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Information and Communications Technology in Vocational and Technical Education in Brunei Darussalam 1999-2001: Evaluating the Need for Innovation and Change

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A thesis submitted in partial fulfilment of the requirements of the University of Greenwich for the Degree of Doctor of Philosophy

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List of Main Acronyms

BDNDP	Brunei Darussalam National Development Plan
BDTVEC	Brunei Darussalam Technical and Vocational Education Council
BECTa	British Educational Communications and Technology Agency
BTEC	Business and Technology Education Council
CGLI	City and Guilds of London Institute
CSUP	The Committee of Scottish University Principals
CTE	Certificate in Technical Education
CUITE	Computer Use in Technical Education
DfEE	Department for Employment and Education
DOSME	Department of Science and Mathematics Education
DTE	Department of Technical Education
FEFC	Further Education Funding Council
HRD	Human Resource Development
ICT	Information and Communications Technology
ILT	Information and Learning Technology
ITB	Institut Teknologi Brunei
MIB	Melayu Islam Beraja
MJPAPRSB	Maktab Jururawat Pengiran Anak Puteri Rashidah Saadatul Bolkiah
MKJB	Maktab Kejuruteraan Jefri Bolkiah
MOE	Ministry of Education
MTSSR	Maktab Teknik Sultan Saiful Rijal
NCIHE	National Committee of Inquiry into Higher Education
NGfL	National Grid for Learning
NLN	National Learning Network
PGCE	Post Graduate Certificate in Education
PGCTE	Post Graduate Certificate in Technical Education
PLM	Pusat Latihan Mekanik
SEAMEO-VOCTECH	South-East Asian Ministers of Education Organisation regional centre for Vocational and Technical Education
SHBIE	Sultan Hassanal Bolkiah Institute of Education
SHuTT	Service Hub for Trade and Tourism
SME	Small and Medium Enterprise
SVNR	Sekolah Vokasional Nakhoda Ragam
SVSB	Sekolah Vokasional Sultan Bolkiah
UBD	Universiti Brunei Darussalam
UfI	University for Industry
VTE	Vocational and Technical Education

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And As Always, So Now Also…Thank You, Father.
"Everything comes from You, and we have given You only what comes from Your hand. …As for this abundance… it comes from You and all of it belongs to You."

Abstract

This research study, conducted between the periods 1999 – 2001, examined issues of change in the innovation process of Information and Communications Technology (ICT) in the context of Vocational and Technical Education (VTE) institutions in Brunei Darussalam. The study identified and analysed the factors and/or conditions that support success of ICT implementation; investigated what values, perceptions and attitudes VTE teachers in Brunei Darussalam have towards ICT; analysed the approaches and strategies for institutional management of change and decision-making about the implementing ICT in VTE institutions; documented with a view to informing policy makers and ICT implementers on models of best practices and made recommendations for change. A qualitative case-study method, semi-structured interviews constituted the main data-collection technique for gathering and analysing data, supplemented by a survey questionnaire and documentary analysis. 22 people were interviewed, a further 89 people participated in the questionnaire. The study revealed that the VTE system in Brunei Darussalam was in its early stages in its implementation of ICT; there was a lack of planning and policy to drive the impetus for change within institutions. A number of inter-related factors that hamper change and innovation of ICT were identified such as inadequate physical resources; ineffective staff development programmes; shortage of staff skilled and knowledgeable in ICT; ineffective management of change and lack of role clarity of among some of the VTE staff. The study concluded with a number of recommendations for change, for on-going professional development of VTE teachers and for further research.

Chapter One
Overview and Background to the Study

1.1 Introduction

This chapter presents an overview and background to a research study conducted in the Brunei Darussalam's Vocational and Technical Education Institutions during the periods 1999 – 2001. It is divided into five sections. This section 1.1 introduces the subject of the study and the chapter contents. Section 1.2, I explains how the study was first conceived and why it was conducted. Section 1.3 describes the research aims and the research questions. The limitations of the study are described in section 1.4 and section 1.5 concludes the chapter by outlining the organisation of the thesis.

1.2 Why This Research Study?

Many countries believe that Information and Communications Technology (ICT) has been and will continue to be a critical catalyst in educational reform and re-structuring. Brunei Darussalam's main neighbouring countries, like Malaysia and Singapore, seem to be going all out in transforming their schools into what they term *Smart Schools* (Mohamad, 1998) and *Thinking Schools* (Goh, 1997) respectively. In Australia, there have been intentions to improve the ratio of computers to students in schools; adequately fund teachers' professional development; specify competencies in information technology; and audit, accredit or evaluate computer competencies and achievements (Trinidad, 1998). In the United Kingdom, the government launched the *National Grid for Learning* in the hope of turning Britain into a fully-fledged Learning Society (DfEE, 1997). Brunei Darussalam has a similar aspiration – believing that ICT is an essential element for the engine of economic growth. The country is thus committed to the development of its local workforce, both in the public and in the private sectors, with essential ICT knowledge and skills (Garip, 2001a&b).

Whilst there has been significant impact of ICT on Brunei's business and commerce sectors, its impact on Brunei's education sector in general has been less evident. Although personal computers (PCs) were routinely used as a tool for making many administrative duties more efficient, their appearance in the practice of teaching and learning is minimal (Fung, 1997). The acquisition of ICT knowledge and skills still remained a 'future possibility' for many teachers in the VTE institutions in Brunei Darussalam; and indeed for many teachers elsewhere (Fabry & Higgs, 1997; Bakar & Mohamed, 1998).

This is further constrained by the problems of lack of expertise, of teachers who were not adequately prepared, and of the high cost of providing and updating electronic networks and resources in VTE institutions. Until recently, there have been no supporting policies or strategies to drive the development of ICT in the VTE institutions further in spite of the fact that there is an increasing manifestation of the ICT culture in other sectors of the Bruneian society, notably in business and commerce. Nonetheless, the government of His Majesty the Sultan of Brunei Darussalam is fully aware of its commitment to developing an ICT culture in Bruneian society. For this same reason, the Sultan Hassanal Bolkiah Institute of Education of Universiti Brunei Darussalam (SHBIE, UBD) has incorporated ICT in all of its teacher education courses, to help prepare the increasing number of Bruneian pre- and in-service teacher trainees to use ICT effectively in their destined schools and colleges (Sim, 1998).

The government of His Majesty the Sultan of Brunei Darussalam, has for many years, seen human resources as being the country's most valuable asset. Through the Ministry of Education (MOE), a comprehensive education and training strategy has been set up. This was seen as crucial for and integral to sustained economic growth. During the implementation period of the country's Seventh National Development Plan, the MOE has put technological and entrepreneurial studies at various levels as one of its top priorities. The initiative aims not only to develop the appropriate skills among the increasing number of young people in the country but also to help reduce the reliance on foreign expertise (BDSNDP, 1997).

Since the independence of Brunei Darussalam from Great Britain in 1984, the country has increased its number of education and training institutions at all levels including vocational and technical education. With the continual and rapid development in ICT, there is a strong need to shift the country's efforts in dealing with the development of its human resource. The recent 5-year Eighth National Development Plan emphasises the need for a renewed attitude towards investing in people (Garip, 2001b). Investment in HRD in the area of ICT is seen as a priority.

In December 1997, an evaluation study was conducted to assess the effectiveness and relevance of the VTE Teacher Education Programme in Universiti Brunei Darussalam (i.e. the PGCTE/CTE programme) (O'Neill and Fung, 1998). The overall outcomes of the evaluation were constructive. The courses within the PGCTE/CTE programme were seen as appropriate and successful with relatively small changes recommended. Fourteen recommendations were presented. Among others, these include the need to improve access to the ICT facilities provided by the programme provider (SHBIE, UBD) as well as the VTE institutions. The *Computer Use in Technical Education* (CUITE) course was found to be very relevant; however, the need for more advanced ICT 'knowledge and skills' development that went beyond 'computer awareness', simple drill and practice and use of word-processors and spreadsheets was highlighted.

