according to whether or not they indicated that Information Technology was used in the lessons.

The small percentage of students in the I.T. without Business group who indicated that I.T. was not used in the lessons may have been at the time studying the CXC I.T. General Proficiency syllabus which concentrates heavily on the theoretical aspect of Information Technology, or they may mean that I.T. is not used in any lessons other than I.T. ones.

From the responses to this question, it is clear that mainly those teachers who are preparing students for the CXC Information Technology examinations use Information Technology in their teaching.

Very few other teachers make use of computer-based instruction in their teaching.

At one secondary institution, some students indicated that Information Technology was also used in the teaching of English and Typewriting and Social Studies, but that was more the exception than the rule.

One student wrote, 'For English, sentences are given with grammatical errors and spelling errors for us to correct. In Typewriting, we type words to gain speed, and in Social Studies we use PCGLOBE.'

Responses from the tertiary cohort also indicated that teachers made very little use of Information Technology in the execution of their lessons. A few students however stated that Information Technology was used in the teaching of Physics.

A student wrote, 'I.T. is incorporated into the Physics syllabus via the use of educational programs on a computer for demonstration purposes.'

6.7 The Analysis of the Follow-up Schedule

This schedule (see Appendices O,P) was designed to facilitate contact with the school-leavers as they moved into employment and other post-school activities.

Of the 286 students who responded to the student questionnaire, 72% (n=208) were able to be contacted. These school-leavers were contacted during 1994.

Disconnected phones and/or change of addresses made it impossible for the other students to be contacted.

6.7.1 +Bus+I.T.

Of the students (n=83) who chose the Bus+I.T. option, 86% of them (n=72) were contacted. At the end of 1994, many of these students (72%) were engaged in various employment activities. Most of these (61%) were in I.T. related jobs. Some 14% were pursuing further studies at University, 11% of these were I.T. related courses. Some 12% of these students had emigrated to North America. 2% of these were studying I.T. related courses at college. Only 2% of this cohort was unemployed.

6.7.2 +Bus-I.T.

Of the students who chose this option (n=81), 74% of them were contacted. Of these 31% were employed, 51% were furthering their studies, 16% were unemployed and 2% had emigrated. Of those who were studying, 53% were taking courses in I.T.. Many of these respondents said that they needed to become I.T. literate in order to make themselves marketable in the job arena. Of those who were working at the end of 1994, 62% were in I.T. related jobs. 40% of these stated that they had to first acquire I.T. skills before being employed while the others obtained that training on the job either through 'in-house' training or by taking I.T. courses on a part-time basis in the evenings after work.

6.7.3 -Bus+I.T.

It was possible to follow-up 59% of the students in this cohort (n=44) who responded to the survey. Of these 23% were employed, 69% were furthering their studies and 8% were unemployed. 60% of those who were studying were in non-I.T. related fields, and one person was a Barbados scholar who was now studying to be a medical doctor.

6.7.4 -Bus-I.T.

Of the respondents in this cohort (n=78), it was possible to contact 76% of them. The results showed that 41% of them were employed, 7% were unemployed, 50% were furthering their studies and 2% had emigrated.

Of those who were employed, 2% stated that they had to acquire I.T. skills before they could get a job. Of those who were studying,. 66% of them were enroled in Business and/or Information Technology courses.

Many stated that it was imperative that they acquire both a knowledge of the business environment and I.T. skills in order to make themselves marketable in today's world.

6.8 Conclusion

In general, students who were using I.T. in their workplace found that the applications they were taught in school were the ones used in business and so had no problem adjusting to the operations in their work environment. Many stated that they thought that studying I.T. had enhanced their personal development. They cited areas such as doing things methodologically and their sharpened problem-solving skills as being most helpful in the workplace. These findings support the detailed hypotheses as stated in Section 7.1. One school-leaver who studied I.T. at school but is not using it directly in her employment as she is a member of the cabin crew of one of the regional air carriers, stated that she still approaches the problems at work with what she calls 'a computer attitude'.

Many of the students who did not study I.T. at school found that they had to become I.T. literate in order to acquire a job. This finding supports the data in the Employers' questionnaire and interview schedule, where employers stated emphatically that they only hired persons who already possessed I.T. skills.

Many of the school-leavers who did not acquire I.T. skills in school stated that they were at a disadvantage when looking for work and so many of them had to first acquire I.T. skills before they were able to get a job.

Table 2: Showing a comparison of the percentage of students in employment etc. two years after leaving school.

OPTION	EMPLOYED	UNEMPLOYED	FURTHER EDUCATION	OTHER
BUS+IT	72	2	14	12
BUS-IT	31	16	51	2
-BUS+IT	23	8	69	0
-BUS-IT	41	7	50	2

It is noted that the greatest percentage of those employed are those with I.T. skills. This is followed by those who had Business training, but no training in I.T.. The smallest percentage of those employed consists of those persons who did not have training in either Business or I.T..

The data from the various research instruments has revealed some startling comparisons and raised some interesting issues. This has provided a fertile bed for the discussion which follows in the next chapter.

CHAPTER 7

DISCUSSION of the RESEARCH FINDINGS

7.1 Introduction

The initial results of the research support the hypothesis which state that young people who are competent in Information Technology are better prepared for work in business organisations, obtain white collar jobs ahead of those who do not possess such competencies and enjoy increased career opportunities and flexibility.

The detailed hypotheses state that:

1. The business environment in Barbados is leaning towards the increasing use of I.T., especially in the main industries of tourism and light manufacturing. Since school leavers will undoubtedly come in contact with the world of business, it is necessary to prepare them so that they will be able to function competently in an ever-changing technological business environment.

2. The inclusion of I.T. in the curriculum will benefit students because it will:
   a) enrich and extend their learning environment by promoting collaborative working habits and independent study, thus developing in them that spirit of co-operation and responsibility needed for successful work in a business environment;

   b) enhance their problem-solving and decision making abilities. The acquisition of these skills are of paramount importance to the continued development and prosperity of the business organisations;

c) promote their self-esteem by enabling them to acquire self-confidence and encouraging that flexibility and openness of mind which will allow them to adjust to and take advantage of the ever-changing technology in the business world;

d) increase their understanding and enhance the knowledge needed for handling their personal affairs;

e) enable them to take advantage of the services of the business world;

f) give them an added advantage when seeking employment because they will be equipped with I.T. skills which will be useful in a modern economy;

g) enhance their performance in their jobs, thus increasing their productivity. This will in turn give their employers that competitive edge which can be translated into increased profits and company prosperity.

In the sections which follow, the relationship between the hypotheses and the research findings will be discussed.

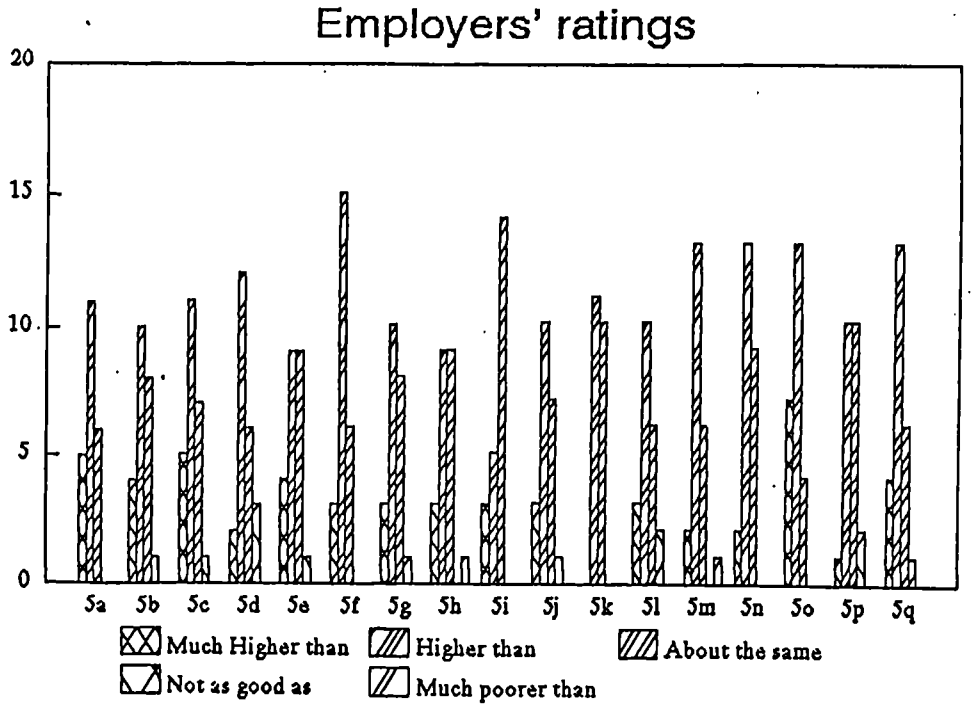
7.2 I.T. and the Employer

As is evident from the Employers' survey (see Section 6.2), the Barbadian business sector consists mainly of service industries which are closely related to tourism. The food industries play an important part as well. The light manufacturing sector is also instrumental in providing much needed foreign exchange for the country. There are only two major locally owned construction firms which acquire most of the government contracts and those of larger businesses, and a number of small, self-employed builders who mainly cater to the needs of the middle and lower income classes of the society.

It is noted that almost two-thirds of the businesses in the cohort employ fewer than fifty (50) persons and just about one-tenth employ more than one hundred (100) persons on a full-time basis. Notwithstanding the size of the businesses, just over eighty percent of them employ some aspect of I.T. in their day-to day operations. This is done in spite of the difficulties which many of them encountered in introducing I.T. into their respective organisations (see Section 6.2.6).

The employers interviewed stated that since the introduction of I.T. in their respective businesses, they have found it very difficult to work without it. They confirmed that the use of I.T. has speeded up many bureaucratic operations and has also facilitated the streamlining of many of these operations.

Figure 2.



Key

5a) Performance in teamwork
5b) Ability to work in a group
5c) Possession of self confidence
5d) Ability to think creatively
5e) Effective evaluation of situations
5f) Overall job performance
5g) Perform given tasks efficiently
5h) Use of initiative
5i) Possession of leadership qualities
5j) Use of effective problem solving skills
5k) Make appropriate decisions when necessary
5l) Possession of positive work attitudes
5m) Easily adapt to different situations
5n) Level of dependability
5o) Willingness to try something new
5p) Level of responsibility
5q) Level of motivation

Barbadian employers, like the other social partners, also support the hypothesis that young people who are competent in Information Technology are better prepared for work in business organisations, obtain white collar jobs ahead of those who do not possess such competencies and enjoy increased career opportunities and flexibility. They contend that workers with I.T. skills perform generally higher than those workers without such skills (see Figure 2).
In general there is no evidence of a significant difference in the responses except for the attributes (5d), 'ability to think creatively' (p=.06) and, (5k) 'make appropriate decisions when necessary' (p=.06) which has particular significance for the food industry (see Figure 2).

The employers state that they are very dependent on I.T. and so future employees must be computer literate when seeking employment in their organisation. Many Managers have stated that since the introduction of I.T. not only has their productivity increased but also their profit margins and their competitiveness. One Manager stated that the benefits gained from the introduction of I.T. were difficult to quantify because I.T. has saved time, and since for his company 'time is money', gains were evident in every area of operation. Another Manager stated that the benefits from I.T. were so great that the company was now moving towards being a 'paperless office'. The Board of Directors of that company is of the view that this innovation would substantially enhance their productivity and their competitiveness.

These views support the detailed hypotheses number 1 and number 2g which state that Barbadian business organisations are making greater use of I.T. and so workers with I.T. skills will be a great asset to their employers because those skills will enable the company to become competitive and experience prosperity.

7.2.1 Training

Barbadian employers like Barbadian educators, would benefit from I.T. training. Training is needed if business managers are to realise their goals of introducing new I.T. applications into their organisations. To this end, the Barbados Institute of Management and Productivity (BIMAP) has been established to administer, among other things, training in Management Information systems and various I.T. productivity tools in order to enable business persons to become knowledgeable in I.T. and related disciplines. The need for I.T. training in the school system is corroborated by the fact that most of the employers preferred their prospective employees to have some I.T. skill - word processing being the most popular choice. Employers interviewed emphasised that **all** students should be trained in I.T. skills regardless of their subject option.

The data from the employers cohort indicated that many employers were considering introducing computerised accounts, computerised payroll systems, computerised pricing and ticketing systems and databases in their businesses in the near future (see Section 6.2.7). It therefore stands to reason that if school-leavers are to be well prepared for the job market, training in these areas should be included in the curriculum.

Barbadian employers are of the belief that such training is mandatory if the country is to be competitive in world economies. Frank Odle, a manager of a leading retail outlet which donated a range of computer equipment to a secondary on the island, contends that:

> 'The work-force must be equipped and prepared if Barbados is to survive as a viable economy, where its citizens enjoy a high quality of life.' (SUNDAY ADVOCATE newspaper, 6 November 1994).

Employers interviewed (see Appendix C) are convinced that students should be exposed to business activities before they leave school and that during their school career, students should take at least one business-oriented subject. They argued that if students acquired temporary weekend and holiday jobs they would understand how the business environment operated and so be better prepared to enter full-time employment when they graduated from school.

Some Barbadian business organisations also see it as their duty to offer work-experience opportunities to students in order to give them that needed exposure to the business environment. The Managers interviewed argued that this experience was paramount, for even though the number of certificates a student may obtain after writing his/her school-leaving examinations would be an indication of the student's aptitude to learn facts and pass examinations, the best indication of the student's ability to perform adequately in the workplace would be the report on his/her work-experience performance.

It is therefore the duty of the school system to ensure that its teachers are so trained that they can adequately deliver I.T. and related business knowledge to the students. One employer stated that it is understandable that teachers may not be interested in learning about the business world if they are not teaching a business-related subject. Nevertheless he thought that teachers should become knowledgeable about the operations of the business world if they are to adequately prepare the students for the technological world of work. Data collected from the Educators' Interview Schedule (see Appendix F, question 12) discloses that the majority of both Barbadian and U,K, secondary teachers interviewed were not fully aware of how businesses operate. Some U.K. teachers expressed the view that they would like business houses to provide teachers with the opportunity to familiarize themselves with business operations so that they would become more informed.

7.3 I.T. and the Teacher

7.3.1 Knowledge and beliefs

The data discloses that most secondary school teachers from both countries had at least a basic knowledge of computers. A smaller percentage of U.K. teachers than Barbadian teachers indicated that they had no knowledge at all (see Section 6.3.4).

The educators interviewed agreed that Information Technology can make a useful contribution to life in general especially in the area of business education and personal development (see Appendix F, question 9).

Although the views of these educators support the hypotheses which detail the benefits of I.T. to the enhancement of student learning, yet these educators do not however think that Information Technology can or will replace the teacher in the classroom (see Appendix F, question 13).

Barbadian educators generally agreed that I.T. and related activities would complement and improve their teaching, and that it would facilitate the removal of the teacher-centred approach to teaching which is now so prevalent in Barbados. Emphasis would therefore shift to the more useful and productive student-centred approach to teaching.

A United Kingdom government statistical survey revealed that more than one-third of the secondary school headteachers and one-half of the primary school headteachers reported that I.T. made a substantial contribution to teaching and learning (DfE 1995).

One Barbadian educator interviewed thought that to some extent, the traditional educational priorities were being destabilised by the introduction of Information Technology (see Appendix F, question 10). However, he viewed that as a sign of progress. Another Barbadian educator reflected that some teachers felt threatened when I.T. was first introduced because they were afraid of change, but thought that they have now grown to accept that change and enjoy the benefits which have come with it.

The views of the educators surveyed support the hypothesis that young people who are competent in Information Technology are better prepared for work in business organisations, obtain white collar jobs ahead of those who do not possess such competencies and enjoy increased career opportunities and flexibility. These educators agreed that in order to achieve this goal, there should be close cooperation between business organisations and the school. One U.K. educator remarked that business organisations should keep schools and colleges abreast of developments in business so that the students can be trained to work effectively in business organisations at the end of their school career.

Barbadian educators expressed the view that local business organisations should become involved in the delivery of the educational package and in the development and provision of resources. They could, for example, donate computer equipment to schools and participate in work experience programmes. One U.K. educator commented,

> 'Businesses could allow teachers to use their equipment and help teachers to keep up-to-date with the developments in computers.'

The involvement of business organisations in education is more widespread in the U.K. than it is in Barbados. However, recently a Barbadian company donated about one million Barbados dollars worth of computer equipment to a local secondary school. That company has encouraged other business enterprises to follow its example.

7.3.2 Training

The data supports the belief that there is an acute need for teacher training in I.T. in the Barbadian education system. Since educators believe that school-leavers should be I.T. literate, it is therefore necessary that the teacher too be so skilled. It is noteworthy that while some teachers indicated that they had a basic knowledge of computers, yet only five percent in the primary sector, sixteen percent in the secondary and thirty percent in the tertiary sector actually possessed a certificate in I.T. (see Section 6.3.4).

Bourne (1994) also discovered that the percentage of teachers trained in I.T. applications is marginal. Only 15% of staff in schools have training in personal computer applications. Her findings showed that of this marginal number, only 36% of those teachers who had experience in computer applications, used computers regularly for classroom instruction.

Training in Information Technology is needed at all levels of the education system and this training should be provided on a continuous basis. Bourne (1994) also states that no workshops for training teachers in Information Technology were conducted at the schools during the academic year 1993-1994.

It is only fair to say however, that some short courses were conducted for teachers at the local teachers' training college during the Easter holidays. This is most inadequate since the number of interested teachers far outweighs the number which can be accommodated on these courses.

However, the Minister of Education is aware of this need and has stressed that this area of training would continue to be an area of emphasis for the Ministry of Education. (SUNDAY ADVOCATE Newspaper, 6 November 1994).

An aggressive staff-development programme in computer use and Information Technology will raise the I.T. consciousness of teachers. This in turn will impact on students, enabling them to accept the computer as a viable educational aid. The more time a teacher spends working with computers - the greater the likelihood of that teacher integrating computer-assisted learning (CAL) activities in his/her teaching. Evidence has shown that the skill base possessed by teachers is significantly related to training received (Pelgrum, 1992).

Hawkridge (1993), contends that the effects of I.T. on teachers (and other educational personnel) include changes in role and status and changes in the type of training required. Chomienne (1988), observed that the result of the impact of I.T. on the teachers' task was an increase in their workload. Nevertheless, teachers appreciated I.T. because of the control they could exercise over it and the amount and quality of subject content which could be included when I.T. was used as a tool.

Reinen and Plomp (1993), hypothesized that the integration of computer use in teaching is positively correlated with the number of years the teacher has been working with computers as well as the amount of training undertaken. They found from their research that teachers who have had training in certain aspects of educational computer use are more likely to use the computer in their lessons than the group who did not receive any training in this area.

Orlich, as cited in Reinen and Plomp (1993) contends that staff development is a basic and necessary component of the continuing education of teachers, administrators and other staff as they extend their professional or technical knowledge. Van den Akker, as cited in Reinen and Plomp (1993) confirms that teachers need new roles in order to work with new programs and technologies.

Reinhardt (1995) states that in the SPA's Report on the Effectiveness of Technology in Schools 1990-1994, which summarises 133 studies, evidence was found in many of those studies which prove that it was not enough to introduce computers into the education system. He contends that before the benefits of the introduction of computers in education can be experienced, there must first (among other things) be extensive teacher training.

It is recognised that factors such as hardware and software availability and administrative support have a significant role to play in the successful implementation of the use of the computer in education, but it is the teacher's attitude, knowledge, interest and commitment which holds the key to the success of the implementation of the use of Information Technology in education. West-Burnham (1990), argues that effective training and development is as much concerned with empowering teachers as with transmitting new demands and methods of working. A well organised staff development program will provide teachers with the skills, knowledge, problem solving capacities and leadership skills necessary to effectively and efficiently incorporate Information Technology into their teaching.

Barbadian educators have expressed a desire to be trained. From their interviews, even those who are trained in I.T. have indicated a willingness to attend refresher courses to enable them to keep abreast of the developments in Information Technology (see Appendix F, question 14). They stated that at present, teachers have 'to use their own initiative in order to improve their competence.' These educators would like a greater measure of support from the authorities.

The Ministry of Education in Barbados, must therefore establish a comprehensive policy on I.T. training and administration in schools with special emphasis on its integration in the curriculum.

7.3.3 Use

In addition to the lack of knowledge of the computer and the lack of training on the part of the Barbadian secondary school teachers, another reason why Barbadian teachers may not see the urgency of becoming computer literate, or why they may not be using the computer in the execution of their lessons, is that there is no social pressure exerted on them to use computers (see Appendix F, question 7). This pedagogical deficiency is reflected in the survey where many Barbadian teachers were unable to comment on the suitability of I.T. in the teaching of CXC subjects or to evaluate the performance of students with I.T. skills against those who did not possess such skills. Yet when asked, in another question, of the value of I.T. in education, there was a broad consensus and little uncertainty that I.T. was a valuable and necessary addition to the curriculum.

All of the U.K. educators interviewed expressed the view that they felt pressured in some way to use computer related activities in the execution of their lessons. These educators stated that they felt that the general opinion in the teaching profession was 'to keep up with the technology.'

Bourne (1994) states that more than 90% of the schools use computers for classroom instruction, 77% use them in lesson preparation and 65% use computers in office administration. She did not however point out that these figures represent whole school responses and not those of individual teachers. Therefore to say that 90% of the schools use the computer in classroom instruction **does not mean** that 90% of the teachers in Barbadian schools engage in such practices.

The data from the Barbadian educators' survey has revealed that only 8% of the primary school teachers used I.T. regularly in their teaching (see Section 6.3.5). In the U.K. survey conducted by the Department for Education (1995), it was reported that 56% of the teachers in the primary schools used computers at least twice a week on average. The Barbados survey revealed that 18% of secondary school teachers use I.T. regularly in their teaching. This can be compared with 27% of the teachers in the U.K. secondary educators survey.

The problem of the uptake of I.T. in education does not only affect Barbadian teachers. Veen (1993), disclosed that although the Dutch government has been stimulating the use of computers in secondary education since 1984, only 9% of Dutch teachers make use of computers from time to time.

Regarding the use of I.T. in departments in secondary schools, once again this lack of use and or lack of knowledge of use is very apparent in the Barbadian cohort. In comparison, the DfE (U.K.) survey reported that on average three-quarters of the departments in secondary schools used I.T. in their teaching (DfE 1995). In some schools however, I.T. applications are utilised in order to ease the burden of bookkeeping tasks associated with schooling (Pelgrum 1992). This has saved much time and energy in the preparation of student lists, circular letters and other correspondence.

The Bourne (1994) report states that in Barbados computers are used mainly for classroom instruction (24 schools), instructional materials (20 schools), office administration (17 schools), class records (13 schools) and club activities (8 schools).

7.3.4 Problems Affecting I.T. Use

There are four types of problems plaguing the implementation of Information Technology in the Barbadian education system. There exists the daunting spectre of diverse financial, technical, professional and administrative problems which impact heavily on the success or lack of success of the I.T. programmes in operation.

Besides the lack of software, Bourne (1994) also cites the presence of obsolete hardware and an insufficient number of computer systems as a major obstacle. Large classes, insufficient finances to upgrade and maintain computer systems, high repair and maintenance costs all impact heavily on the implementation of the use of the computer in education here in Barbados.

Administrative problems such as the organisation of the timetable to accommodate adequate time for classes in Computer education/Information Technology, or for teachers to be trained in the use of the technology also pose a hindrance (see Section 6.3.12).

7.4 What is being done?

7.4.1 a) National policy

The hypothesis that young people who are competent in Information Technology are better prepared for work in business organisations, obtain white collar jobs ahead of those who do not possess such competencies and enjoy increased career opportunities and flexibility, is also supported by the Government of Barbados. This is evident in the words of the Minister of Education who stated that:

> 'The key to keeping our country on the cutting edge is having the nation's children computer literate and proficient in the use of those devices which constitute current computer technology. The key to success in the future lies in training for our children and adequate exposure to a variety of information systems.' (SUNDAY ADVOCATE newspaper, 6 November 1994).

To this end all public secondary schools have been equipped with computer networks consisting of at least ten work-stations. The computer systems were acquired from overseas and installed in the classrooms before most teachers were trained to use them. This resulted in many teachers 'fearing' the computer and regarding it as something which was thrust upon them.

Some computer training is now done during the Easter holidays. Some organisations in conjunction with the Ministry of Education have also organised computer training courses. One such project is that organised in conjunction with York University in Canada and Erdiston Teachers' Training College in Barbados. In the initial phase, two groups of twenty teachers were trained over a two-year period, in three one-week sessions. This training involved sessions on applications software, an introduction to the use of multimedia in education and the examination of such issues as were pertinent to the impact of Information Technology on the change process as it related to education.

Another more recent project, being organised in conjunction with UNESCO, The Caribbean Network of Educational Innovation for Development (CARNEID), The Barbados Telephone Company (BARTEL) and The Barbados External Telecommunications Co. Ltd. (BET) was launched on November 14th 1994. These organisations are seeking to upgrade and improve the capacity of Information Technology in secondary schools in Barbados (Bourne 1994).

In this project teachers were trained in the use of communications software and shown how to access databases and other files from local and international bulletin boards. For the project, selected schools which had the required hardware in place were piloted. In time, it is planned to extend this facility to all secondary schools.

The execution of national policy will entail the disbursement of relatively substantial financial resources. It will therefore be necessary for educational decision-makers, in their quest to achieve computer literacy in the education system, to avail themselves of current information on computer hardware and software in an effort to invest their limited resources wisely.

The relevancy of educational planning to developing countries cannot be overemphasized (Ishumi, 1984). This is particularly important especially where resources - especially financial ones - are a serious constraint.

7.4.2 b) School policy

Some schools in Barbados have a vigourous I.T. programme, but at most others, the I.T. programme is a fledgling one and there is no set policy which is followed. One secondary school, with the help of a business organisation, has acquired a state-of-the-art computer lab which consists of more than sixty (60) computers. It is believed that other schools will adopt a similar initiative and approach business houses for financial and technical assistance in getting their Information Technology programme organised.

7.5 I.T. and the Student

It is hypothesised that acquiring an I.T. capability will have certain positive effects on the cognitive and effective behaviour of the students. In general, the Barbadian students agreed that I.T. is very beneficial to them and that it is essential in the proper functioning of today's world (see Sections 6.6.11, 6.6.12).

There are many benefits to be obtained from having an I.T. capability. The effect of I.T. on learners according to Hawkridge (1993), can be subdivided into cognitive and affective. The cognitive effects include the acquisition of knowledge and skills. The affective effects include positive changes in such attributes as attitudes towards learning, social awareness and group behaviour. Reinhardt (1995) contends that 'there is ample evidence that the appropriate use of technology can boost retention rates and reduce boredom and mis-behaviour.'

7.5.1 Student Learning

The data demonstrates that Barbadian students believe that I.T. should be included in the school's curriculum because it would enrich their learning environment and enhance student learning (see Section 6.6.7). A one-way analysis of variance performed on the students' responses substantiates this claim ($p=0.1$). The null hypothesis was also refuted when students strongly agreed that Information Technology in the curriculum enables them to acquire self-confidence ($p=.03$), and that it encourages them to think creatively ($p=.07$).

These are positive ingredients of enhanced learning. This finding supports the detailed hypothesis number 2a which states that the inclusion of I.T. in the curriculum will enrich and extend the students' learning environment.

Vivien Johnston (1987), found in his research that when pupils were asked what they thought they had learned while using the computer, nearly one third of them were unable to comment. Of those who responded to the question, a high percentage of them felt that the technical aspects of their writing, especially spelling, had improved. Other areas of improvement noted by his student cohort included reading, improved co-operation skills and improved keyboard skills.

When these results were compared with those of the Barbadian cohort, it was noted that the Barbadian students agreed that team work skills, independent study skills, the acquisition of self-confidence, the development of creative thought and the ability to evaluate situations were all enhanced by I.T. These findings support the detailed hypotheses 2a and 2c (see Section 7.1). It is noteworthy that even those students who did not study I.T. believe that they too would experience these benefits if they were exposed to I.T. (see Figure 3).

Johnson (1993) affirms that in the U.K., I.T. did make a contribution to learning but the contribution was not consistent across subjects or age groups. Bourne's (1994) findings indicate that as a direct introduction of computer technology in the classroom, improvement in student learning and motivation have been observed.

It is argued that the impact of I.T. on learning achievement is enhanced by teaching. Roblyer (1994), argues that the type of application and the use to which I.T. is put seem to dictate how great the impact will be.

Johnson's (1993) research revealed that computers were good motivators which heightened pupils' interest and enjoyment of subjects. He contends that the use of computers aids concentration by focusing pupils' attention on the work in hand. The result of this was an improvement in the standard of work that was produced. This in turn, gave the students a sense of pride in the production of their work as their final presentation assumed a professional and business-like appearance.

He found that when using I.T. the pupils were so motivated that they were often keen to continue work with I.T. beyond and outside of the normal classroom session, whereas in other non-I.T. involved subjects the students became bored and easily and constantly lost concentration. The writer's experience over the years also supports Johnson's (1993) findings.

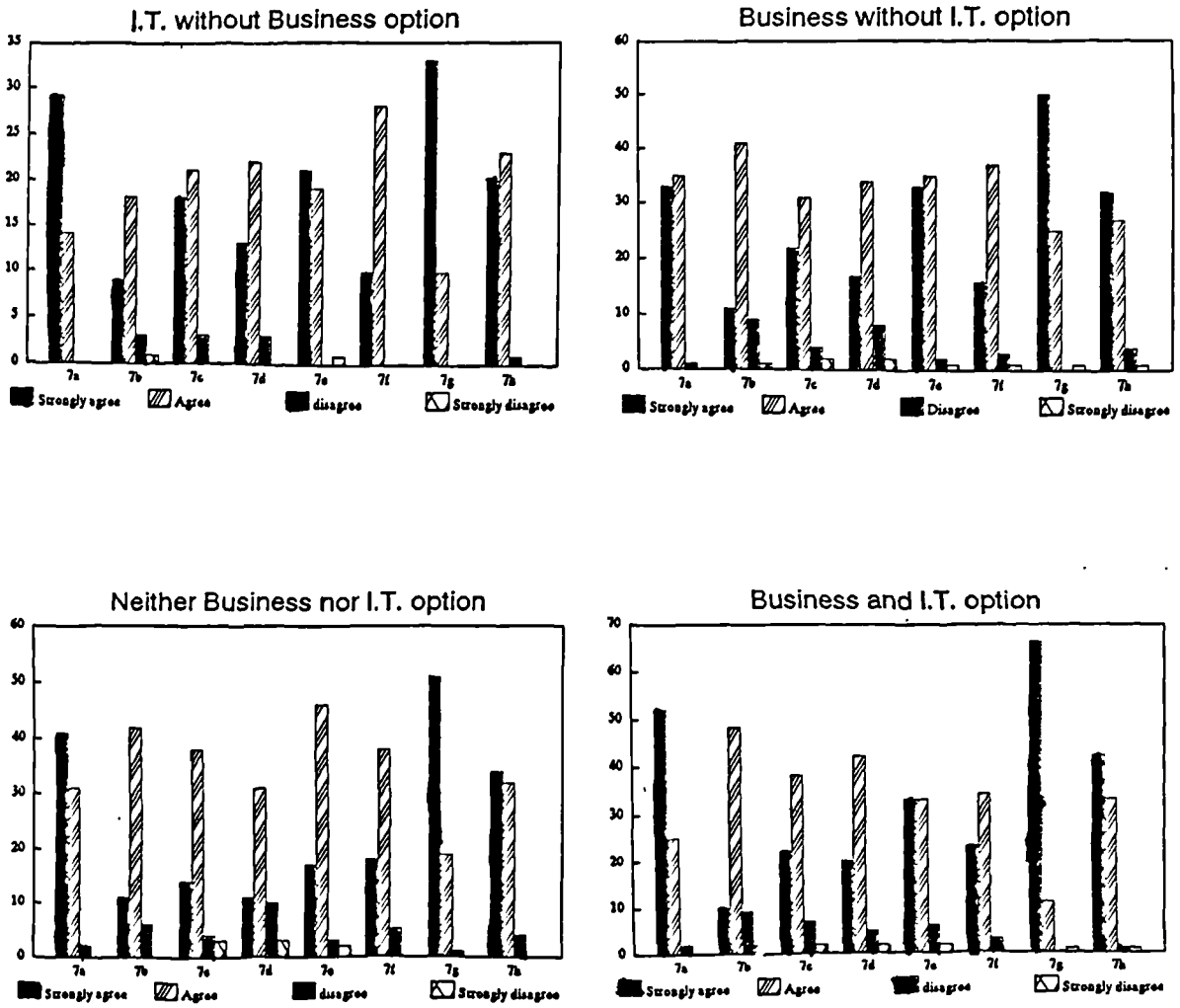
The Barbadian I.T. educators who were interviewed (see Appendix F, question 4) stated that their students responded to the computer with 'great excitement and enthusiasm'. One teacher remarked,

> ' The children feel that knowledge of Computing is prestigious and they realise the necessity of being computer literate.'