Other 'hidden' issues began to emerge during the evaluation (Fung, 1998). Amongst others, the efforts to integrate ICT into the existing curriculum were perceived to be challenging because access to computing facilities at the

workplace was very limited for both students and staff. Stand-alone PCs (mostly concentrated in computer laboratories) were already too old and too slow to support current (then) software and applications. The number of computer labs was not enough to meet the demand from the increasing number of students, let alone networked or multimedia PCs. There were critical comments on the problems of maintenance of ICT facilities and the lack of technical expertise.

Other concerns that arose were issues related to limited development and training opportunities for staff and lack of expertise in ICT. Despite various efforts to minimise the later problem, VTE has continually experienced a shortage of staff competent in ICT (Fung, 1998). The teachers who participated in the evaluation speculated that only a small number of staff had attended formal courses and training in microcomputer applications and professional development activities such as seminars, IT exhibitions, short courses and conferences. They also revealed that many had acquired their IT skills through self-coaching or private training and short courses conducted elsewhere outside their colleges.

It was increasingly clear that most of the issues brought up during the PGCTE/CTE programme evaluation were not pedagogically-related. Whilst there were efforts to introduce ICT into the existing learning and teaching process, it appeared to be rather unproblematic among the less-bothered staff in the VTE institutions. It was obvious from the concerns raised and I strongly feel that the Bruneian VTE teachers need more support in their professional development – especially in the area of ICT. It was then that I was trying to

find out what types and kinds of professional development these VTE teachers need. Thereafter, I began to think about doing a research study on issues linked to these concerns and a PhD was an obvious choice. Hence, in summary, I wanted to do it because of:

- my role in VTE in Brunei Darussalam
- my experiences with the Teacher Education Programme and
- my personal commitment and conviction.

1.3 The Research Aims and Questions

This research study sets out to investigate and analyse pertinent issues and problems related to the implementation of ICT in the context of Vocational and Technical Education (VTE) in Brunei Darussalam. The study centres upon the VTE teachers' needs for professional development in the above context focussing on their cultural orientation; the learning environment; the pressures set upon them by the ever-changing policies and curricular structures; the management and leadership in the VTE institutions; the needs for training, learning, development and change and other prevailing issues and foreshadowed problems which might arise during the course of the investigation in relation to the use of ICT in their respective VTE institutions. The study is, therefore, relevant to the professional development needs of the VTE teachers in Brunei Darussalam. The aims and objectives of the study are:

- to investigate what values, perceptions and attitudes VTE teachers in Brunei Darussalam have towards ICT;
- to identify, analyse and compare the factors and condition supporting success of ICT implementation in VTE institutions in Brunei Darussalam and elsewhere – especially the UK;
- to analyse the approaches and strategies for institutional management of change and decision-making about the implementing ICT in VTE institutions.
- to document and inform policy makers on examples or models of best practices and make recommendations for change.

Based on the above aims and the background of the study outlined

earlier, the following research questions have been used to guide the investigation. They are designed to achieve the aims and objectives of the study.

- At the institutional level, where are the VTE colleges now in terms of their progress of development in ICT? How adequate is resource provision for effective implementation of ICT?
- Are there any pressures for change? Are there any plans strategically focused on ICT? What are the strategies currently employed by VTE institutions in bringing about change?
- At the individual level, what values are held by VTE teachers towards ICT? How competent/ready are they with ICT? What attitudes do VTE teachers' hold towards ICT?
- What are the factors and conditions that support (or fail to support) successful implementation of ICT in the VTE institutions?
- What model of 'best practices' from other countries might be culturally-transferred to the VTE system in Brunei Darussalam?
- What implications are there for VTE teachers' professional development? What implications are there policy development and further research?

These research questions serve as a guide and form the framework for the study.

1.4 Limitations of the Study

This study encountered a number of problems and limitations. Firstly, there was the problem of locating the required documents such as files, memoranda, circulars and minutes of meetings, from where data from documents such as policy and implementation statements (in relation to the use of ICT and VTE teachers' professional development) could be drawn. There was a time when a specific file was requested but it could not be located or was not available. In addition, locating and analysing document contents were time-consuming tasks. I was thus, compelled to be selective in the scrutiny and analysis of the documents. Such limitation could affect the outcome of the data analysis from documents.

Secondly, while accessing the site for fieldwork was relatively easy because I was associated, albeit not directly, to the VTE system, a close working relationship with the interviewees in the past could pose a 'validity' problem. There could be responses communicated on the basis what the interviewees thought I would like to hear and in some cases I sensed that a few interviewees were not forthcoming to sensitive questions. The 'reliability' of information obtained in this form might be affected.

Thirdly, as there had been no research studies conducted on this subject in Brunei Darussalam, the study relied heavily on the literature and research from overseas – particularly the experiences and perspectives in the UK. However, such reliance on overseas literature would have to be reviewed in terms of the cultural compatibility of such countries. I recognised that some of the overseas findings would have to be treated with caution as they might

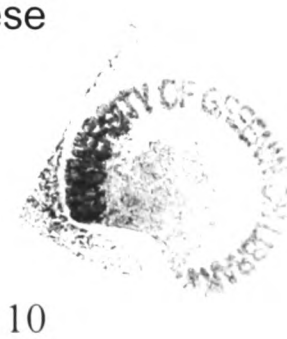
not be readily transferable or applicable to the Brunei situation.

Fourthly, there was the problem of 'generalisibility' of findings. As in the case of other studies utilising the Case-Study Approach or Method, the applicability of findings of this study beyond the context of Brunei Darussalam might be limited. Nevertheless, the findings of the study should be useful for comparative purposes in cases where the cultural contexts are similar.

Fifth, my role as a researcher in this study was that of a data-collection instrument. This means that the data collected from interviews and questionnaires, for example, passed through my mind and were subject to my own interpretation in the recording of the data. Therefore, my perspectives could influence the research findings and the conclusions of the study. This limitation was minimised by letting the interviewees comment on the interview transcripts and on the final case-study report.

Sixth, in the process of data analysis and interpretation, the raw data were organised and categorised (using the mind-maps and coding) resulting in the reduction of the size of the original data. This process could result in the loss of some information or meaning attached to the original data.

Finally, there is an issue related to updating the findings. I recognised that there have been developments both in the UK and in Brunei Darussalam (since I left the UK in June 2002). Due to work commitment, I have done very little work, apart from improving the write-ups and content of this thesis. That is why the submission of this thesis has been delayed. Therefore, these findings might only be valid only up to that time.



1.5 Conclusion and Organisation of the Thesis

This thesis is organised in nine chapters. In this chapter I have presented the background of the study and explained why I had decided to pursue this research. I also gave the aims of the study and proposed a number of research questions which I have used to guide the study.

Chapter Two describes the context of the study which includes the socio-economic development of Brunei Darussalam. The focus of the chapter was on the role of Vocational and Technical Education in human resource development (HRD), where and how ICT takes the central stage and links its development in relation to HRD.

In Chapter Three, I examine some of the relevant work done by other people. The review of literature was based mostly on the perspective of developed nations – especially in the UK – the base of my PhD research study. The chapter aims to show how the findings from this review have been fitted into the framework of the project.

The Research Design and Methodology is presented in Chapter Four. There, I discuss the influence of educational research paradigms and then describe the case-study research and explain the rationale and justifications for adopting such an approach in this research study. I also describe the 'open' emergent research design and how it was deployed in the study – including the details of the data-collection techniques, their inter-relationship and data analysis leading to the development of the case study report.

In Chapter Five, I describe my first attempt at analysing the findings of three case studies colleges in the UK. The focus will be on the factors in development, identification of models of good practice, barriers to innovation and change. I also explain how these case studies done in the UK were used to set the agenda for the major fieldwork in Brunei Darussalam.

The findings of the major case study in Brunei Darussalam will be presented in Chapter Six. I explain how four major themes emerged from the analysis of the interviews done in 3 VTE institutions. The case study report will also focus on the development of policy and its direction over a period of the project. I also explain why there was a need to do further analysis on all of the seven VTE institutions in Brunei Darussalam that necessitated the use of a survey questionnaire. The findings of the questionnaire are presented in Chapter Seven.

In Chapter Eight, the key findings of the study are discussed drawing on the implications for the development of strategy and policy for ICT for VTE, training and professional development of VTE teachers, recommendations for change and implications for further study.

Finally, in Chapter Nine, I describe my learning experiences and development as a researcher throughout the period of the study.

Chapter Two
The Context of the Study

2.1 Introduction

This aim of this chapter is to introduce Negara Brunei Darussalam, the country and its system of Vocational and Technical Education – the context of the research study. The focus is on the socio-economic background and the development and the innovation of ICT in the VTE system highlighting the issues and problems affecting the system. The chapter also reveals the increasing relevance of the study in the light of policy development since 1998.

This chapter is divided into five sections. This section 2.1 introduces the chapter and describes how it is organised. Section 2.2 describes the country's socio-economic and demographic structures. Sections 2.3 describe the country's systems of government and the economy elaborating on the national policy on human resource development and the recognition of ICT as the new engine for economic growth. Section 2.4 describes the system of Vocational and Technical Education, the organisational structure, its development, its links to other organisations and the status of ICT in the VTE System. Finally, section 2.5 concludes the chapter.

2.2 The Country – Brunei Darussalam

Brunei Darussalam, situated in South-East Asia is at the north-western coast of the island of Borneo. It occupies a relatively tiny land area of 5,765 sq km, sandwiched between the two large Malaysian states of Sabah and Sarawak. It faces the South China Sea and lies approximately 440 km north of the equator. The land is divided into four administrative districts, named after the principal rivers of the country – *Brunei-Muara*, *Tutong*, *Belait* and *Temburong*. The capital city, Bandar Seri Begawan, is located in the smallest district – Brunei-Muara.

According to the government statistics (BDSY, 2001), the population of Brunei is estimated to be about 343,600. Of that figure, about 182,100 (53%) are males and about 161,500 (47%) are females. The capital city, Bandar Seri Begawan is the most densely populated with an estimate of more than 50,000 people. The Malays made up about two thirds (67%) of the population of Brunei Darussalam. The minorities include Chinese (15%) and Indians (6%). Various indigenous peoples, such as Dusuns, Dayaks, Ibans and Belaits together make up about 12% of the population.

The country's official language is *Bahasa Melayu* or Malay. English, the second language, is widely used for official purposes, commerce and education. The state religion is Islam. 63% of the people in Brunei Darussalam are Muslims. Other faiths include Buddhism (14%), Christianity (8%), while the rest (15%) follow indigenous beliefs.

Most of the country's revenues come from the production of oil and gas. The citizens of Brunei Darussalam enjoy the benefit of free education up to

the highest level at local as well as overseas universities, with primary and secondary education being provided in Malay, English, or Chinese. The one and only local university, *Universiti Brunei Darussalam* formed in 1985, currently enrols about 3,500 students. Almost 5% of the gross national product (GNP) was spent on education. Costs of medical services are also borne by the government.

Early historical studies such as Jamil Al-Sufri (1990) show that the modernisation of Brunei began in the 1950s when the father of the present ruler, Sultan Sir Omar Ali Saifuddien III became the 28th ruler. Sultan Sir Omar Ali Saifuddien III, who died in 1986, is fondly remembered by many Bruneians as the *Architect of Modern Brunei*. His reign was characterised by rapid social, economic as well as political developments. By 1959, a number of earlier treaties with Britain were terminated and a new treaty, officially known as the *1959 Brunei Constitution*, was established. Under this new treaty, the Government of Brunei took over the administration of all its internal affairs while the British Government retained responsibility for external affairs, which included defence. The post of British Resident was replaced by the British High Commission office.

The present ruler, the 29th of his line of monarchs that dates back to the 14th century, His Majesty Sultan Haji Hassanal Bolkiah Mu'izzadin Waddaulah, the Sultan and Yang Di-Pertuan of Brunei Darussalam, ascended to the throne on October 5th, 1967. Throughout his reign the country has continued to develop and prosper, giving priority to the development of welfare services such as free health and education to its citizens.

After about a century under British 'protection', Brunei gained its full independence on January 1st, 1984. Since independence, the country has steadily strengthened its sovereignty as a kingdom of *Melayu Islam Beraja* (MIB – *translated as* Malay Islamic Monarchy). During the launch of the 5th Brunei National Development Plan, His Majesty the Sultan and Yang Di-Pertuan of Negara Brunei Darussalam said:

> "*Brunei Darussalam shall be for ever sovereign, democratic and independent Malay Muslim Monarchy upon the teachings of Islam according to the Ahlis Sunnah Wal-Jamaah and based upon the principle of liberty, trust and justice and ever seeking the guidance and blessings of Allah (to Whom be praised and Whose name be exalted) the peace and security, welfare and happiness of the people of Brunei Darussalam*" (BDNDP, 1985)

To this day, the MIB concept remains the main driver that influences and shapes the Bruneian society. The following quote is taken from the official website of the Government of Brunei Darussalam:

> '*the nation hopes that through the true adoption and practice of the MIB philosophy, the purity of Islam, the purity of the Malay race and the [institution of the] Monarchy can be maintained and preserved as a lasting legacy for future generations*' (MIB, 2000).

Its commitment towards the Islamic way of life in Brunei Darussalam is evident through the continual banning of, for example, alcohol, non-*halal* food items such as pork, gambling houses and entertainment clubs.

2.3 The Government

The systems in the government have been very much influenced by the systems adopted traditionally in Great Britain. This is featured not only in the present education system but also the legal and administrative system. The current political system is partly based on English Common Law, in which the country adheres to the rule of the law and the independence of the judiciary, partly according to the written 1959 Brunei Constitution and partly based on the MIB concept. This mixture of traditional and reforming policies is a common feature of the current structure of ministerial government system.

The ministerial system of government revolves around the Sultan as the supreme executive power and authority. In accordance with the 1959 constitution, the Ministers including the Prime Minister, Deputy Ministers as well as the Attorney General and Heads of Government Departments are appointed by the Ruling Monarch at his disposal (Brunei Darussalam in Profile, 1988). Within this framework, the Sultan is not only the Head of State but also the Head of the Government. In the present Government structure, besides being the Ruler, His Majesty Sultan Haji Hassanal Bolkiah is also the Prime Minister, the Minister of Defence, the Minister of Finance, and the Head of the Islamic Religion of Brunei Darussalam. Being a working monarch, he is actively involved in the conduct of the state affairs internally and internationally.

There are no political parties in Brunei Darussalam. The MIB concept sees this as unnecessary as the relationship between the people and their ruler is very closely mutual and reciprocal. The Sultan often meets the people

through an extensive series of visits and the people are able to communicate directly with the Sultan and the Government without any need of political intermediaries. In his keynote address during the admission of the country as member of the United Nations in 1984, the Sultan expressed the following principle:

> *"...we will uphold the principle that each country has the inalienable right to establish its own form of government, without any form of outside interference and always having regard to the prevailing circumstances in each country and the aspirations of its own people for a better standard of livelihood and well-being..."*

The main drivers for Brunei Darussalam's economic growth are the oil and gas sectors. They account for 80 per cent of Brunei's exports and 50 per cent of overall economic activity (BDSY, 2001). However, the oil and gas reserves are projected to run out in less than 30 years. Because of this, the country has stepped up its efforts for generating alternative source of income by diversifying its economy.