Since the computer afforded pupils the opportunity to work in an open ended way, this enabled them to become involved in more complex and challenging learning situations beyond what they would normally experience. Roger Schank as cited in Reinhardt (1995), sees computers as 'electronic mentors' and declares, 'The greatest value of computers is that they will watch out for you and let you do stuff without fear or embarrassment.'

Figure 3.

The views of Barbadian Students on the benefits of I.T. to their personal development



Key

7a) Enrich your learning environment
7b) Promote team work
7c) Promote independent study
7d) Enable you to acquire self-confidence
7e) Encourage you to think creatively
7f) Help you to evaluate situations
7g) Give you an added advantage when seeking employment
7h) Enhance your job performance

7.5.2 Personal Development

In order to assess the students' views on how I.T. could influence their personal development, Question 7 was included in the Students' Questionnaire (see Appendix M). To obtain a similar opinion from the educators Question 14 was included in their questionnaire. In addition, another research strategy, that of Classroom Observation, using the instruments of the Observation Schedules (see Appendices H,I) was employed to gain another perspective of Barbadian teachers' views on the influence of I.T. on students' development.

From the students' point of view, those who studied Information Technology stated that possessing an I.T. capability gave them the added advantage of being more motivated, self-confident and self-relying. They are also of the view that they have acquired a sense of well-being and positiveness of attitude which has enhanced their personal development (see Section 6.6.7).

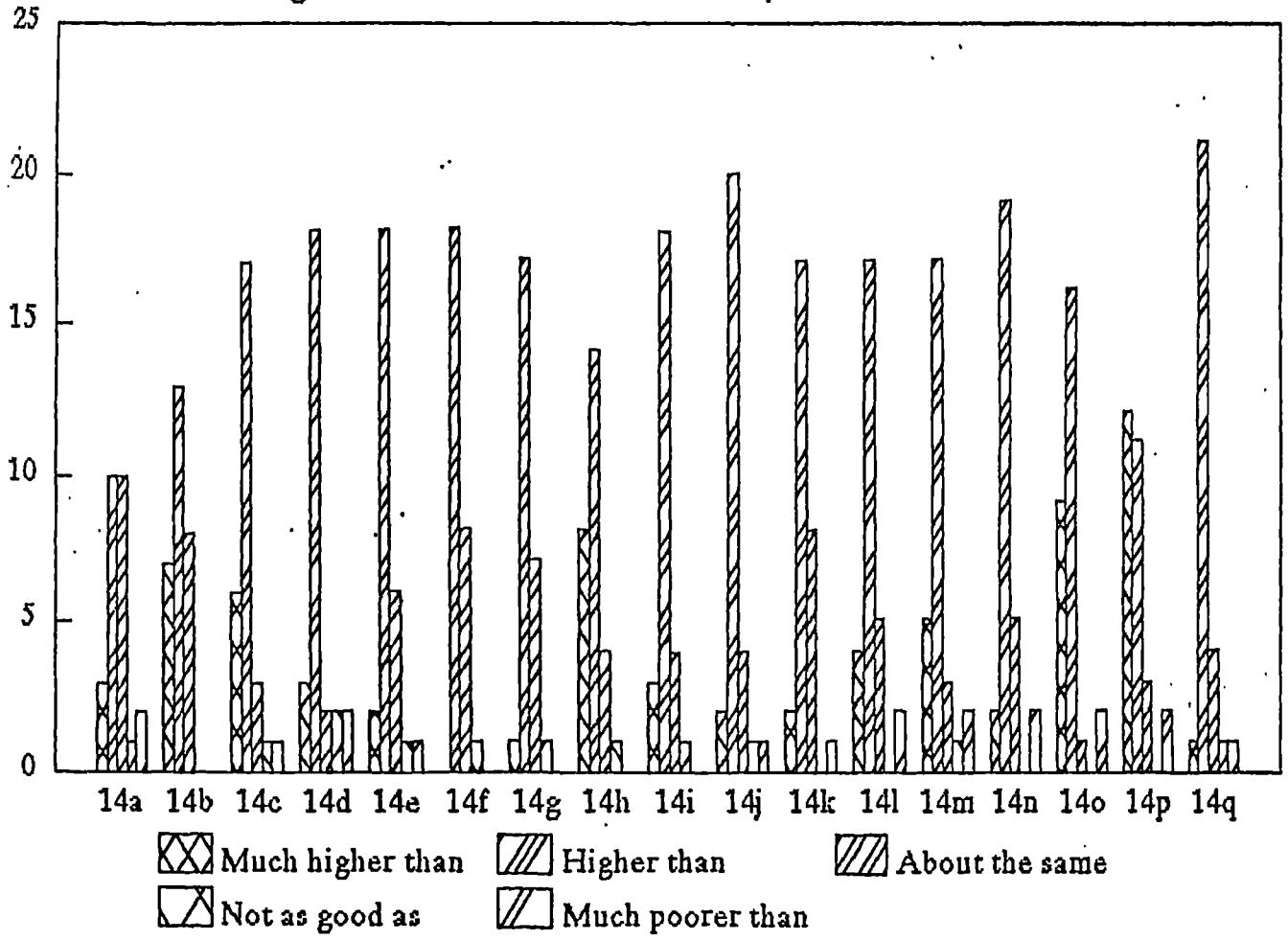
In the Barbadian educational environment, students usually have to share computer equipment during class time. This situation has led to the development of a spirit of collaboration and cooperation among students. In some interview sessions, Barbadian educators stated that during Information Technology classes, students were always willing to share knowledge and help their classmates to solve any problems related to the task in hand (see Appendix F, question 4). This supports the detailed hypotheses 2a, 2b and 2d (see Section 7.1).

The use of the technology to promote co-operative learning is a teaching strategy which can be facilitated through the implementation of I.T. practices. The use of multimedia, hypertext and INTERNET will further the realisation of this goal. To access information in this way, will motivate the student who is usually bored with dull classroom routines. This claim is supported by Jan Davidson as cited in Reinhardt (1995), who contends that computers are very patient teachers, which can inspire creative thinking, promote enterprise and whet curiosity.

Educators too, both British and Barbadian, agree that students who possess skills in I.T. possess more self confidence and were more motivated than those who did not possess such skills (see Figures 4.1; 4.2 (14p)). This view, however, is not quite supported by the results obtained from the analysis of the data of the Teachers' Observation Schedule (see Figure 5 (ATT16)).

Figure 4.1.

U.K. Teachers' rating of students with I.T. skills as compared to those students without I.T. skills

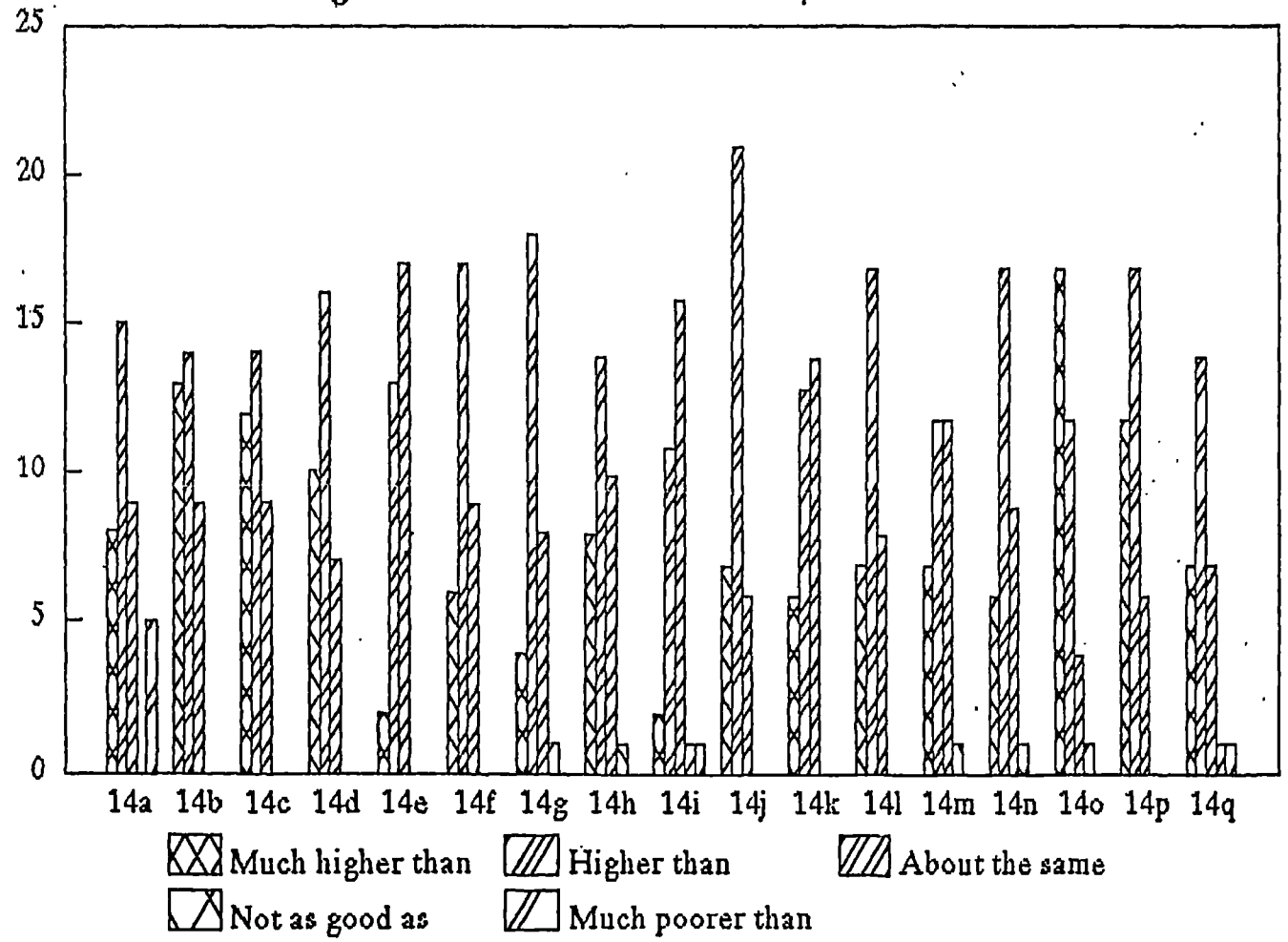


KEY to Figure 4.1

14a) Performance in teamwork
14b) Ability to work independently
14c) Development of self-confidence
14d) Ability to think creatively
14e) Effective evaluation of situations
14f) Overall performance level
14g) Performance of given tasks
14h) Use of initiative
14i) Development of leadership qualities
14j) Development of problem-solving ability
14k) Development of decision-making ability
14l) Development of positive work attitudes
14m) Easily adapt to different situations
14n) Development of dependable/responsible work habits
14o) Willingness to try something new
14p) Level of motivation
14q) Ability to manage time effectively

Figure 4.2

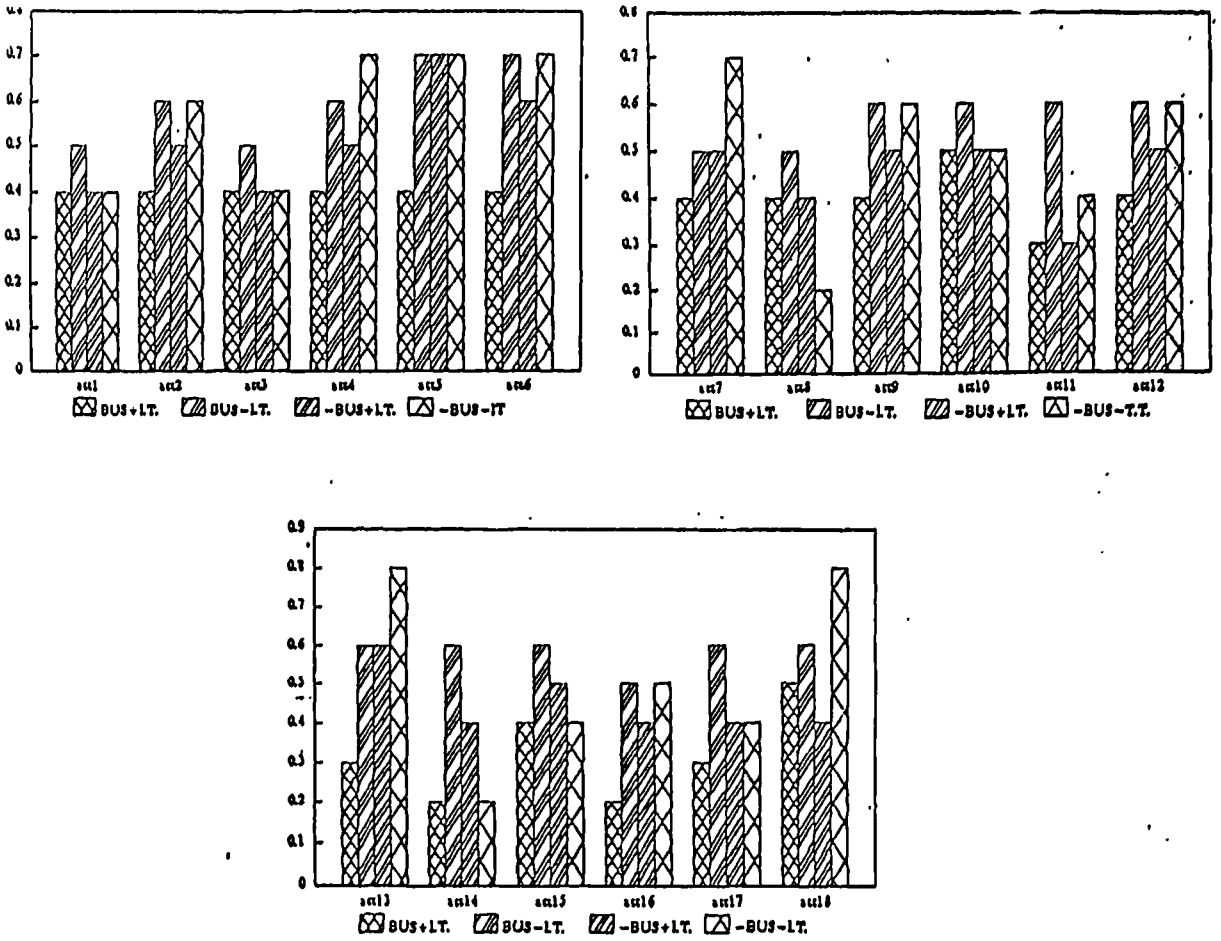
Barbadian teachers' rating of students with I.T. skills as compared to those students without I.T. skills



KEY to Figure 4.2

14a) Performance in teamwork
14b) Ability to work independently
14c) Development of self-confidence
14d) Ability to think creatively
14e) Effective evaluation of situations
14f) Overall performance level
14g) Performance of given tasks
14h) Use of initiative
14i) Development of leadership qualities
14j) Development of problem-solving ability
14k) Development of decision-making ability
14l) Development of positive work attitudes
14m) Easily adapt to different situations
14n) Development of dependable/responsible work habits
14o) Willingness to try something new
14p) Level of motivation
14q) Ability to manage time effectively

Figure 5.
Comparative graphs showing students' improvement according to Option groupings



Key

ATT1) Ability to work in a group
ATT2) Ability to work independently
ATT3) Ability to think creatively
ATT4) Ability to evaluate situations
ATT5) Ability to use initiative
ATT6) Ability to make decisions
ATT7) Ability to adapt to different situations
ATT8) Ability to solve problems
ATT9) Ability to concentrate on a task for a period of time
ATT10) Development of self-confidence
ATT11) Development of leadership qualities
ATT12) Development of positive work ATTitudes
ATT13) Development of qualities of responsibility
ATT14) Development od competitive ATTitude
ATT15) Desire to try new things
ATT16) Level of motivation
ATT17) Increase in students' productivity
ATT18) Overall personal development

Table 3 shows a ranking according to option groups of the overall percentage of students who showed some improvement over the period of observation. This analysis was performed on Observation Schedule-2 (see Appendix I). In this schedule teachers were required to evaluate the students' performance at the end of the academic year.

It is noted that students studying Information Technology without Business subjects ranked first in five attributes namely: 'the ability to work independently'; 'the ability to think creatively'; 'the ability to evaluate situations; 'the ability to use initiative' and 'the ability to adapt to different situations'. Notice should be taken of the fact that this group was usually rated quite high in the initial observation schedule but in the final analysis this high rating was not sustained. One reason for this could be that these students continued to work at a high level and so a rating which indicated 'no improvement/remained the same' was given.

Table 3. Ranking of attributes according to Option grouping

ATTRIBUTES	BUS+ I.T.	BUS- I.T.	-BUS +I.T.	-BUS -I.T.
1. Ability to work in a group	3	1	2	4
2. Ability to work independently	3	2	1	4
3. Ability to think creatively	4	2	1	3
4. Ability to evaluate situations	4	2	1	3
5. Ability to use initiative	4	2	1	3
6. Ability to make decisions	4	1	2	3
7. Ability to adapt to different situations	2	4	1	3
8. Ability to solve problems	2	1	4	3
9. Ability to concentrate on a task for a period of time	2	1	4	3
10. Development of self-confidence	2	1	4	3
11. Development of leadership qualities	2	1	4	3
12. Development of positive work attitudes	2	1	4	3
13. Development of qualities of responsibility	2	1	4	3
14. Development of competitive attitude	2	1	4	3
15. Desire to try new things	2	1	3	3
16. Level of motivation	4	1	3	2
17. Increase in student's productivity	2	1	4	3
18. Overall personal development	2	1	4	3

Students who studied Business subjects without Information Technology however ranked first in thirteen attributes. These include: 'the ability to work in a group'; 'the ability to make decisions'; 'the ability to solve problems'; 'the ability to concentrate on a task for a period of time'; 'development of self confidence'; 'development of leadership qualities'; 'development of positive work attitudes'; 'development of qualities of responsibility'; 'development of competitive attitude'; desire to try new things; level of motivation'; 'increase in student's productivity' and 'the overall personal development'.

Generally, the Business and Information Technology group ranked a close second to the Business without Information Technology group. It is noted that the Information Technology without Business group seemed to have performed at extremes - either at the top or at the bottom. The Neither Business nor Information Technology group ranked mostly third, placing second only in one attribute - 'level of motivation'; and fourth in two attributes - 'ability to work in a group' and 'ability to work independently'.

A quantitative measurement of improvement (see Table 4) calculated on the data gained from the Teachers' Observation Schedule, indicates that in general, all students have shown some measure of positive improvement over the period of observation whether or not they have studied Business or Information Technology (see Figure 5). It can be concluded that even though I.T. enhances student learning, student progress is not linked solely to the study of Information Technology or Business Studies.

Table 4.

Table showing the results of a quantitative measure to show amount of improvement between the Option groups.

	bus+it	bus-it	-bus+it	-bus-it
ATT1	0.4	0.5	0.4	0.4
ATT2	0.4	0.6	0.5	0.6
ATT3	0.4	0.5	0.4	0.4
ATT4	0.4	0.6	0.5	0.7
ATT5	0.4	0.7	0.7	0.7
ATT6	0.4	0.7	0.6	0.7
ATT7	0.4	0.5	0.5	0.7
ATT8	0.4	0.5	0.4	0.2
ATT9	0.4	0.6	0.5	0.6
ATT10	0.5	0.6	0.5	0.5
ATT11	0.3	0.6	0.3	0.4
ATT12	0.4	0.6	0.5	0.6
ATT13	0.3	0.6	0.6	0.8
ATT14	0.2	0.6	0.4	0.2
ATT15	0.4	0.6	0.5	0.4
ATT16	0.2	0.5	0.4	0.5
ATT17	0.3	0.6	0.4	0.4
ATT18	0.5	0.6	0.4	0.8

* A score of 0.0 indicates that no improvement was evident.

Table 5.

Table showing relative improvement between the Option groups, Bus+IT, Bus-IT and -Bus+IT when compared to the control group -Bus-IT.

	BUS+IT	BUS-IT	-BUS+IT
ATT1	1	1.2	1
ATT2	0.6	1	0.8
ATT3	1	0.8	1
ATT4	0.6	0.8	0.7
ATT5	0.6	1	1
ATT6	0.6	1	0.7
ATT7	0.6	0.7	0.7
ATT8	2	2.5	2
ATT9	0.6	1	0.8
ATT10	1	1.5	1
ATT11	0.7	1.5	0.7
ATT12	0.6	1	0.8
ATT13	0.4	0.7	0.7
ATT14	1	3	2
ATT15	1	1.5	1.2
ATT16	0.4	1	0.8
ATT17	0.7	1.5	1
ATT18	0.6	0.7	0.5

When examining the progress of the Business and I.T. and the Business without I.T. groups, the data from the observing teachers show that students who studied Business without I.T. have shown more improvement than those who studied I.T. When compared to the entire cohort, this group - Business without I.T. - has shown the greatest degree of overall positive improvement.

One may perhaps conclude, that although I.T. has become a necessary tool in the business world and even though students, teachers and employers alike perceive I.T. as being a major catalyst of personal and cognitive development, yet the data reveals that personal development is also possible without the studying of I.T..

In general, I.T. students were rated initially at a higher level than students without I.T. Therefore a greater degree of improvement was noticed in the performance of those students who did not study I.T. than in those who studied I.T. It may be queried that the alternative subject taken by the Business without I.T. group may in some way, be responsible for the higher rating of that group. However, in view of the fact that these students have the option of choosing one of a wide range of subjects, it is very unlikely that their performance was due to the taking of any particular subject.

One reason for the 'levelling off' of the Business and I.T. group in particular may be the fact that a high percentage (77%) of that group is female compared to 58% of the Business without I.T. group. The literature reveals that initially girls perform well in the technology but as time progresses they are overtaken by boys (Duncan, 84).

A transitory glance at the comparative results of the Teachers' Observation Schedule (see Figure 5) may appear as if students of I.T. did not improve or in other words have deteriorated over the period of observation, but that may not in fact be the case. For it must be noted that this cohort was done with students who were in their final year of schooling and were also exposed to I.T. for at least a year before the commencement of the observation. These students then may have reached their plateau during the period of observation.

It is noted that in the Educators' questionnaire (see Appendix E), teachers' evaluated the students with I.T. skills higher than those without. Various criteria could account for the difference in response. Criteria such as teacher bias, teacher expectation, actual student performance or the fact that the observing teacher had more time to critically assess the student could all have impact on the teachers' decision.

The overall results as shown in Table 4 and Table 5, however are within acceptable variations due to population size. There seem to be some deterioration shown for 'Ability to evaluate situations' (ATT4); 'Ability to adapt to different situations' (ATT7) and 'Overall personal development' (ATT18). Whereas positive attribute change is noted particularly for, 'Ability to solve problems'(ATT8) and 'Development of competitive attitude' (ATT14). The reasons for these differences may be related to factors other than those which are being measured. One factor could be that of the rate of maturation of students at that age.

An interesting follow-on study to this research would be to perform the observation on a group of students who are not I.T. literate, in which part of the group is given I.T. training and the other part is not. The results could then be analyzed on the initial impact of I.T. training on student learning.

It is noted that students who studied Business subjects even though they may not have studied I.T. were rated as having shown much improvement over the period of observation (see Figure 5). Since many of these students would have been studying Business for the first time in their school career, it may be concluded that the study of business subjects is also an asset to the school-leaver who is preparing for the world of work.

In noting the degree of change and improvement in students, the case for the establishment of a vibrant Business Education programme is emphasised. For the degree of change and improvement which is evident in the BUS-I.T. group supports the view that a good Business Education programme will also enable the students to develop those attributes of personal development which will enable them to make a meaningful contribution to any business organisation. It must be remembered however, that since employers are requiring their prospective employees to be computer literate, this group, upon acquiring I.T. skills would be an invaluable asset to any organisation. Evidence to this effect is shown in the student follow-up where many of these students stated that they either had to first acquire I.T. skills before they could get a job or that they received such training on the job (see Section 6.7.2).

One important dimension which has emerged from this data and which merits further research is the importance of the study of Business subjects in the preparation of school-leavers for the world of work in Barbados.

Students too, are realising the importance of the study of Business subjects in their preparation for life and work. Statistics obtained from CXC in Barbados reveal a continued high number of student entries for examinations in Business subjects. This trend also holds true in the U.K. as supported by statistics obtained from the N.E.A.B. in Manchester (see Appendix Q).

To this end, the educational authorities in Barbados must realise that in order to prepare its school-leavers for the world of work, it will be necessary for it to establish not only a meaningful I.T. programme, but also a comprehensive Business Education programme in which students can gain insights and experience into the operations and requirements of modern business organisations.

7.5.3 Employment prospects

The views of employers surveyed in Barbados and England support the hypothesis that young people who are competent in I.T. are better prepared for work in business organisations, obtain white collar jobs ahead of those who do not possess such competencies and enjoy increased career opportunities and flexibility.

Barbadian employers expressed the view that the knowledge of Information Technology helps the student to get employment. They stated that a knowledge of word processing and Computerised Accounts are particularly advantageous when job-hunting today. They also agreed that the acquisition of an I.T. capability in school gives the student the motivation and the facility to adapt to the use of new software packages. A check with managers of Job Centres in England in the Manchester area revealed that employers are requesting that prospective employees be computer literate and possess at least word processing skills as a pre-requisite for employment. Reinhardt (1995) also states that in the U.S. 'businesses require schools to turn out students with a different set of skills than those emphasised in early 20th century pedagogy (for) employers themselves are using new technologies to educate workers.'

The Student Follow-up questionnaire (see Appendix O) was designed specifically to obtain from I.T. students who had completed the Students' questionnaire (see Appendix M) their views on the relevancy of the I.T. they had studied and to ascertain how useful they thought it was now that they had left school. For students who had not studied I.T., a similar questionnaire was designed and its main emphasis was to ascertain their views on how they felt not having done I.T. as part of their school career (see Appendix P).

The data from the Students' questionnaire (see Appendix M) show that Barbadian students are aware that possessing I.T. skills gives them an added advantage when seeking employment. Even before they left school, the students gave a positive indication (p=.1) that possessing I.T. skills would give them an added advantage when seeking employment (see Section 6.6.7 (g)).

Those Barbadian school-leavers whose progress was monitored after they graduated agreed that their Information Technology skills had served them well. The data from the Students' Follow-up questionnaire (see Appendices O,P) show that the students who studied I.T. in school seemed to move easier into employment than those who did not. Of those I.T. students who also studied Business, it was found that at the end of 1994, only two (2) per cent of those contacted were still unemployed (see Section 6.6.1). This compares with eight (8) per cent for the group which studied I.T. but not Business, 16 per cent for the group which studied Business but not I.T. and seven (7) per cent for the group which studied neither Business nor I.T. (see Table 8).

This finding supports the main hypothesis (see Section 2.6.2) which states that people who are competent in I.T. obtain white collar jobs ahead of those who do not possess such competencies. It also supports the detailed hypotheses numbers 2e and 2f (see Section 7.1) which state that these students will be able to take advantage of the services of the business world and that they would have an added advantage when seeking employment because they would be equipped with those skills which are needed in a modern economy.

However, those school-leavers who had not acquired I.T. skills during their school career, stated emphatically that it was to their disadvantage not to have acquired such skills while in school. Many of those former students realised after leaving school that there was a gap in their education and so many of them took the initiative and attended I.T. classes in order to acquire the necessary skills.

It is noted that of the group which studied Business but not I.T., 53 per cent of those who were furthering their studies were taking I.T. courses. 40 per cent of this cohort who was now employed stated that they first had to acquire I.T. skills before they could get a job. This reflects the emphasis the Barbadian business world is placing on the acquisition of I.T. skills.

In general, the data reveals that those persons with I.T. skills fared better in acquiring employment after leaving school than those without such skills. It also points to the fact that those persons with training in Business as well as I.T. were even more successful.

7.6 Gender

One striking issue which has arisen from the research relates to Gender. Much of the Literature has recorded significant differences in the uptake of I.T. amongst males and females. The literature points out that in general more males respond to I.T. and I.T. related activities than do females. Questions are also being raised concerning the effects of formal education upon women in Third World countries (Duncan, !984).

7.6.1 The Business and I.T. group

In the Barbadian student survey, of the students (n=127) who took I.T. whether or not it was combined with business subjects, 57% of them were females (n=73). Of those I.T. students (n=99) selected by teachers for observation over one academic year 69% of them were girls (n=68). When considering the number of students opting for I.T. courses, it is a clear indication that more girls than boys are choosing I.T. From observation Barbadian girls do not seem any less inhibited than boys from taking I.T.

However, when analyzing the Observation Schedule a striking difference is evident in the overall development of the students. The data reveals that of the students who studied I.T. more males than females showed improvement over the period of observation. More females than males were rated as having shown no improvement during this period. The data shows that more females than males were rated as having deteriorated during this period. These results are similar to those quoted by Duncan (1984) where she found that in educational research carried out in the U.S., girls began with an initial advantage but were gradually overtaken by boys.

7.6.2 The Business without I.T. group

On the other hand, of those students taking the Business without I.T. option, the females showed the greatest improvement overall. For such attributes as 'ability to work in a group'; 'ability to work independently'; 'ability to work independently'; 'ability to make decisions'; 'ability to solve problems' and 'desire to try new things', the males showed the greatest improvement, while the females showed the greatest improvement in all other attributes.

For such attributes as 'ability to work in a group', 'ability to solve problems' and 'desire to try new things', even though the males showed the greatest improvement, they only scored one percentile more than the females. It is noted that the females showed the greatest improvement in eleven (11) out of eighteen (18) attributes and the males were rated as having remained the same in a similar number of attributes.

For such attributes as 'ability to use initiative', 'ability to make decisions', 'ability to concentrate on a task for a period of time' and 'development of competitive attitude', more females than males were rated as having improved overall and as having shown no improvement. For these attributes a very large percentage of males - usually as much as 50% - was rated as having deteriorated over the period of observation.

7.6.3 The Neither Business nor I.T. group

In the group which studied neither Business nor I.T. the females showed the most overall improvement for every attribute. It is interesting to note here that in all attributes except 'ability to work in a group', 'ability to evaluate situations', 'ability to make decisions', 'ability to concentrate on a task for a period of time' and 'development of positive work attitudes', no male student was rated as having 'strongly improved'.