Maintaining an efficient, clean and honest administration has always been the goal of the government of His Majesty the Sultan of Brunei Darussalam and all government servants are encouraged to work as a team, be determined and full of vigour in order to attain certain desired level of standards. The government realises that the key to progress and development rests with the people especially the younger generation. Realising the challenge of the rapid change brought by the increasing globalisation of the world economy, greater emphasis has been placed on the

need to prepare young people with knowledge and skills through education and training. In His Majesty's message delivered during his 50th Birthday in 1996, he said:

> *"Development and prosperity [of the nation] will also be more easily achievable through education and knowledge. Hence, our Government will always place great emphasis on the need to equip the young generation or youths with the necessary skills and expertise…. Our youths need to equip themselves with various skills, so that they can be utilised as the manpower resources needed for industries that are value-added, high-tech and based on information-technology. Besides this, an integrated approach between the family institution, the education system and the society is also needed to lay a strong foundation. In this way, we can hope to produce youths whose values systems are in accord with national aspirations, and who have the capabilities and are able to shoulder their responsibilities as a contributor to society"*
>
> [Excerpt from the *Titah* (royal keynote address, translated) of His Majesty the Sultan of Brunei Darussalam during His 50th Birthday Celebration]

The country's small population is insufficient to supply the entire workforce needed to implement the targets for national development. Hence the government has had to rely on skilled (and unskilled) workers from other countries. In its effort to reduce the country's reliance on imported labour, the Government has sought to give priorities to train more locals through technical and vocational education and training.

2.4 Vocational and Technical Education (VTE) System

2.4.1 The Development of VTE System in Brunei Darussalam

The first explicit expression by the Government of Brunei Darussalam to introduce vocational and technical education in the country appeared in the Baki-Chang Report in 1959 (Jumat, 1989). However, formal VTE provision only began in 1970 with the establishment of two trade schools, offering craft level courses to cater for the needs of Form 3 school leavers at that time (Jamil, 2000). One of them was based in Belait and the other in the capital (then known as Brunei Town). According to Jamil (2000), the establishment of the two trade schools marked the beginning of a separate VTE system, although at that time it was administered by what was then known as the Organiser of Technical Education, a small section of the then Department of Education.

The need for VTE programmes arose from the economic situation at that time when local workforce was needed to work in the government as well as the commercial and construction sectors (Bakar, 1991). According to Bakar (1991), because of the scarce local resource at that time, foreign labour force had to be imported and there was then a strong need to prepare and train local workforce in vocational and technical skills area to progressively and successively replace these foreign workers.

Over the years, the VTE system continued to expand and more VTE institutions were built in line with the national as well as human resource development needs and in accordance to the successive NDPs. The two pioneering trade schools also increased their range of courses and

programmes and by 1977, higher craft and technician levels programmes (based on the UK's CGLI, RSA, BTEC etc) were introduced to cater for the needs of Form 5 leavers (Jamil, 2000). Having gone through a number of structural changes, in 1996 they were upgraded to the status of 'technical colleges' and respectively renamed *Maktab Teknik Sultan Saiful Rijal* and *Maktab Kejuruteraan Jefri Bolkiah.* The administrative functions of these colleges were under the jurisdiction of the MOE's Department of Schools through a small section known as the Technical Education Division. When the capacity and strength of VTE began to expand, the MOE decided that it was time to form a separate department. In January 1993, the Department of Technical Education was established. Today, there are seven government-owned VTE institutions in the country under the jurisdiction of the Department of Technical Education. Table 2.1 shows the seven institutions, their year of inauguration and the level of programmes they offer.

Table 2.1 Vocational and Technical Education Institutions under Department of Technical Education

VTE Institution	Year Established	Level of Programmes
ITB	1986	Higher Technician
MJPAPRSB	1986	Nursing Diplomas
MTSSR	1986	Technician level
MKJB	1986	Technician level
PLM	1986	Craft level
SVNR	1991	Craft level
SVSB	1995	Craft level

See also appendix A (VTE institutions and Programme Areas) for more detailed information on all of the seven institutions including the URL addresses of their websites.

According to Jamil (2000), there had been several developments that took place towards the end of the last century. These changes were said to have arisen from the following reasons:

- The need to meet the specific demand of the local economy
- Responding to the need for greater flexibility and effectiveness in terms of the delivery of HRD in line with the NDP
- The need to move away from total dependence on foreign programmes, awards, accreditation, towards locally-based equivalents
- Responding to the need of the localisation policy

Table 2.2 summarises the type of change, the year that change took place in the VTE system and their specific function and/or roles:

Table 2.2 Major Changes in VTE

Year	Nature of Change	Function/Roles
1989	Establishment of Vocational Programme Development Centre (VPDC)	Currently known as Programme Development Section (PDS) – To produce locally-designed curriculum materials for VTE institutions
1991	Establishment of Brunei Darussalam Technical and Vocational Education Council (BDTVEC)	To take over the responsibility of the UK-based awarding Certificates and Diplomas as of 1995
1993	Establishment of a separate Department of Technical Education (formerly the VTE system was under the jurisdiction of the Department of Schools within the MOE)	To provide VTE and training services to students and community (including the private sectors) and the government

[Source: DTE, 1999]

2.4.2 VTE Teachers

The total number of VTE teachers in 1999 was 490 – 348 (71%) male and 142 (29%) female. Expatriate staff constituted 46% of the total. This implies that there is still room for more local VTE teachers to meet the requirement for subject matter teaching of the VTE programme currently held by expatriates. Most local VTE teachers (except in ITB and in MJPAPRSB) have HND level qualifications or below and have a teacher training qualification. Many expatriate VTE teachers have degrees and tend to have more industrial experience than local staff. A 'professional development' strategy has been adopted by DTE to promote skills and knowledge transfer – whereby a local staff member is paired with an expatriate one. This strategy was meant to mix and match the 'qualification' and 'experience' of teaching staff so that they complement each other (DTE 1999). Table 2.4 shows the summary of the number of VTE teachers in the seven VTE institutions for the year 1999.

Table 2.4 the Population of Teaching Staff

VTE Institutions	Local Staff		Expatriate Staff		Overall Total		Staff Total
	Male	Female	Male	Female	Male	Female	
ITB	17	9	45	0	62	9	71
MTSSR	61	41	69	15	130	56	186
MKJB	43	9	42	2	85	11	96
MJPAPRSB	8	30	8	8	16	38	54
SVNR	20	8	14	4	34	12	46
SVSB	9	9	8	6	17	15	32
PLM	1	0	3	1	4	1	5

[Source: DTE, 1999]

The specific duties and responsibilities of VTE teachers vary according to the needs of each institution. This is summarised in table 2.5 below:

Table 2.5 VTE Teachers' Qualifications and General Responsibilities

Teacher Categories	Minimum Qualifications	General Tasks
Assistant Technical Instructor (ATI)	Ordinary National Certificate (ONC)	Assisting Technical Instructor in practical areas
Technical Instructor (TI)	Ordinary National Diploma (OND) + Technical Teacher Teaching Certificate	Practical and theory teaching up to PND level programmes
Assistant Senior Technical Instructor (ASTI)	Higher National Certificate (HNC) + Technical Teacher Teaching Certificate	Practical and theory teaching up to ND level programmes
Senior Technical Instructor (STI)	Higher National Diploma (HND) + Technical Teacher Teaching Certificate or First Degree without Teaching Certificate	Practical and theory teaching up to ND level programmes and some administrative duties (e.g. head of department/section)
Education Officer (EO)	First Degree + Post Graduate Certificate in Education	Practical and theory teaching up to HND level programmes and some administrative duties (e.g. head of department/section)

[Source: DTE, 1999]

The VTE teachers in ITB are referred to as 'lecturers' and they are categorised using a different scheme. This is illustrated in table 2.6 below:

Table 2.6 ITB Lecturers' Qualifications and General Responsibilities

Teacher Categories	Minimum Qualifications	General Tasks
Lecturer (L)	First Degree in relevant field	Mostly theory teaching up to HND level programmes and some administrative duties
Senior Lecturer (SL)	Masters Degree in relevant field + relevant experience	Mostly theory teaching up to Degree level programmes, some administrative, research and consultative work
Principal Lecturer (PL)	Masters/Doctorate Degree in relevant field + relevant experience	Mostly theory teaching up to Degree level programmes plus administrative, research and consultative work

[Source: DTE, 1999]

MJPAPRSB, the college of nursing, has a similar scheme of categorisation to ITB, except that an appropriate teaching qualification is a requirement for the nursing lecturers and such a requirement is not a necessity for lecturers in ITB. ITB has a greater autonomy in many areas particularly in financial matters, when compared to the other VTE institutions. With the exception of ITB, the functions and operations of the rest of the VTE institutions are under the jurisdiction of the Department of Technical Education.

2.4.3 VTE Students and Training Programmes

The total number of students studying in VTE institutions in 1999 was 2342, of whom 1277 (55%) were male and 1065 (45%) female. Table 2.7 below summarises the overall distribution:

Table 2.7 VTE Student Population Distribution

VTE Institution	Craft Level		Technician Level		Overall Total		Total
	Male	Female	Male	Female	Male	Female	
ITB*	-	-	111	166	111	166	**277**
MTSSR	91	71	418	280	609	351	**860**
MKJB	127	44	238	102	365	146	**511**
MJPAPRSB**	-	-	-	-	104	293	**397**
SVNR	121	60	-	-	121	60	**181**
SVSB	47	49	-	-	47	49	**96**
PLM	20	-	-	-	20	-	**20**
Total	**406**	**224**	**767**	**548**	**1277**	**1065**	**2342**

* HND programme (2½ Years) ** Diploma in Nursing (3½ Years) **[Source: DTE, 1999]**

The VTE training programmes mainly cater for the needs of local students. However, a limited number of places are available for Bruneian scholarship recipients from the OIC and Commonwealth countries to study in ITB and the College of Nursing, MJPAPRSB.

Table 2.7 shows that the two pioneer colleges, MTSSR and MKJB, are the producers of the bulk of VTE graduates. ITB is the sole producer of graduates at higher technician or higher diploma level.

According to Jamil (2000), the yearly production of VTE graduates from all disciplines of the VTE training programmes is about 1300. Assuming that the capacity of VTE institutions does not change, the VTE system is capable of producing over 13,000 graduates in the next decade or so. Comparing this figure with the projected workforce requirement in 2011 (EPU, 1990) – about 93,300 for low growth and 148,300 for high growth, VTE will be able to produce only 14% of the projected workforce required for low growth or 8.7% for high growth. Unless the HRD capacity and capability of VTE is increased, the country will still have to rely on imported workers (Jamil, 2000).

2.4.4 Problems and Challenges faced by the VTE system

Jamil and Omar (1999) identified eight major issues and problems facing the VTE system in Brunei Darussalam. They are:

- inadequacies in policy making structures and limited capacity in policy options analysis for addressing a particular socio-economic problem, making the environment less favourable for the development of quality VTE and training policies and outcomes.
- limited number of qualified administrative personnel with high leadership quality, making the transition process inefficient and ineffective
- limited capacity in the utilisation of research and evaluation as tools for development
- unsystematic staff development activities

- inadequate and insufficient teachers for VTE programme development and delivery
- the training needs of teaching staff are not adequately addressed (ibid. p29).

The implementation of Technical Teacher Education programme in SHBIE UBD sought to address the problem of inadequately trained teachers. Besides, opportunities are also open for VTE teachers to upgrade their academic qualifications according to the needs of each VTE institution.

In addition, the DTE's *Planning and Operational Document 1999-2004* outlines the following objectives and strategic goals under goal 2 – to develop an effective human resource development plan (DTE 1999, p19):

- To develop human resource development plans. By end of September 1999, a plan of staff development activities for the next 5 years including budgetary requirements will have been developed for approval.
- To consolidate staff development policy. By June 2000, a list of staff development policy statements will have been compiled, discussed and approved.
- By end of 2004, to increase the number of locally-trained VTE teachers by 75%.
- By end of September 1999, a proposal of short and long term staffing requirements of VTE institutions will have been developed and made available to allow successive planning
- To establish consultation framework for technical teachers
- By end of 1999, 25% of DTE staff/VTE institutional staff will have attended conferences/workshops/seminars

- By end of March 2000, at least one international conference will have been organised for VTE teachers.

2.4.5 The Status of ICT in the VTE System (1999-2001)

A recent report from the Department of Technical Education (DTE, 2000) shows that more than 90% of the VTE programmes at all levels offered by the VTE institutions have IT components in them. They may be in either *Applied Computing* or *Practical Computing* or *Computer Applications*. For example in the NTC3 programmes, the *Computer Applications* unit is taught at least 2 hours per week, while in the pre-ND and ND programmes, students are taught *Practical Computing* and *Applied Computing* units respectively. At the HND level, computers are used in all areas at all levels in the operation of the institution and especially in the running of *Computer Information Systems* and *Electronic and Communication Engineering* programmes. According to the report (DTE, 2000), this strategy would ensure that the VTE students would have been sufficiently prepared in terms of ICT literacy when they leave or graduate from the VTE institutions. In terms of VTE teachers' ICT literacy, the report from the DTE claims that more than 80% of the VTE teachers are computer literate. It is however, not clear from the report how that figure is derived nor is there any clear definition for 'computer literacy'.

In terms of physical resources to support learning and teaching, the report reveals that the provision for ICT hardware and software in the VTE institutions (with the exception of ITB) is "generally inadequate" (DTE, 2000). Only three of the institutions have local-area networks (LANs), and even those are not well developed. VTE teachers have limited access to the

Internet. According to the report, access is only given for administrative use. Except for ITB, where student email accounts are provided, in general VTE students did not yet have access to emails through any formal programmes. Table 2.8 shows the student-computer ratio in March 2000:

Table 2.8 VTE student-computer ratio in March 2000

VTE institutions	Student Population	Number of PCs available for student use	Student-Computer ratio
ITB	341	200	2:1
MTSSR	874	35	25:1
MKJB	469	53	9:1
MJPAPRSB	470	6	78:1
SVNR	176	18	10:1
SVSB	186	40	5:1
PLM	50	0	0
Total	2566	352	7:1

[Source: DTE, 2000]

An informal study conducted by Ahmed (2000) in one of the VTE institutions revealed somewhat contrasting results. Some of the key findings are summarised below – the results are based on the data analysis of questionnaires distributed to 210 instructors in four selected VTE institutions with a response rate of 52%:

- 90% of the respondents think that students' learning is enhanced with the use of ICT
- 98% of them recommend more use of ICT in education
- 74% of them use ICT in the teaching and learning process
- 70% of them identified the lack of ICT resources as the main reason for lack of use of ICT for teaching and learning

- 78% of the ICT users had not received any formal training.

In terms of the availability of ICT teachers in 1999, DTE has 35 VTE teachers in terms of staff strength for ICT-related courses programmes, 21 of whom are local. The department is planning to recruit more ICT teachers to meet the increasing demands of the VTE training programme (DTE, 2000). The report also emphasises that "training of non-ICT teachers will be mounted to increase the proportion of computer literate staff in VTE to 100%".