In this cohort, more males were rated as having showed no improvement than females. When compared to the females, more males than females were rated as having deteriorated over the period of observation.

For such attributes as 'ability to concentrate on a task for a period of time', 'development of self confidence' and 'development of positive work attitudes' no female was recorded as having deteriorated; while for such attributes as 'ability to adapt to different situations', 'development of leadership qualities', 'development of qualities of responsibility', 'desire to try new things' and 'overall personal development' no one - male or female was rated by the observing teacher as having deteriorated over the period of observation.

7.6.4 The I.T. without Business group

Since the number of female students in the I.T. without Business cohort is too small (n=6) for a statistically significant comparison, that cohort was eliminated from this analysis.

7.6.5 General findings

The analysis of variance performed on the data reveals that the ratings done on the initial Observation Schedule at the beginning of the academic year, indicates that there was a difference between the genders on many of the attributes under observation. This difference indicates that the females were slightly ahead of the males in the following attributes: 'Ability to work independently' (p=.05); 'Ability to think creatively' (p=.1); 'Ability to adapt to different situations' (p=.01); 'Ability to concentrate on a task for a period of time' (p=.08); 'Development of self confidence'(p=.1); 'Development of leadership qualities' (p=.04); 'Development of positive work attitudes' (p=.1); 'Development of qualities of responsibility' (p=.04); 'Desire to try new things' (p=.1); 'Increase in student's productivity' (p=.1) and 'Overall personal development' (p=.03).

However, the ANOVA results on the final ratings indicate that differences existed only on two attributes, 'Ability to concentrate on a task for a period of time' (p=.1); and 'Overall personal development' (p=.1) where the females were slightly ahead of the males.

When considering the results of the Teachers' Observation Schedule it is noted that some teachers found difficulty in assessing student development and so indicated 'uncertain' for many responses. Since this Schedule focused on how certain attributes were influenced by I.T. over a period of time, the issue became one of maturation.

In the Barbadian context, it is clear that the differing rates of development between boys and girls have also been reflected in the students' uptake of I.T. However, in general, one may conclude that the acquisition of I.T. skills has helped to equalize the genders rather than to perpetuate their differences.

7.6.6 CXC examinations

The Caribbean Examinations Council (CXC) introduced examinations in Information Technology 1993. Table 6 shows the Barbadian entries and passes by gender for the two years the examination was offered.

Table 6.

YEAR	1993		1994	
GENDER	MALE	FEMALE	MALE	FEMALE
ENTRIES	58	76	113	130
PASSES	39	42	97	118

The statistics reveal that over the two years the examination was administered, the number of entries for girls was greater than that for boys. However, in 1993, the percentage passes for boys was greater (67%) than that for girls (55%). In 1994 however, the percentage passes for girls (91%) was greater than that for boys (85%). The chisquare statistic for these results (χ^2=5.561, df=3) indicate however, that no strong reliance could be placed on these results when comparing the genders.

7.7 Cost effectiveness

Much has been spent on the acquisition of hardware and software in order to effect the implementation of CAL and I.T. in the education curriculum. Has this been worth the cost? Is the society getting value for the money spent?

When computers were first introduced into the education system, there was great expectations about the potential of computers to reshape education into an institution emphasizing the learning of productive skills by offering students an attractive learning environment heavily dominated by self-exploratory and problem-solving activities (Pelgrum & Plomp, 1993a).

The data suggest that in Barbados, computers are used mainly for the teaching of the CXC syllabus. Hence they are used mainly for elementary programming, word processing, databases and spreadsheet creation. Very few teachers in Barbados use CAL. This situation seriously limits the number of students who are actually afforded the chance to become computer literate.

It must be emphasised that the acquisition of I.T. skills is not limited only to the knowledge and use of business application software. Students can acquire I.T. skills through the use of other software and courseware programs as well. For example, students can acquire skills in understanding and accessing databases by using such programs as PCGLOBE and BODYWORKS.

Pelgrum and Plomp (1993a), also found from their research in eighteen countries that the use of computers in education is often still at a 'low-level' stage where students are taught the use of specific software packages like word processing and drill and practice - whereas the use of simulations and self-exploratory software - the kind that indicates high-level use, and fosters the development of cognitive skills - are used to a lesser extent. They admit therefore that in general computers in education are not meeting the expectations of their enthusiastic proponents.

Hawkridge (1993), argues that cost-effectiveness analysis must be differentiated from cost-benefit analysis, for whereas cost-benefit analysis reduces all costs and benefits to financial terms, cost-effectiveness analysis permits value judgements. Although it was difficult to put a cash value on all the inputs and outputs of learning with and learning without computers, yet Hawkridge (1993), found that in comparison greater monetary costs were incurred when the technology was used than when it was not, but that this increased cost was justified by the 'additional benefits' which were obtained from I.T. use.

Such broader external effects (Hawkridge, 1993) cannot be ignored by educators and education authorities. He also found that students exposed to I.T. learn better than those who are not so exposed. He argues that those who are exposed to I.T. score higher on standardised tests, possess improved problem-solving skills, and, as observed by teachers, they acquire insights and cooperate better than those who are not exposed to I.T.

Many of these observations, though not quantifiable measurements, were also found to be true in the Barbadian cohort in which teachers were asked to observe certain characteristics of students' attitudes and performance.

Hawkridge (1993) questions whether or not the success of those students can be attributed to the fact that computers were involved in the learning process. Although he does not table an answer to the question, yet he noted that such comparisons are essential if cost-effectiveness is to be judged.

7.8 What of the Future?

There is a great challenge facing this small Third World developing country. On the one hand, it has to keep abreast of the global trends of economic development and on the other hand it has to grapple with the traditional elements of nationalism and those factions which are opposed to the change process.

Perhaps Barbados ought to examine the approaches to I.T. implementation which have been used by other countries in an effort to avoid any pitfalls which may have befallen those countries. Should Barbados like Australia adopt a 'conservative approach' (Burke,1987) to the introduction of I.T. in education fearing like the Soviets that I.T. would have certain negative effects on its society?

Should the Barbadian school system embody a strong vocational emphasis as is recommended by such U.S. educators as Biermann (1994) and Roberts (1994)?
Or should it adopt Ashenden's (1987) views that such preparation should take place in the post-school sector?

The consensus in the literature points to the relevance of school curriculum in which education systems in most countries, both developed and developing, are aiming towards making their school-leavers 'marketable' in order to ensure their smooth transition to the world of work.

Like other tourism propelled economies, Barbados has endeavoured to sell to the rest of the world services and to as lesser extent, products which they demand even though these products and services can be got from other sources - perhaps even at more competitive rates. This situation compels Barbados to ensure that its offerings are exemplary - to the point where consumers would choose them - their cost notwithstanding.

In this information age, it is the use of the technology which would enable Barbados to have the 'cutting edge'. If 'Tourism is really our business' - as the local advertising slogan pronounces, then it is incumbent upon this country to ensure that it keeps ahead of its competitors.

Thus, in spite of its small size and economic limitations, Barbados will have to grapple with the developing technology, for as Taitt (1993) points out, the developing technology will allow more small businesses to exist and compete favourably with corporate giants.

According to Gore (1994), utilising the Global Information Infrastructure (GII) will help Barbados - and similar Third World countries - to realise its goals. The GII will facilitate and bridge the communications gap, as all countries - big and small - will be able to travel along the 'information superhighway'. So there is hope for survival and sustainability for all developing Third World countries like Barbados.

Barbados must therefore equip its young people to face a modern world with its plethora of technical developments because the work arena of the 21st century will be much more complex and challenging than that of today. Computer competency will be vital (Taitt, 1993). Liao (1994), argues that it will be necessary for all to become more technologically literate so that more informed decisions about personal and social choices can be made.

7.9. Conclusion

The Barbadian educational system must therefore prepare its graduates to meet the challenges posed by the technological advancement of the society. Developing countries like Barbados cannot afford to leave the implementation of I.T. to chance or as late as the post-school sector. It is of utmost importance that Barbadian students receive I.T. training while in school.

Students will need to become self-directed learners and problem-solvers who can select, analyze and evaluate data and information. In order to realise this, much attention has to be paid to the teaching methods used and the role of the classroom teacher would need to be re-evaluated.

The classroom environment should be a student-centred one in which the students will be self-motivated, self-propelled and self-directed, thus allowing the teacher to individualise instruction. This allows the student to progress at his/her own pace, free from the pressures of having to 'keep up with the class'.

The technology itself facilitates new methods of learning and instruction and so with the support of innovative teachers who empower their students and act as facilitators of information rather than dispensers of it, students will become more powerful learners ready and willing to face the challenges of the technological world of work.

In order to be a successful professional and contributing member of society, students today will need to learn how to use the new information and communication tools to solve problems, make informed decisions and be more productive (Liao, 1994).

It is clear then that I.T. impacts on every aspect of the educational diaspora - from the curriculum to methods of teaching. This in turn precipitates changes in the structure of the educational system in particular and in the society in general.

CHAPTER 8

RECOMMENDATIONS AND CONCLUSIONS

8.1 Meeting the needs

The 21st century will bring with it a plethora of information which will be intertwined with computer operations. Technologies such as Global Information Retrieval, which will provide a direct home-to-home satellite digital video and audio service; verbal computer communications, which will recognise voices and respond to verbal commands; multimedia instruction, which will facilitate learning through all the senses and virtual reality real-as-life simulations; will be as commonplace as the use of word processing, database and spreadsheet programs are today. Taitt (1993), envisages that by the year 2003 communications between home and satellite will be a two-way flow allowing selected information to be collected over existing telephone lines.

It is established that one of the signs of progress is the replacing of old jobs with new ones. Taitt (1993) argues that the job force of the 21st century will be much more varied than today's. It can therefore be concluded that many of the types of jobs which will exist then do not exist today. Futrell (1993), corroborates this by declaring that the world of tomorrow, especially the work world, will require significantly different and greater levels of knowledge and skills than we have today.

If this premise is accepted, it is clear that the skills levels for all workers - both incumbent and new entrants to the workforce - must be raised, and workers must be provided with the knowledge and skills required for the kinds of jobs that will be created as a result of the introduction of I.T., if the country is to acquire and subsequently retain its competitive edge. To this end, young people must be equipped with skills which will enable them to adapt and cope with career changes (Caribbean Community Secretariat, 1994).

What then can and must a small, economically fragile, Third World developing economy like Barbados do to prepare for such an eventuality? First of all, Barbados and other countries like it, must recognise that there is a need to prepare for change by a process of training and development which is as much concerned with the effective as it is with the cognitive, as much concerned with process skills as with outcomes, and with personal growth as much as technical competence (West-Burnham, 1990).

8.2 Pedagogy

In order to ensure that its school-leavers obtain the necessary skills and competencies with which to face the 21st century, the Barbadian educational administrators will need to re-think and restructure the delivery of education to its young people. New methods of learning and instruction will have to be employed.

Many of the teachers interviewed have stated that when introducing their classes to Information Technology, they discuss the basic theory of computing and then go on to the system to practice the task at hand.

The employment of such techniques as team-teaching which brings together teachers from the academic and vocational departments, and project learning, where students do projects that require them to integrate academic and occupational content (O'Neil, 1993), will greatly enhance the learning environment.

Emphasis must be placed on the development of problem-solving skills instead of the present rote-learning and regurgitation method. West-Burnham (1990), argues that a problem-solving approach where the emphasis is on the generation of solutions rather than the intellectualisation of difficulties is essential to organisational development. Taitt (1993), contends that the teaching of computer programming over a three to four year period is the best way to develop lasting problem-solving skills.

In an effort to accomplish these goals, students must be trained to express themselves and to be active self-directed, self-motivated learners and not passive recipients of teacher-imparted knowledge. The new type of student envisaged is mature in thinking and outlook, capable of self-directed learning, an independent thinker (who is) able to research, access and use information intelligently (Caribbean Community Secretariat, 1993).

The data from the Employers' survey revealed a more marked preference for the attributes 'ability to work unsupervised' ($p=.08$) and 'willingness to learn' ($p=.06$). When the means were compared, it was found that these attributes were of paramount importance for the service industries. This is important for Barbados since it is essentially a service economy.

The teacher must become a facilitator rather than the dispenser of knowledge. The practice of the teacher standing in front of the class and 'lecturing' for at least forty minutes at a time is obsolete. The new type of teacher envisaged will need to be skilled in a variety of teaching methods. 'Chalk and talk' (methods) must give way to inspired teaching supported by such teaching/learning aids as audio and video tapes, printed materials, radio, television and computers (Caribbean Community Secretariat, 1993).

Curriculum content must be adapted to suit the needs of the 21st century and must assume an academic and vocational orientation. Barbados therefore needs to adopt an approach to curriculum development which is more integrated and multidisciplinary and which utilises available technologies. Schools must remove the walls that separate academic and vocational programs and integrate work-based and school-based learning experiences for all students (Futrell, 1993).

The idea of linking academic and vocational content has emerged as a key component of the new thinking about how to better prepare students for the world of work (O'Neil, 1993). It must be realised that with the existing computing and telecommunications equipment, students will have access to vast and varied amounts of information which can change the real world and not just simulate it. The technology now allows students to work on real world problems instead of hypothetical ones.

On the question of whether or not students should experience a curriculum that is linked to the world of work, some U.S. educators argue totally in its favour. These educators contend that the inclusion of occupational content in the curriculum does not mean preparing students for low-level, manual jobs, but instead will give students a broad-based education whose programs will include among others, communications, co-operation, human relations and reasoning and thinking skills (Biermann, 1994), (Roberts, 1994). It is the acquisition of these skills which 'will enable citizens to grow and flourish in a rapidly changing society' (Biermann, 1994).

O'Neil (1992), contends that schools are about ten years behind the technology that is used in the workplace. If that is really so, and if technology is to be used authentically, then there is no doubt that the learning environment and the delivery of curriculum content must change in order to adequately prepare the students for the world of work.

8.3 Teacher training

In order for teachers to be able to operate at the high standard which is required, a vigourous teacher training programme must be established. If that is not done, it will be discovered that funds spent on computer equipment etc. will have been wasted, for no amount of equipment is as important as a well-trained teacher who is able to lead students to becoming effective, independent learners.

It is imperative, that changes in the institutional arrangements for teacher training are required in order to enable more persons to receive training and to make the training more relevant to the demands of the classroom. The Caribbean Community Secretariat recommends that there should be a shift from institution to school-based training in order to reach more teachers. In addition to the training of teachers, the Secretariat also recommends the establishment of training programmes for teacher trainers. The Secretariat goes on to suggest that the universities in the region should develop close ties with training institutions, make their programmes more relevant and enable trainers to reflect on and systematise the work they do.

Taitt (1993), maintains that educational authorities should train as many teachers as possible to be competent in the use of computers and they should hire only those teachers who are computer competent. This policy should be conveyed to the universities and colleges so that they in turn will include courses in I.T in their teacher education programmes.

Attachments at job sites would enable teachers to learn new technologies and upgrade their skills, for, given the rapid changes occurring in the workplace, owing in large measure to the rapid advances in technology, the links between institutions and manpower planning must be strengthened (Caribbean Community Secretariat, 1993). Pelgrum (1992) maintains that the amount of information teachers receive about pedagogy and instruction is strongly associated with attitudes about the educational impact of computers.

The Ministry of Education as well as the teacher-training college will therefore need to look closely at the types of teacher training programs necessary to strengthen teacher competency in I.T. and place particular emphasis on training opportunities in the pedagogical and instructional aspects of computer use.

8.4 Policy

Effective I.T. policies should be established in order to minimise the number of hindrances teachers experience in trying to implement the use of Information Technology in their teaching. The main hindrances identified by teachers in their quest to implement I.T. in their lessons include: the lack of skills; the lack of time for proper lesson planning; the accommodation of I.T. and CAL lessons on the timetable and the lack of hardware and software.

The problem of skill can be solved with a good teacher training programme similar to the one discussed above. The problem of the lack of time for the planning of lessons may be solved in the short term, not by providing more time on the timetable for I.T. classes, but by the adjusting of other variables in the teaching process. Perhaps with a change of teaching method to a more student-centred one in which students are motivated to experiment and explore, teachers may discover that while students are working at their systems, they (teachers) will have more time to plan and organise other aspects of their lessons. This situation will occur when teachers act as facilitators instead of dispensers of knowledge.

The solving of any problems associated with the organisation of the timetable will depend heavily on the skill of the designer of the timetable. Perhaps the appropriate person(s) could be given some training in timetable design. Sometimes however, the problem is not one of a lack of expertise in timetable design, but one of lack of awareness of the importance of Information Technology and CAL on the whole. In this case, the designer of the timetable should be afforded the benefit of training in Information Technology as well.

The problem of the lack of hardware and software and the maintenance of it will prove costly to address, but in the long-run that cost will be well justified. One accepts that the limitations of the hardware infrastructure in schools may not allow many students to have individual use of a computer system for the full length of each I.T. lesson. Here again, the question of the teaching method use is highlighted. It may become necessary to employ such techniques as 'grouping' where small groups of students - maybe two or three - share the execution of a task on the computer. In this way every student will get an opportunity to work on the computer and in turn learn vital skills of co-operation and team-work.

Providing adequate numbers of computer systems is costly, but maintaining those systems is even moreso. Therefore the education authorities **must** establish an efficient workshop where systems can be repaired quickly. Perhaps a cadre of technicians can be trained to repair computer systems and these can then be allotted to specific schools to make regular checks on the hardware and repair any malfunctions before they become too critical.

8.5 Conclusions

The use and application of computers in school is a very complicated, expensive and time-consuming process often fraught with problems. Much is expected from the 'computer revolution' in Barbadian schools, in that it is hoped that the acquisition of knowledge will be made easier and the learning process simplified to the point where students will be so motivated to learn, that much self-learning will take place and so the quantity and quality of knowledge acquired would greatly increase. The outcome of all this, it is argued, would be a reduction in the potential knowledge gaps which now exist and a more technological oriented workforce which would be capable of functioning effectively and efficiently in the technological business environment of the 21st century.

It is evident that throughout the world Information Technology has had a significant impact on every aspect of society. This in turn has resulted in great repercussions on the education systems of the various countries whose duty it has become to establish programmes to ensure that its citizens are computer literate so that they can make a meaningful contribution to and operate effectively in a modern technological business environment.

In order to achieve a similar goal, Barbados must not be afraid to grapple with the changes which are concomitant with this development. The educational decision-makers must realise that change is axiomatic to organisational life and that an organisation which ceases to respond effectively is balanced on the fine line between stability and stagnation (West-Burnham, 1990).

It is clear that small developing economy-strapped countries like Barbados have to endeavour to be as computer literate as those prosperous developed ones. The task is however compounded by the changing use (and the constant development) of the technology over time (Sutton, 1991). Hope lies in the fact that with the recent and continued developments in fibre optics and the establishment of the Global International Information superhighway, this goal is attainable.

Barbados too must be mindful of the benefits of acquiring an I.T. capability and ensure that all its school-leavers have the opportunity to acquire that capability. Barbadian students recognise the benefits they can gain from acquiring I.T. skills and in general are inspired by the use of the technology.

Barbadian teachers want to acquire I.T. skills. This can be facilitated through a vibrant retraining programme which can be organised by the local Teachers' College and University, both of which have tutors who are capable of organising such courses.

Barbadian employers, like those elsewhere, want their employees to be computer literate and so prefer to hire white collar staff who have already acquired I.T. skills. These employers are willing to work closely with the educational authorities to establish work-experience and apprenticeship programmes in order to give senior students in secondary and tertiary educational institutions the experience of working in a business organisation, so that upon graduation the transition from school to work would be a smooth one.

As the 21st century approaches, the educational authorities must define and redefine their policy with regard to Information Technology in the curriculum in Barbados. Note has to be taken of the direction in which I.T. is advancing. Particular attention must be paid to the emphasis on the communications aspect of I.T..

Carter (1994a), contends that as we approach the 21st century the focus will be on networking. He continues that it is simply not possible for existing educational systems to meet the challenges of the 21st century without embracing the power of the new technologies. Information Technology will network as it were, students, teachers, parents and employers alike. The links which facilitate this communication are vital to the continued advancement of the life and well being of the community.

This illuminative study has highlighted the role of I.T. in preparing Barbadian young people for employment. It has examined the state of I.T. as it exists in some developed and developing countries and recommended how Barbados could proceed with its I.T. programme in order to get maximum benefit from its available resources, being cognizant of the fact that in spite of its small size and economic fragility it has to acquire and maintain a competitive edge in a technologically enhanced global marketplace.

The study utilised a plurality of methods which were designed to obtain a maximum amount of information and a variety of views and opinions from the different cohorts. It is recalled that in the selection of the students for the two student cohorts, taking into consideration the demanding workload of Barbadian teachers and in order to ensure their co-operation, the teachers were given a free hand in the selection of the students. This resulted in very small numbers in some of the Option groupings especially in the Neither Business nor I.T. group of the Classroom Observation exercise. On reflection however, the writer thinks that perhaps if the teachers were not allowed that degree of freedom, maybe the numbers in that particular grouping would have been slightly larger. Due to the small size of that group, and since it was used as a control group in Table 5 (see Section 7.5.2), because of the skewness which resulted, much reliance should not be placed on those results. Instead the results in Table 4 (see Section 7.5.2) would give a more reliable comparison of the groups.

The substantive objective of the study was to determine whether or not I.T. was beneficial to student progress and the contribution it made to their subsequent employability. The data gained from the research instruments have strongly supported this objective as well as the main hypothesis and the detailed hypotheses. The employers have all agreed that a prospective employee who possesses I.T. skills will be a preferred employee.

This was borne out in the results of the Student Follow-up Survey in which it is noted that a greater percentage of students with I.T. skills had moved more easily into employment than those who did not possess such skills. The students too, have realised the importance of acquiring I.T. skills and so many of those who did not acquire such skills while in school, have realised that there is a gap in their education and so have taken the initiative and are now pursuing courses in an effort to acquire the necessary I.T. skills.

Another interesting finding is that of the relationship between Business and I.T.. The data from the Follow-up survey revealed that although the persons with I.T. skills had an advantage in acquiring employment, yet those persons with training in both Business and I.T. seemed to be even more successful in obtaining employment.

A note of interest also lies in the finding that the acquisition of I.T. skills seems to have been instrumental in equalising the development of the genders as seen from the results of the Teachers' Observation Schedule (see Section 7.6.5).

As is demonstrated by Krathwhol's model of the chain of reasoning (see Figure 1), a model is not complete unless it leads to further research. Thus, besides informing on the role of I.T. in preparing Barbadian young people for work, further studies could be generated from some of the issues raised in this study.

One such study could attempt to measure the level of capability actually acquired by Barbadian school-leavers who have been exposed to I.T. and compare that to the level that is required by employers. Kimbell et al (1991) posits that assessing I.T. capability is dependent on various factors including environmental ones. It would be of interest to determine how Barbadian environmental factors impact on the acquisition of an I.T. capability.

This could be done in conjunction with the follow-on study suggested in Chapter seven, in which the data on a group of students under observation would be analyzed on the initial impact of I.T. training on student learning in Barbados. If the necessary financial assistance could be obtained it would be very beneficial to the wider Caribbean if the scope of the study could be broadened to include other Caribbean islands and the results compared on an inter-island basis.

In view of the fact that Barbadian society is now on the threshold of the introduction and implementation of I.T., this study sought to determine what basic and initial I.T. skills Barbadian school-leavers needed; whereas the suggested follow-on study would, in the light of the recommendations made, assess the situation after those basic skills would have acquired some element of perfection, and policies which have been introduced would have rooted and germinated.

The evidence from the research data gives a positive answer to the Research questions (see Section 2.6.1) and supports the hypothesis which states that young people who are competent in Information Technology are better prepared for work in business organisations and so obtain white-collar jobs before those who do not possess such skills. Therefore, given the positive results which have been experienced by students who possessed skills in Information Technology when compared to those students who did not possess such skills, it can be concluded that I.T. is beneficial both to student progress and to their subsequent search for employment.

APPENDICES

Appendix A: Letter to employers, explaining the purpose of the research.

CAVE HILL DRIVE
ST. LUCY
BARBADOS

1992 06 02

Dear Respondent,

I am a student of Salford University, England, presently embarking on research in pursuit of a PhD degree in Information Technology.

Information Technology (I.T.) refers to the use of the computer for the processing of data.

The study will assess the significance of Information Technology (I.T.) in the Barbadian education system and evaluate the success if I.T. programmes in preparing young people for the technological business environment.

The aim of this questionnaire is to determine the views of employers on the use of I.T. applications in business.
I am most grateful for your cooperation at this time.

Please be assured that your response will be treated with total confidence. Your name and that of your organisation will not be disclosed in any way.

The data collected will be used solely for the purposes of this research in the production of my thesis and associated non-commercial educational papers and publications.

Thank you for your assistance.

Yours sincerely

Barbara Scantlebury (Mrs.)

Appendix B:

EMPLOYERS' QUESTIONNAIRE

FOR QUESTIONS 1 TO 6, PLEASE INDICATE YOUR RESPONSES BY MEANS OF A TICK (√).

1. What type of business do you operate?
   a) construction ____ b) food ____
   c) manufacturing ____ d) service ____
   e) other..specify ___

2. How many persons do you employ?
   a) part-time _____
   b) full-time _____

3. Are you currently using I.T. applications in your organisation?
   a) yes ____
   b) no ____
   (If the response to question 3 is NO, please GO ON TO QUESTION 6.)

4. How many people are currently using any of the following Computer-based/Information Technology systems in your Organisation?

   a) computer-aided design (CAD) ___
   b) computerised accounting ___
   - specify package _____
   c) computerised payroll ___
   d) computerised pricing/ticketing ___
   - e.g. barcodes ___
   - kimball tags ___
   e) credit card validation systems ___
   f) databases ___
   - specify package _____
   g) desk-top publishing ___
   h) electronic cash register ___
   i) electronic typewriter ___
   j) spreadsheets ___
   - specify package _____
   k) stock control system ___
   l) word processing ___
   - specify package _____
   m) Other... specify _____

FOR QUESTION 5, PLEASE INDICATE YOUR RESPONSE BY CIRCLING THE APPROPRIATE NUMBER ACCORDING TO THE KEY PROVIDED.

KEY
1. Much higher
2. Higher
3. About the same
4. Not as good as
5. Much poorer than
6. Uncertain

5. How would you evaluate workers with I.T. skills, as compared to those without I.T. skills?

a) Performance in teamwork	1	2	3	4	5	6
b) Ability to work independently	1	2	3	4	5	6
c) Possession of self-confidence	1	2	3	4	5	6
d) Ability to think creatively	1	2	3	4	5	6
e) Effective evaluation of situations	1	2	3	4	5	6
f) Overall job performance	1	2	3	4	5	6
g) Perform given tasks efficiently	1	2	3	4	5	6
h) Use of initiative	1	2	3	4	5	6
i) Possession of leadership qualities	1	2	3	4	5	6
j) Use of effective problem-solving skills	1	2	3	4	5	6
k) Make appropriate decisions when necessary	1	2	3	4	5	6
l) Possession of positive work attitudes	1	2	3	4	5	6
m) Easily adapt to different situations	1	2	3	4	5	6
n) Level of dependability	1	2	3	4	5	6
o) Willingness to try something new	1	2	3	4	5	6
p) Level of responsibility	1	2	3	4	5	6
q) Level of motivation	1	2	3	4	5	6

6. What difficulty(ies), if any, in introducing computer-based or Information Technology systems have you encountered, or do you anticipate, you would encounter while introducing I.T. in your organisation?

a) deciding on suitable applications or equipment _____
b) obtaining finance _____
c) obtaining suitable training _____
d) recruiting suitable trained personnel _____
e) persuading staff to adopt new methods _____
f) Other .. please specify _____

7. If you are considering introducing I.T in your organisation within the next two years, please indicate what applications you are planning to use. If you are already using some computer-based applications, please indicate what new applications you are hoping to introduce.

a) computer-aided design (CAD) ___
b) computerised accounting ___
- specify package _____
c) computerised payroll ___
d) computerised pricing/ticketing ___
- e.g. barcodes ___
- kimball tags ___
e) credit card validation systems ___
f) databases ___
- specify package _____
g) desk-top publishing ___
h) electronic cash register ___
i) electronic typewriter ___
j) spreadsheets ___
- specify package _____
k) stock control system ___
l) word processing ___
- specify package _____
m) Other... specify _____

FOR QUESTION 8, INDICATE YOUR ANSWER BY PLACING THE APPROPRIATE NUMBER (1,2, OR 3), ON THE LINE WHICH CORRESPONDS TO YOUR CHOICE.

8. Of the following I.T. skills, which THREE , in order of preference (first, second, third), would you prefer prospective employees to acquire BEFORE they are recruited in your organisation?

A knowledge of:

a) Wordprocessing _____
b) Spreadsheets _____
c) Databases _____
d) Computerised Accounting _____
e) Computerised Stock-control _____
f) Computerised Payroll _____
g) Other..Specify _____

FOR QUESTION 9, PLEASE INDICATE YOUR RESPONSE BY CIRCLING THE APPROPRIATE NUMBER ACCORDING TO THE KEY PROVIDED.

9. In order to be successful in Business in today's world, how important is it for prospective employees to possess the following attributes?

KEY:
1. Very important
2. Important
3. Not important

a) Ability to adapt to different situations	1	2	3
b) Ability to communicate	1	2	3
c) Ability to work with others	1	2	3
d) Ability to work unsupervised	1	2	3
e) General fitness	1	2	3
f) Good I.T. skills	1	2	3
g) Good level of numeracy	1	2	3
h) Good English Language skills	1	2	3
i) Neat and tidy appearance	1	2	3
j) Mature/stable outlook	1	2	3
k) Positive attitude to work	1	2	3
l) Willingness to learn	1	2	3

THANK YOU FOR RESPONDING TO THIS QUESTIONNAIRE

ALL GOOD WISHES.

Appendix C:

EMPLOYERS' INTERVIEW SCHEDULE

1. What areas do you think have benefitted most from the introduction of Information Technology (I.T.) in your organisation? In what way?

2. What influence has the introduction of Information Technology had on your recruitment policies?

3. What has been the effect of the introduction of I.T. on your company's productivity?

4. What has been the influence of the introduction of I.T. on your company's profit margins?

5. Has your business become more competitive since the introduction of I.T.? If so, in what way?

6. How would you evaluate the performance of workers with I.T. skills?

7. How do you think the present school system can help in the preparation of young people for work in the technological business environment?

8. What should young people know about the role of industry and commerce **before** they enter the technological business environment?

9. How do you think that the qualifications or certificates of a prospective employee can serve as an indication of the candidate's ability to perform adequately in the workplace?

10. What knowledge of and experience in the business environment do you think teachers should bring to bear on their teaching if they are to adequately prepare students for work in an ever changing technological business environment?

11. How do you as an employer think that you can help in the preparation of young people for work in this new business environment?

Appendix D: Letter to Barbadian educators explaining the purpose of the questionnaire.

CAVE HILL DRIVE
ST. LUCY
BARBADOS

1992 04 02

Dear Respondent,

I am a student of Salford University, England, presently embarking on research in pursuit of a PhD degree in Information Technology.

The study will assess the significance of Information Technology (I.T.) in the education system of Barbados and evaluate the success if I.T. programmes in preparing young people for work in a technological business environment.

The aim of this questionnaire is to determine the views of educators on the use and suitability of Information Technology (I.T.) in education.