In terms of the place where DTE wished VTE to be over the period 1999-2004, as spelled out in its strategic goals, the targets are that by June 2000 (DTE 1999, p17):

- DTE will have developed its data-base for DTE staff, students and examination results, BDTVEC programmes, equipment inventories, type of industries in Brunei Darussalam
- 50% of DTE personnel will be skilful in some computer programmes
- 50% of DTE personnel will have been supplied with computers
- the DTE will have its email in operation
- 75% of VTE institutions will have Internet access by dial-up connection
- At least three VTE institutions will have been upgraded in terms of computer facilities.

From the above statements, two key issues emerged. Firstly, a question of whether or not 'DTE personnel' include VTE teachers in the VTE institutions. Second, the issue of whether or not the professional development needs of the VTE teachers in the specific knowledge and skills area of ICT have been addressed.

In May 2001, an ICT Task Force Committee was set up in DTE. The members of this committee comprise the heads (or their representatives) of the IT/Computing Department/Section of all VTE institutions. One of the key tasks of this committee was to create an IT Master Plan for the VTE system (DTE, 2001a) by streamlining the IT Master Plan for the MOE (MOE, 2000). The minutes (DTE, 2001b) of the first committee meeting held in May 2001 suggest that the primary focus of the meeting was on the development of the physical infrastructure. It is increasingly evident that DTE is responding positively to the increasing importance of ICT. However, the key issues of staff development and training of VTE teachers and their professional development needs in ICT have yet to be addressed.

2.5 Conclusion of Chapter Two

For Brunei to remain competitive in the ever-changing world market, investment in capital resources will not suffice to maintain the economic stability needed without having a highly-developed, competent and flexible workforce. To maintain its economic stability and survive through the 21st century, it is not enough for Brunei Darussalam to invest only in capital resources, the country also needs to put its confidence in the development of a highly-educated, competent and flexible workforce as a prime asset in economic competitiveness. In this respect, the VTE system has a role to play towards the achievement of this goal. As Jamil (2000) says in the conclusion of his keynote text, "*the VTE system will cease to be effective unless it is sensitive and responsive to the changes in the socio-economic environment*". VTE, thus, plays an important role in the provision of quality HRD programmes for the achievement of the societal goals. The development of VTE and the potential of ICT in energising this development through the professional development of its teachers need to be researched to guide proper and coherent planning and decision making so that VTE can effectively contribute to the achievement of HRD goals. This study sought to investigate the issues of change brought about by the innovation of ICT in the context of Vocational and Technical Education (VTE) institutions in Brunei Darussalam.

Chapter Three
Literature Review

3.1 Introduction

The main focus of this chapter is to develop a theoretical understanding of the subject of change in relation to the innovation of Information and Communication Technology (ICT) in the Vocational and Technical Education (VTE) System in Brunei Darussalam. Since local literature on this subject in the context of Brunei Darussalam is very limited, the review will be based on the experiences and perspectives of educational institutions outside Brunei Darussalam. Most of the literature was drawn from the experiences and perspectives of the schools in the UK – many of which can be transferred to the context of VTE in Brunei Darussalam.

With this purpose in mind, this chapter has been divided into five main sections. This section explains the organisation of this chapter. Section 3.2 describes how external pressures brought about by the development of ICT have penetrated into educational institutions the world over. This section also explores the various ways in which governments and their related agencies have imposed pressure for change. Section 3.3 reviews a number of chosen internal models of change espoused by researchers and writers on change and innovation focussing on the various approaches and strategies to managing change. The emphasis throughout is put on its relation to human resource development. Section 3.4 reviews specific and pertinent issues as they relate to the use of ICT in education. Finally in section 3.5, the findings of the literature review are summarised and the utilisation of such findings in the conduct of the present study is explained.

3.2 ICT and the Imperatives for Change

Development of ICT, in both hardware and software and the supporting infrastructure have brought about unprecedented reaction by many countries around the world. Many view ICT as instrumental to creating a highly-skilled workforce capable of coping with the rapid technological changes of the 21st century. Some of the recent features include increased power in terms of speed and greater storage, decreasing costs, wider than ever range of devices, convergence of TV and mobile telephony, greater bandwidth for faster Internet connections, and information transfer, wireless broadband, voice input and handwriting recognition, and improvements in display and so on. These latest developments, as Tabberer (2000) puts it, 'are enough to pop our heads'.

In more developed countries, there has been a shift in workplace practices particularly in the last two decades in terms of the change in the nature of the workforce – 'the industrial age has been replaced by the information age' (Evans, 2000). According to Evans (2000) the number of 'muscle jobs' like manufacturing in the UK had halved in the past two decades – from seven to a little more than three million and had largely been replaced by 'knowledge jobs'. As a result, ICT is now 'an expected competence instead of a mystery for a minority' (Evans, 2000). The imperatives of change appear to be the need in every individual's ability to continually accumulate knowledge and skills as they strive through the unpredictability of life situations and circumstances, learn to work co-operatively in a team, adapt to new environments and continue to learn independently in this new and ever-changing learning environment and re-assess and continually claim ownership

of their own life-long learning skills.

Another imperative for change is *Globalisation.* There is a direct parallel between the continual process of globalisation and the rapid advance and development of ICT. In the world of business, globalisation has produced imperatives such as the need for enterprises to re-assess their business practices in order to maintain competitiveness (Lubbers, 1998). However, globalisation is not just dominated by economic forces. Globalisation has political and cultural aspects as well, and these form the imperatives shaping the development of the global cosmopolitan society as well as creating a challenge for education to update, re-assess and re-align its existing practices of learning and teaching that match the current and future national needs and trends. Hence these imperatives also point to the need to keep abreast with the development of ICT innovation for effective and intelligent utilisation. The growing technological imperative brought about by the effects of globalisation means that learning and educational institutions can no longer be complacent in their use of ICT as a vehicle through which academic standards can be raised (Giddens, 1999).

For these reasons, educational institutions everywhere are facing a period in which ICT penetrates every area of learning and teaching practices. As Greenfield (2000) says, 'the pace of change fuelled by developments of ICT is faster than our ability to think up ways of using it to its full potential'. Change is driving the belief that 'students will need to be competent in ICT in order to be successful workers and continual learners in the expanding global economy' (Sparks, 1998).

In the United Kingdom, schools, colleges and universities are increasingly focussing on the Internet and the pedagogical opportunities it provides (CSUP, 1992). UK government reports such as the 'National Committee of Inquiry into Higher Education' revealed that IT has been intensively introduced into all sectors of education in the UK over the last two decades (NCIHE, 1997). These reports reveal that progress is being made in the use of ICT for learning and teaching in all sectors of UK education; however, it is relatively slow, patchy and not extensive (NCIHE 1997). As Somekh (2000) says, "there have been achievements but they have never matched the dream".

In 1997, the UK government recommended the creation of a National Grid for Learning, NGfL (DfEE, 1997). It formed part of the ICT initiative in the learning society and was intended to introduce a comprehensive scheme of new technologies in schools, teacher education and development, provide curriculum support and help in the development of lifelong learning (DfEE, 1997). The targets for NGfL also include the following:

- by 1999, all newly qualified school teachers should be ICT literate to a specified standard;
- by 2002, all schools should be connected to the Grid and serving teachers should generally feel confident and competent to teach using ICT.