Information Technology (I.T.) refers to the use of the computer for applications such as wordprocessing, database management and spreadsheet analysis as well as in classroom teaching.

The Ministry of Education has granted me permission to carry out this research in the schools under its jurisdiction.

I am most grateful for your cooperation at this time.

Please be assured that your response will be treated with total confidence. In order to facilitate any follow-up which may become necessary, I would be grateful if you would be disposed to write your name etc. in the space provided at the end of the questionnaire. Your name etc. and that of your organisation will not be disclosed in any way.

The data collected will be used solely for the purposes of this research in the production of my thesis and associated non-commercial educational papers and publications.

Thank you for your assistance.

Yours sincerely

Barbara Scantlebury (Mrs.)

Appendix E:

EDUCATOR'S QUESTIONNAIRE
CIRCLE THE APPROPRIATE RESPONSE(S).

1. At what level do you teach?
   a) Primary
   b) Secondary
   c) Tertiary

2. How long have you been teaching?
   a) 0 - 10 years
   b) 11 - 20 years
   c) 21 + years

3. Gender
   a) Male
   b) Female

4. What is your present position?
   a) Teacher
   b) Head of Department
   c) Deputy Head
   d) Principal
   e) Lecturer
   f) Other: specify_____

5. What knowledge of microcomputers do you have?
   a) A basic knowledge
   b) Much - (not certified)
   c) Very much - (certified)
   d) None

6. How often do you use computer-based Information Technology?
   a) Very regularly
   b) A least once per week
   c) Occasionally
   d) Never

7. In order to further your capability in Information Technology (I.T.), which ONE of the following would you need MOST?
   a) More equipment
   b) More software
   c) More training

FOR QUESTION 8, INDICATE YOUR ANSWER BY PLACING THE APPROPRIATE NUMBER (1 - most preferred, TO 10 - least preferred), ON THE LINE WHICH CORRESPONDS TO YOUR CHOICE.

8. What aspect of Information Technology would you like to know more about?

a) Computer-Assisted learning _____
b) Computer literacy_____
c) Computers in school administration _____
d) Computerised accounting_____
e) Curriculum development (teaching a specific subject) _____
f) Databases _____
g) Desk-top publishing__
h) Spreadsheets _____
i) Word processing _____
j) Other ..specify_____

9. What subject(s) are you presently teaching?

1) _____
2) _____
3) _____

FOR QUESTIONS 10, 11, 12 AND 13, INDICATE YOUR RESPONSE BY CIRCLING THE APPROPRIATE NUMBER ACCORDING TO THE KEY PROVIDED.

10. Please indicate how much use is made of I.T. in the various Departments in your school.

KEY
1: Regularly - Daily/a few times a week
2: A few times a month
3: Occasionally
4: Not at all
5: Uncertain

Administration	1	2	3	4	5
Business Education	1	2	3	4	5
English	1	2	3	4	5
Foreign Language	1	2	3	4	5
General Studies	1	2	3	4	5
Mathematics	1	2	3	4	5
Science	1	2	3	4	5
Vocational Studies	1	2	3	4	5

11. How do you evaluate the suitability of Information Technology applications in the teaching of the following CXC subjects?

KEY

1. Very well suited
2. Fairly well suited
3. Not suited
4. Uncertain

SUBJECT	SUITABILITY			
Agriculture	1	2	3	4
Art	1	2	3	4
Art & Craft	1	2	3	4
Biology	1	2	3	4
Chemistry	1	2	3	4
Clothing & Textiles	1	2	3	4
Craft	1	2	3	4
English Language	1	2	3	4
English Literature	1	2	3	4
Food & Nutrition	1	2	3	4
French	1	2	3	4
Geography	1	2	3	4
History	1	2	3	4
Home Management	1	2	3	4
Information Technology	1	2	3	4
Integrated Science	1	2	3	4
Mathematics	1	2	3	4
Office Procedures	1	2	3	4
Physics	1	2	3	4
Principles of Accounts	1	2	3	4
Principles of Business	1	2	3	4
Social Studies	1	2	3	4
Spanish	1	2	3	4
Technical Drawing	1	2	3	4
Typewriting	1	2	3	4
Woodwork	1	2	3	4

12. Do you think the Barbadian education system should aim to achieve the following goals?

KEY
1. Strongly agree
2. Agree
3. Disagree
4. Strongly disagree
5. Uncertain

a) Every student graduating from secondary school should have a knowledge of I.T.	1	2	3	4	5
b) I.T. should be used ONLY in vocational-oriented subjects.	1	2	3	4	5
c) I.T. should be integrated in as many subjects as possible.	1	2	3	4	5
d) Every student in secondary school should receive instruction in wordprocessing.	1	2	3	4	5

13. To what extent are the following factors hindering the implementation of I.T. practices at your school?

KEY
1. Very much
2. Not very much
3. Not at all
4. Uncertain

THE LACK OF:				
a) Computer-literate teachers	1	2	3	4
b) Teacher interest	1	2	3	4
c) Pupil interest	1	2	3	4
d) Computer hardware	1	2	3	4
e) Instructional software	1	2	3	4
f) Time to develop lessons in which I.T. is used	1	2	3	4
g) Space on the timetable for an additional subject	1	2	3	4
h) I.T. training for teachers	1	2	3	4
i) Teacher knowledge on the use of I.T. in the execution of their teaching lessons	1	2	3	4
j) Administrative support	1	2	3	4
k) An efficient computer maintenance programme	1	2	3	4
l) A comprehensive policy on I.T. implementation	1	2	3	4

FOR QUESTION 14, PLEASE INDICATE YOUR RESPONSE BY CIRCLING THE APPROPRIATE NUMBER ACCORDING TO THE KEY PROVIDED.

KEY

1. Much higher
2. Higher
3. About the same
4. Not as good as
5. Much poorer than
6. Uncertain

14. How would you evaluate students <u>with</u> I.T. skills as compared to those without I.T. skills?

a) Performance in teamwork	1	2	3	4	5	6
b) Ability to work independently	1	2	3	4	5	6
c) Development of self-confidence	1	2	3	4	5	6
d) Ability to think creatively	1	2	3	4	5	6
e) Effective evaluation of situations	1	2	3	4	5	6
f) Overall performance level	1	2	3	4	5	6
g) Performance of given tasks	1	2	3	4	5	6
h) Use of initiative	1	2	3	4	5	6
i) Development of leadership qualities	1	2	3	4	5	6
j) Development of problem-solving ability	1	2	3	4	5	6
k) Development of decision-making ability	1	2	3	4	5	6
l) Development of positive work attitudes	1	2	3	4	5	6
m) Easily adapt to different situations	1	2	3	4	5	6
n) Development of dependable/ responsible work habits	1	2	3	4	5	6
o) Willingness to try something new	1	2	3	4	5	6
p) Level of motivation	1	2	3	4	5	6
q) Ability to manage time effectively	1	2	3	4	5	6

FOR QUESTION 15, INDICATE YOUR ANSWER BY PLACING THE APPROPRIATE NUMBER (1, 2, OR 3),ON THE LINE WHICH CORRESPONDS TO YOUR CHOICE.

15. Of the following I.T. training courses, which **THREE**, in order of preference (first, second, third), would you be interested in attending.

KEY
1. First choice
2. Second choice
3. Third choice

a) school-based in-service computer training, one morning per week _____
b) University-based Faculty of Education, summer vacation courses _____
c) Private tuition _____
d) Day release in-service training _____
e) Ministry of Education Continuing Education computer classes _____
f) Ministry of Education Easter vacation classes _____
g) Barbados Community College Continuing Education course _____
h) 3-month full time course - overseas _____
i) 3-month full time course - locally _____
j) 6-month full time course - overseas _____
k) 6-month full time course - locally _____
l) 1-year full time course - overseas _____
m) 1-year full time course - locally _____
n) Other... Specify _____

Name: _____

Address: _____

_____

Tele. NO. _____

School: _____

Tele. NO: _____

THANK YOU FOR RESPONDING TO THIS QUESTIONNAIRE

ALL GOOD WISHES.

Appendix F:

EDUCATORS' INTERVIEW SCHEDULE

1. What does the term 'Information Technology' mean to you?

2. Do you teach I.T. as a subject or do you use CAL in your teaching? (If 'No', go on to question 7).

3. What methods do you use to introduce the use of the computer to your class(es)?

4. How do the students respond to this/these method(s)?

5. What sort of results do you get? For example, are the students successful in examinations and/or in gaining employment?

6. What enhancements in the personal development of the students do you notice after they have been exposed to I.T.?

7. Do you experience any social pressure to use I.T. in your teaching?

8. What sources of useful information concerning I.T. have you encountered?

9. In what aspect(s) of life do you think I.T. can make a useful contribution?

10. Do you think that traditional educational priorities are being undermined by the introduction of I.T. initiatives?
If so, which priorities?

11. What co-operation do you think should exist between business organisations and schools?

12. Do you think that as a teacher, you understand the operations of the world of industry and commerce, so that you can adequately prepare young people for the world of work?

13. Do you think that with the introduction of I.T. in education, the computer will eventually replace the teacher in the classroom?

14. How would you like to improve your competence in I.T.?

Appendix G: Letter to Barbadian educators regarding the Observation Schedules.

CAVE HILL DRIVE
ST. LUCY
BARBADOS
92 09 09

Dear Colleague

As part of my research into the Significance of Information Technology in the education system of Barbados, I would be grateful if you would assist me in the completion of the enclosed Observation Schedule.

It will be necessary for you to identify a group of about twenty final year students and closely observe their progress during the academic year 1992-93.

Please fill in one form for each student selected. I will collect these forms towards the end of the month. During the third term, I will send you another set of forms on which you will record your observations.

I am most grateful to you for the time you have taken to assist with this schedule.

All good wishes

Yours sincerely

Barbara Scantlebury (Mrs.)

Appendix H: EDUCATORS' OBSERVATION SCHEDULE - 1

Student Name _____
Gender _____

1) Is the student presently studying Information Technology/Computer Studies? Yes No (Circle ONE)

2) Is the student presently studying any Business Education subjects? Yes No (Circle ONE)

ON THE FOLLOWING CHART, RATE THE STUDENT FROM 1 - VERY HIGH, TO 5 - VERY LOW, ACCORDING TO YOUR OBSERVATION. INDICATE YOUR RESPONSE BY TICKING ( ) IN THE APPROPRIATE BOX.

ATTRIBUTES	1	2	3	4	5
1. Ability to work in a group					
2. Ability to work independently					
3. Ability to think creatively					
4. Ability to evaluate situations					
5. Ability to use initiative					
6. Ability to make decisions					
7. Ability to adapt to different situations					
8. Ability to solve problems					
9. Ability to concentrate on a task for a period of time					
10. Development of self-confidence					
11. Development of leadership qualities					
12. Development of positive work attitudes					
13. Development of qualities of responsibility					
14. Development of competitive attitude					
15. Desire to try new things					
16. Level of motivation					
17. Increase in student's productivity					
18. Overall personal development					

Appendix I: **EDUCATORS' OBSERVATION SCHEDULE - 2**

Student Name _____

Gender _____

1) Is the student presently studying Information Technology/Computer Studies? Yes No (Circle ONE)

2) Is the student presently studying any Business Education subjects? Yes No (Circle ONE)

PLEASE INDICATE YOUR RESPONSE BY TICKING ( ) THE APPROPRIATE BOX ACCORDING TO THE KEY PROVIDED

KEY

1. Marked improvement shown
2. Satisfactory improvement shown
3. No improvement shown
4. Some deterioration noted
5. Uncertain

ATTRIBUTES	1	2	3	4	5
1. Ability to work in a group					
2. Ability to work independently					
3. Ability to think creatively					
4. Ability to evaluate situations					
5. Ability to use initiative					
6. Ability to make decisions					
7. Ability to adapt to different situations					
8. Ability to solve problems					
9. Ability to concentrate on a task for a period of time					
10. Development of self-confidence					
11. Development of leadership qualities					
12. Development of positive work attitudes					
13. Development of qualities of responsibility					
14. Development of competitive attitude					
15. Desire to try new things					
16. Level of motivation					
17. Increase in student's productivity					
18. Overall personal development					

Appendix J: Letter to U.K. educators explaining the purpose of the questionnaire.

CAVE HILL DRIVE
ST. LUCY
BARBADOS

1992 04 02

Dear Respondent,

I am a student of Salford University, England, presently embarking on research in pursuit of a PhD degree in Information Technology.

The study will assess the significance of Information Technology (I.T.) in the education system in preparing young people for work in a technological business environment.

The aim of this questionnaire is to determine the views of educators on the use and suitability of Information Technology (I.T.) in education.

Information Technology (I.T.) refers to the use of the computer for applications such as wordprocessing, database management and spreadsheet analysis as well as in classroom teaching.

Please be assured that your response will be treated with total confidence. In order to facilitate any follow-up which may become necessary, I would be grateful if you would be disposed to write your name etc. in the space provided at the end of the questionnaire. Your name etc. and that of your organisation will not be disclosed in any way.

The data collected will be used solely for the purposes of this research in the production of my thesis and associated non-commercial educational papers and publications.

Thank you for your assistance.

Yours sincerely

Barbara Scantlebury (Mrs.)

Appendix K:

U.K. EDUCATORS' QUESTIONNAIRE
CIRCLE THE APPROPRIATE RESPONSE(S).

1. At what level do you teach?
   a) Primary
   b) Secondary
   c) Tertiary

2. How long have you been teaching?
   a) 0 - 10 years
   b) 11 - 20 years
   c) 21 + years

3. Gender
   a) male
   b) female

4. What is your present position?
   a) Teacher
   b) Head of Department
   c) Deputy Head
   d) Principal
   e) Lecturer
   f) Other specify_____

5. What knowledge of microcomputers do you have?
   a) A basic knowledge
   b) Much - (not certified)
   c) Very Much - (certified)
   d) None

6. How often do you use computer-based Information technology?
   a) Very regularly (every day)
   b) At least once per week
   c) Occasionally
   d) Never

7. In order to further your capability in Information Technology (I.T.), which ONE of the following would you need MOST?
   a) more equipment
   b) more software
   c) more training

FOR QUESTION 8, INDICATE YOUR ANSWER BY PLACING THE APPROPRIATE NUMBER (1 - most preferred, TO 10 - least preferred), ON THE LINE WHICH CORRESPONDS TO YOUR CHOICE.

8. What aspect of Information Technology would you like to know more about?

a) Computer-Assisted learning _____
b) Computer literacy_____
c) Computers in school administration _____
d) Computerised accounting_____
e) Curriculum development (teaching a specific subject) _____
f) Databases _____
g) Desk-top publishing__
h) Spreadsheets _____
i) Word processing _____
j) Other ..specify_____

9. What subject(s) are you presently teaching?

1) _____
2) _____
3) _____

FOR QUESTIONS 10, 11, 12 AND 13, INDICATE YOUR RESPONSE BY CIRCLING THE APPROPRIATE NUMBER ACCORDING TO THE KEY PROVIDED.

10. Please indicate how much use is made of I.T. in the various Departments in your school.

KEY

1. Regularly - Daily/a few times a week
2. A few times a month
3. Occasionally
4. Not at all
5. Uncertain

Administration	1	2	3	4	5
Art	1	2	3	4	5
Business Education	1	2	3	4	5
English	1	2	3	4	5
Foreign Language	1	2	3	4	5
Geography	1	2	3	4	5
History	1	2	3	4	5
Mathematics	1	2	3	4	5
Music	1	2	3	4	5
P.E.	1	2	3	4	5
Religious Studies	1	2	3	4	5
Science	1	2	3	4	5
Technology	1	2	3	4	5

11. How do you evaluate the suitability of Information Technology applications in the teaching of the following GCSE subjects?