The UK Prime Minister, Mr. Tony Blair in support of the NGfL, said:

"Technology has revolutionised the way we work and is now to transform education. Children cannot be effective in tomorrow's world if they are trained in yesterday's skills. Nor should teachers be denied the tools that other professionals are trained to take for granted. Standards,

literacy, numeracy, subject knowledge – all will be enhanced by the Grid and the support it will give to our programme for schools improvement"

[quoted in Somekh, 2000]

The UK government's intention to harness the full potentials of new technology to transform education for the benefit of all was demonstrated through the setting out of various aims which include widening access to Information Technology (IT); promoting competition and competitiveness through IT, with the aim of helping business and the wider community, and fostering quality in the content of new services; and to modernise government and ensure that IT is used to deliver the improved and high quality services.

The UK government's commitment to ICT is also obvious through the investment at the national level. In England, Wales and Northern Ireland, the importance placed on ICT is evident from the fact that IT is taught as a National Curriculum subject, IT is also part of the core requirements for the General National Vocational Qualification (GNVQ) examination and IT is a *Key Skill* in Curriculum 2000. As a result ICT is promoted in schools as well as in teacher education. The aim is to "*unlock the kind of learning opportunities, tailored to individual needs and aspirations that until a few years ago, would have been considered impossible*" (DfEE, 1997).

The UK government aims for lifelong learning are expressed in the Green Paper, *The Learning Age* (DfEE, 1998) and this was later taken forward in the White Paper, *Learning to Succeed* (DfEE, 1999) emphasising knowledge acquisition, skills development and student-centred flexible education and

training. Parallel aims are also laid out in *The Education and Training Development Agenda 2000-01* - to "help develop a 'learning society' in which, everyone, in whatever circumstances, routinely expects to learn and upgrade skills throughout life" (DfEE, 2000). These numerous government publications, papers and reports, including the more recent 1999 White Paper, *Modernising Government* clearly indicate that the UK government is pressing forward positively in preparing its citizens for ICT and fostering lifelong learning.

Another government initiative to enhance teachers' incentives which was announced in 2000 was to encourage teachers to purchase a computer so that teachers would be able to use them in their planning and preparation at home (i.e. in private personal time). Known as the *Computers-for-Teachers* scheme, this offers eligible teachers in England a subsidy of 50% towards the cost of a personal computers (either desktops or laptops) from an accredited supplier) up to a maximum of £500. The payment of any income tax and insurance due would be covered by the DfEE (DfEE, 2000).

In *The Education and Training Development Agenda: 2000-01* (DfEE, 2000), the UK government outlines specific aims for the University for Industry (Ufl), as an agency promoting both lifelong learning and greater access to ICT. The aims of Ufl are to "*stimulate demand for lifelong learning amongst business and individuals*" and "*promote the availability of, and improve access to, relevant, high quality and innovative learning opportunities*" through the use of ICT.

Similar aims that parallel the broad UK government's aims for ICT are reflected within the Further Education (FE) sector. This was initially

expressed in government documents such as the Higginson Report (FEFC, 1996), which outlined the need for continuous updating of ICT skills, and the potential for ICT to improve and extend access to learning and teaching in FE colleges in the context of lifelong learning.

In December 1998, David Blunkett, the then Secretary of State announced a £74 million three-year government investment in ICT in FE to "*ensure that colleges are properly equipped for the computer age*" (FEFC, 1999). The overall range of activities comprising this initiative led to the creation of the National Learning Network (NLN). With colleges already spending £100 million annually on ICT, as estimated by the FEFC, it was thought that together the two sums would support improvements to ICT infrastructures, connectivity, staff development and more effective learning and teaching, management at the institutional level through colleges' ICT strategies.

More recently, the Further Education National Training Organisation, FENTO, has issued draft standards for the implementation of ICT in FE (FENTO, 2001). The standards seek to improve the delivery of learning, support for learning and teaching, management of learning and organisational management of Information and Learning Technology (ILT), FENTO have recognised the importance of the joint roles of managers and senior managers within FE. Although the FENTO (2001) report suggests these are only at draft stage, it is ostensibly a clear expression of expectations for the important roles of managers in relation to ICT provision within the sector. Yet, in spite of this important work, the standards are less than specific about the sorts of ICT skills that can be expected.

It is therefore evident that the commitment of the UK Government and its agencies to promote change from the outside towards ICT particularly over the last two decades led to the development of a new set of initiatives designed to establish ICT in schools, colleges and universities. Institutions responded by setting their targets for hardware provision and the associated training of teachers. Government agencies such as the DfEE published papers setting out their thinking on the education of teachers in the use ICT in the classroom.

The political and institutional contexts described above suggest that there is strong support for the integration of ICT in all sectors of education as well as teacher education. And to ensure that such integration is effective, practitioners and policy makers are increasingly placing more importance and recognition on the on-going research and studies into issues related to pedagogy, existing practices, attitudes and perceptions of student and teachers as well as other stakeholders (Beetham and Jones, 2000; Pavey and Watson, 2001; Harvey and Oliver, 2001). At the same time there has been an exponential increase in the provision of resources and equipment and budgets for training (DfES, 2001).

In Brunei Darussalam, the government realised that the economic future of the country relies on the choice and decision made by its people today through intelligent use of new technology. In November 2001, a senior government officer remarked,

> *"we cannot simply ignore the changes that are taking place elsewhere or we risk losing the potential enormous benefits....we cannot deny that advanced technology and globalisation have brought its share of*

problems... these changes have revolutionised the way countries and people interact with each other... advanced technology and globalisation are irreversible and unrelenting processes... the price of disconnecting from the global network is isolation and stagnation and we would be left out behind further." (Garip, 2001a).

The government of His Majesty the Sultan of Brunei Darussalam realises that being a small-state with limited resources on its land as compared to many other countries, it has to rely on the national assets – its own people. This point was highlighted by His Majesty in his keynote address in May 2001 at the APEC High Level Meeting on Human Capacity Building, in Beijing, China. In his keynote address, His Majesty underscored the urgent need for all nations in the Asia-Pacific region to develop their human capacity, not only to address the importance of HRD through the training of new skills but also to narrow down the widening digital divide in the advent of the New Economy (Brudirect.com, 2001):

"How can our people benefit from the opportunities now opening up for them in the New Economy? [This] is a very demanding question... In the rapid development now taking place in technology; people have no choice but to acquire skills and knowledge continuously and quickly. This, in essence, is the challenge [that] we face...In Brunei Darussalam, we are also committed to helping our people take advantage of the new opportunities that are opening up... A barrier we have to overcome, however, is the fact that APEC members are at varying stages of development... To overcome this obstacle we believe that new technology has much to offer by way of helping the development [change] process.....we must equip our people with skills

that are constantly updated. Such skills, in turn, have to be brought to an international level of competitiveness... Above all, if our people are to prosper in the New Economy, they must feel [that] they have a personal stake in its success... We have to make sure that knowledge and the means to disseminate it are not kept in the hands of a few. As well as this, we need to do all we can to encourage creativity and innovation."

Various initiatives have been put in place by the Government of His Majesty the Sultan of Brunei Darussalam to ensure that ICT is one of the keys to the growth and prosperity of the nation. For example, in 2001, an estimated B$11.3 million was budgeted for the provision of computers to government schools. Various programmes on ICT have been set up and a new department to oversee the development of ICT was created in the ministry. However, most of these efforts were geared towards improving the physical infrastructure rather than on the development of human resources. Vocational and technical education has an important role to play in these imperatives of change for ICT – especially in the key area of the provision of skilled human resource for the emerging ICT sector.

3.3 Change and Innovation

3.3.1 Definitions and Key Concepts

The focus of this section is on the concepts of *change* and *innovation* as they are applied in educational settings, that is, the change and innovation that seeks to bring about improvement or desirable outcomes through the alteration of practice.