KEY
1. Very well suited
2. Fairly well suited
3. Not suited
4. Uncertain

SUBJECT	SUITABILITY			
Agriculture	1	2	3	4
Art	1	2	3	4
Biology	1	2	3	4
Business Studies	1	2	3	4
C D T	1	2	3	4
Chemistry	1	2	3	4
Clothing & Textiles	1	2	3	4
Computer Studies	1	2	3	4
Commerce	1	2	3	4
English Language	1	2	3	4
English Literature	1	2	3	4
Food & Nutrition	1	2	3	4
French	1	2	3	4
Geography	1	2	3	4
German	1	2	3	4
History	1	2	3	4
Home Management	1	2	3	4
Humanities	1	2	3	4
Information Technology	1	2	3	4
Integrated Science	1	2	3	4
Mathematics	1	2	3	4
Music	1	2	3	4
Office Practice	1	2	3	4
Physical Education	1	2	3	4
Physics	1	2	3	4
Religious Education	1	2	3	4

12. Do you think the U.K. education system should aim to achieve the following goals?

KEY
1. Strongly agree
2. Agree
3. Disagree
4. Strongly disagree
5. Uncertain

a) Every student graduating from secondary school should have a knowledge of I.T.	1	2	3	4	5
b) I.T. should be used ONLY in vocational-oriented subjects.	1	2	3	4	5
c) I.T. should be integrated in as many subjects as possible.	1	2	3	4	5
d) Every student in secondary school should receive instruction in wordprocessing.	1	2	3	4	5

13. To what extent are the following factors hindering the implementation of I.T. practices at your school?

KEY
1. Very much
2. Not very much
3. Not at all
4. Uncertain

THE LACK OF:				
a) Computer-literate teachers	1	2	3	4
b) Teacher interest	1	2	3	4
c) Pupil interest	1	2	3	4
d) Computer hardware	1	2	3	4
e) Instructional software	1	2	3	4
f) Time to develop lessons in which I.T. is used	1	2	3	4
g) Space on the timetable for an additional subject	1	2	3	4
h) I.T. training for teachers	1	2	3	4
i) Teacher knowledge on the use of I.T. in the execution of their teaching lessons	1	2	3	4
j) Administrative support	1	2	3	4
k) An efficient computer maintenance programme	1	2	3	4
l) A comprehensive policy on I.T. implementation	1	2	3	4

FOR QUESTION 14, PLEASE INDICATE YOUR RESPONSE BY CIRCLING THE APPROPRIATE NUMBER ACCORDING TO THE KEY PROVIDED.

KEY

1. Much higher
2. Higher
3. About the same
4. Not as good as
5. Much poorer than
6. Uncertain

14. How would you evaluate students <u>with</u> I.T. skills as compared to those without I.T. skills?

a) Performance in teamwork	1	2	3	4	5	6
b) Ability to work independently	1	2	3	4	5	6
c) Development of self-confidence	1	2	3	4	5	6
d) Ability to think creatively	1	2	3	4	5	6
e) Effective evaluation of situations	1	2	3	4	5	6
f) Overall performance level	1	2	3	4	5	6
g) Performance of given tasks	1	2	3	4	5	6
h) Use of initiative	1	2	3	4	5	6
i) Development of leadership qualities	1	2	3	4	5	6
j) Development of problem-solving ability	1	2	3	4	5	6
k) Development of decision making ability	1	2	3	4	5	6
l) Development of positive work attitudes	1	2	3	4	5	6
m) Easily adapt to different situations	1	2	3	4	5	6
n) Development of dependable/ responsible work habits	1	2	3	4	5	6
o) Willingness to try something new	1	2	3	4	5	6
p) Level of motivation	1	2	3	4	5	6
q) Ability to manage time effectively	1	2	3	4	5	6

FOR QUESTION 15, INDICATE YOUR ANSWER BY PLACING THE APPROPRIATE NUMBER (1, 2, OR 3), ON THE LINE WHICH CORRESPONDS TO YOUR CHOICE.

15. Of the following I.T. training courses, which **THREE**, in order of preference (first, second, third) would you be interested in attending?

KEY
1. First choice
2. Second choice
3. Third choice

a) School-based in-service computer training, organised by the school co-ordinator one morning per week _____
b) School-based in-service computer training, organised by the LEA Advisory teacher, one morning per week _____

c) College-based Faculty of Education, summer vacation courses _____
d) Day release in-service training, organised by the LEA _____
e) Evening classes, in-service, organised by the LEA _____
f) Vacation course organised by the LEA _____
g) 3-month full time course _____
h) 6-month full time course _____
i) 1-year full time course _____
j) Private Tuition _____
k) Other... Specify _____

Name: _____

Address: _____

_____

Tele. No. _____

School: _____

Tele. No: _____

THANK YOU FOR RESPONDING TO THIS QUESTIONNAIRE

ALL GOOD WISHES.

Appendix L: Letter to students explaining the purpose of the questionnaire.

CAVE HILL DRIVE
ST. LUCY
BARBADOS

1992 04 02

Dear Student

I am seeking to research the effectiveness of Information Technology in helping young people to gain employment upon leaving school.

Information Technology (I.T.) refers to the use of computers in applications such as wordprocessing, database management, spreadsheet analysis as well as in classroom teaching.

To this end, I would be grateful if you would complete this questionnaire at this time, and sign your name and address at the end of it in order that I may get in touch with you about a year later to find out about your work after leaving school.

Please be assured that your response will be treated with total confidence. Your name and that of your future employer will not be disclosed in any way.

The data collected will be used solely for the purposes of this research in the production of my thesis and associated non-commercial educational papers and publications.

The Ministry of Education has granted me permission to conduct this research in schools under its jurisdiction.

I am most grateful for your assistance at this time.

Yours sincerely

Barbara Scantlebury (Mrs.)

Appendix M:

STUDENTS' QUESTIONNAIRE

School Code _____

FOR QUESTIONS 1, 2 AND 3, CIRCLE THE APPROPRIATE RESPONSE.

1. Gender a) male b) female

2. Are you presently enroled in:
   a) Secondary school?
   b) Tertiary education at the Barbados Community College?
   c) Tertiary education at the Samuel Jackman Prescod Polytechnic?

3. Which of these subject combinations are you studying?

   a) Business subjects including Information Technology
   b) Business subjects **excluding** Information Technology
   c) General Science including Information Technology
   d) General Science **excluding** Information Technology
   e) General Subjects including Information Technology
   f) General Subjects **excluding** Information Technology

4. How old are you ? _____ years

5. For how many years, approximately, were you exposed to I.T.? _____ years

FOR QUESTION 6, INDICATE YOUR RESPONSE, BY PLACING AN 'X' ON THE APPROPRIATE LINE(S).

6. What aspect(s) of Information Technology are you presently exposed to?
   a) Computerised accounting ___
   b) Databases ___
   c) Desk top publishing ___
   d) Educational games ___
   e) Spreadsheets ___
   f) Wordprocessing ___
   g) Other..Specify _____
   h) None ___

FOR QUESTIONS 7 TO 10, PLEASE INDICATE YOUR RESPONSE BY CIRCLING THE NUMBER WHICH CORRESPONDS TO YOUR ANSWER ACCORDING TO THE KEY PROVIDED.

KEY
1. Strongly Agree
2. Agree
3. Disagree
4. Strongly Disagree
5. Uncertain

7. How do you think the inclusion of Information Technology in the school curriculum influences/would influence your development?

a) enrich your learning environment ..: 1 2 3 4 5
b) promote team work .....: 1 2 3 4 5
c) promote independent study .....: 1 2 3 4 5
d) enable you to acquire self-confidence .....: 1 2 3 4 5
e) encourage you to think creatively .: 1 2 3 4 5
f) help you to evaluate situations ...: 1 2 3 4 5
g) give you an added advantage when seeking employment .....: 1 2 3 4 5
h) enhance your job performance .....: 1 2 3 4 5

8. Do you think that Information Technology will strongly influence society in the future?.....: 1 2 3 4 5

9. Do you think that the school should directly prepare students for the world of work?.....: 1 2 3 4 5

10. Do you think that all students should acquire skills in Information Technology before leaving school? .....: 1 2 3 4 5

11. How do you regard the role of Information Technology in the business world?

_____
_____
_____

12. How do you think Information Technology will influence your life in the future?

_____

_____

_____

_____

13. List the subjects you are currently studying. Put an 'X' beside those subjects in which I.T. is used.

_____	___	_____	___
_____	___	_____	___
_____	___	_____	___
_____	___	_____	___

14. If I.T. is currently used in any subjects you are studying, write a brief description of how the Teacher uses it in the lesson.

_____

_____

_____

_____

Name:_____

Address: _____

_____

_____

Tele. no:_____

THANK YOU FOR RESPONDING TO THIS QUESTIONNAIRE

ALL GOOD WISHES.

Appendix N : 'Thank you' letter to teachers who distributed and collected the questionnaires.

CAVE HILL DRIVE
ST LUCY
BARBADOS

92 06 02

Dear Colleague

Thank you for assisting me in the execution of the completion of the questionnaire for my research purposes.

I know that at present all of us are very busy with our various assignments, and so I particularly appreciate the time you have taken to help me.

The questionnaire was very well filled in. Please thank all of those students and teachers who took the time to complete them. I will be communicating with them in due course.

Every good wish. Have a happy summer holiday!

Yours sincerely

Barbara Scantlebury (Mrs.)

Appendix O:

STUDENT FOLLOW-UP QUESTIONNAIRE

For students who studied I.T. at school.

Student's Name _____

Student's Telephone No. _____

Student's Option _____

Subjects gained at CXC

1. _____ 5. _____
2. _____ 6. _____
3. _____ 7. _____
4. _____ 8. _____

Destination

1994 _____

1. Briefly describe what you are doing present.

_____

_____

_____

2 a) How is I.T. used at your work-place?

_____

_____

b) What I.T. application(s) are you using at present?

_____

_____

_____

c) How did you gain the necessary operational skills?

_____

_____

_____

3 a) Has the study/use of I.T. enhanced your personal development in any way? If so, in what way?

_____

_____

_____

b) Was the I.T you studied in school meaningful and relevant to what you are presently doing? If so, in what way?

_____

_____

_____

Appendix P:

STUDENT FOLLOW-UP QUESTIONNAIRE

For students who did not study I.T. at school

Student's Name _____

Student's Telephone No. _____

Student's Option _____

Subjects gained at CXC

1. _____ 5. _____
2. _____ 6. _____
3. _____ 7. _____
4. _____ 8. _____

Destination

1994 _____

1. Briefly describe what you are doing present.

_____

_____

_____

_____

2 a) How is I.T. used at your work-place?

_____

_____

_____

b) What I.T. application(s) are you using at present?

_____

_____

c) How did you gain the necessary operational skills?

_____

_____

3 a) How do you feel about having not studied I.T. in your school career?

_____

_____

_____

_____

b) If you had studied I.T. in school, do you think it would have helped in your present job? If so, how?

_____

_____

_____

Appendix Q:

Table 7.

SUBJECTS	1993	1994
Information Technology	134	243
Principles of Business	1422	1371
Office Procedures	866	869
Principles of Accounts	1266	1108
Typewriting	563	596

This table shows the subject entries for the above examinations offered by CXC in 1993 and 1994.

* These figures were obtained from the CXC headquarters, Barbados.

Appendix R.

Table 8.

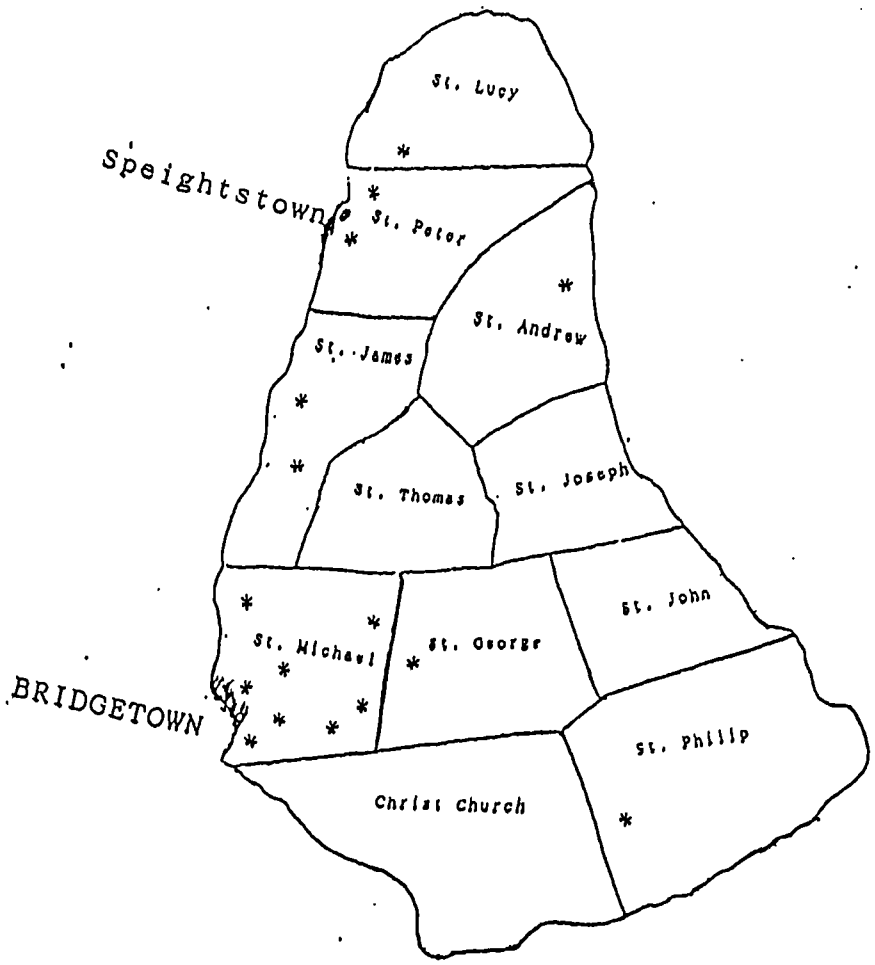
Entries in individual GCSE subjects.

SUBJECTS	1993	1994
Business Studies	13896	13711
Information Technology	12825	12914

* These figures were obtained from the N.E.A.B. Manchester, England.

Appendix S.

The Map of
BARBADOS



The '*' on the map denotes the location of the schools used in the study.

Appendix T:

Ministry of Education, Barbados, choice of Schools/Bursary Form.

MINISTRY OF EDUCATION
BARBADOS, W.I.

CHOICE OF SCHOOLS /BURSARY FORM

A *To be completed by Principal of Primary School*

School Code No. ☐☐☐ Sequence No. ☐☐☐

Before completing this form
Please read very carefully (i) the instructions on the other side of this form
(ii) the information for Parents/Guardians in the Booklet "Government Secondary Schools of Barbados - A Guide"

Name of Primary School..... *(Block Capitals)*

Pupil's Name: ..... (Block Capitals) SURNAME OR FAMILY NAME OTHER NAME(S)

Date of Birth: ... YEAR ... MONTH ... DAY Sex:*(Tick)* Male (M) ☐ Female (F) ☐

Country of Birth: .....

Born Overseas *(Tick)* ☐ Eligibility *(For Official Use)* ☐

Pupil's Address .....

Name of Parent/Guardian ..... *(Block Capitals)*

I certify that the above information is correct .....

Principal's Signature

B *To be completed by Parent Guardian*

CHOICE OF SCHOOL OR BURSARY

After reading the instructions on the other side of this form, write the names of the schools in the order of your choice. If you wish your child to be also considered for a Bursary, place a tick ( ) in the box ☐ at the bottom.

School	School Abbrev.
1st Choice	
2nd Choice	
3rd Choice	
4th Choice	
5th Choice	
6th Choice	
7th Choice	
8th Choice	

School	School Abbrev.
9th Choice	
10th Choice	
11th Choice	
12th Choice	
13th Choice	
14th Choice	
15th Choice	

BURSARY ☐ *(Tick)*

No. of schools chosen including Bursary ☐

Signature of Parent/Guardian: ..... Tel. No. .....Date.....

N.B. Please return completed Form to the Principal of your child's school by Friday, 19th March, 1993.

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