Change and *innovation* are two inter-related concepts. Carlopio (1998) defines *change* as 'an adoption of an innovation' (p.2). Somekh (1996) defines *innovation* as 'any activity or practice which involves human beings in *changes* to established routines' (italics mine). *Change* is often viewed in the positive sense as something 'becoming better' – i.e. becoming better is a consequence or a direct result of change. Conversely, *change* can also be viewed the other way – That is, it turns something to become worse than the previous state or condition or situation.

Innovation may be viewed as 'new way of doing things or to try out new ideas, new method or new invention.' The concept of *innovation* carries the connotation of a shift or change to something better. Most English dictionaries give the meaning of 'to innovate' as 'to start to use new ideas, methods, or invention'. In this context, *change* can be viewed as a consequence of an *innovation* or an innovation responds to changed context/circumstances. The kind of change that most appropriately fits the discussion in this literature review is the one defined by Morrison (1998):

> *"Change can be regarded as a dynamic and continuous process of development and growth that involves a reorganisation in response to*

'felt needs'. It is a process of transformation, a flow from one state to another...leading to a realignment of existing values, practices and outcomes" (p.13).

Somekh (1998) identifies several important features of an innovation process – one of them is 'messiness'. According to Somekh, the process of innovation is 'messy' because of the absence of a 'blue-print for effective management of innovation'. Therefore one has to deal with the situation one is in and proceed in 'whatever best way' and to use that situation as a 'stepping stone in the desired direction' (Somekh, 1998). An innovation process also requires the 'power of individuals to make positive contributions to bring about change'. Somekh (1998) espouses that teacher professional development is central to the process of planning and implementing change and integration of theory and practice.

One of the main factors affecting the process of change is that it often takes time and this is due to its complex nature (Everard and Morris, 1990). There are many ways of looking at the complexity of the process of change. One is that it can operate at different levels, from individual to organisational. It can operate at whole institutional level and can potentially have far-reaching implications for the culture and organisation of an institution. Change can challenge individuals to develop their attitudes, behaviour and skills. Another is that change itself can change as it is introduced.

According to Everard & Morris (1990), the complexity of change tends to be under-estimated by those responsible for introducing change. They write:

> *"Few individuals in an organisation appreciate how multidimensional change really is; we tend to espouse a comfortably simplistic notion of it… Once we understand that it is the social system that withstands change, we begin to realise some of the complexity; for there exist within such systems innumerable relationships, unwritten norms, vested interests and other characteristics that will probably be disturbed by a proposed change… Change will affect beliefs, assumptions and values and be affected by them. Change will alter the way we are expected to do things. And change will alter things we need to do with them*" (p233-234).

Adapting to the use of ICT in the learning and teaching environment, for example, demands changes in teachers' attitudes and new knowledge of the process of learning and teaching. For many teachers, all of these imperatives happen at the same time. Since teachers play a central role in bringing about change and being the people who make up the educational organisation, they need to have the right attitude, motivation and be willing to commit themselves to the change (Fullan, 1991).

Fullan (1991) points out that the process of change depends on 'what teachers do and think' (p.43). He argues that the crucial factor in bringing about successful change involves providing opportunities for individuals to find meaning in the change. The process of change, on the one hand, can make people feel vitally motivated. On the other, it can be also bring in a mixture of feelings – insecurity, uncertainty, and a sense of becoming de-skilled. For example, as change is implemented over a period of time it may cause

gradual loss of confidence and *de*creasing of skills (this is sometimes referred to as *de-skilling*). This may gradually turn to potential immobilisation or outstrip the starting position – causing an undesirable phenomenon known as a 'change dip' (Goddard and Leask, 1992). That is why support in terms of on-going professional development and other training is necessary not only to prevent this phenomena from happening – that is, to help people come out of this change dip but also to enable them to acquire new knowledge and to develop new attitudes and skills (Joyce and Showers, 1980).

Often, change initiatives fail to deliver what they promise. Everard and Morris (1990) offer several reasons to explain why those introducing change might fail. First, the proponents of change can be over-rational in introducing change (assuming that others will wish to follow once the logic of a planned direction is explained). Second, they can be operating at such a different thought level from those whom the change will affect that they are unable to see how others in fact perceive change. Third, they might over-rely on power and position, whilst neglecting the values, feelings, ideas and experiences of those whom change affects. Fourth, they can fall into the trap of explaining problems which necessitate change to individuals rather than to methods and systems – thus causing defensiveness and they might be trying to deal with an insoluble problem.

3.3.2 The Change Agents as the Key Component

The most crucial components of an innovation process are the people, often referred to as the *agents* of change. As McNay (1997) says... "People are the key to change..." McNay (1997) suggests the use of Lewin's (1951)

'force-field' analysis (see Fig 3.1 below) to 'identify forces/people for and against the proposals, and the strength of their attitude. Then, try to reduce the forces against and increase those in favour.'

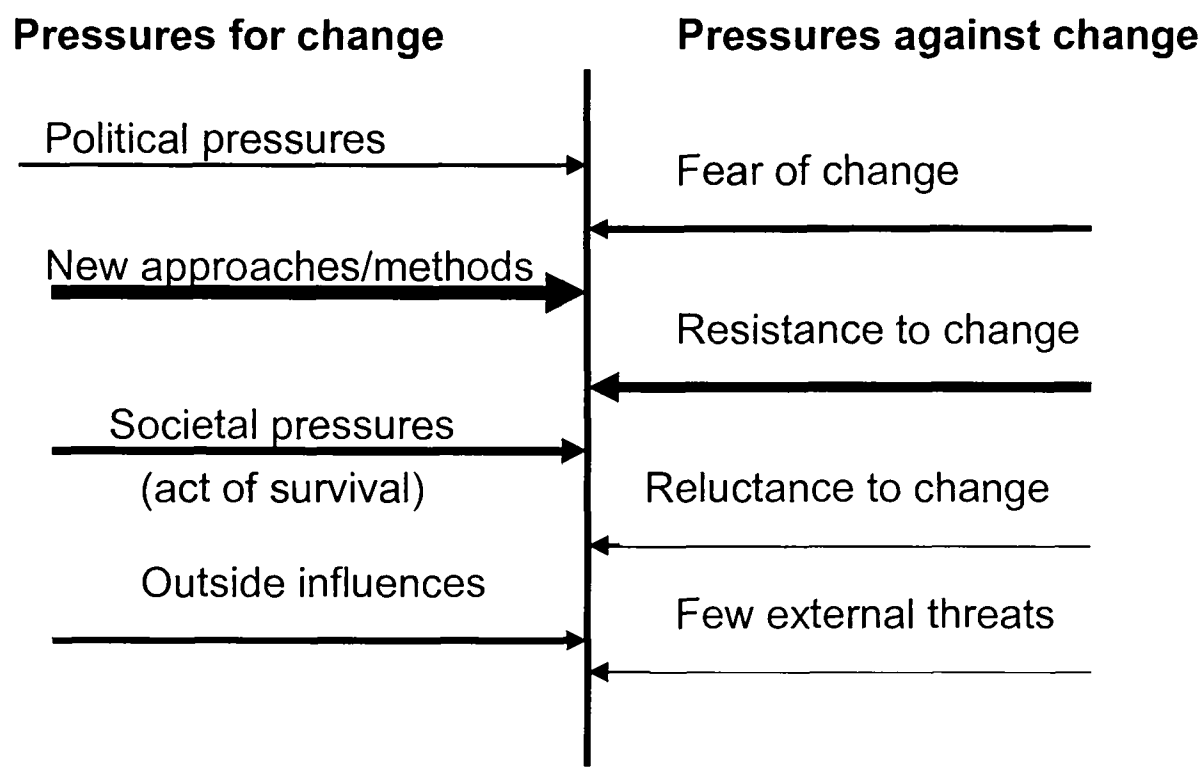


Figure 3.1 Lewin's force-field Analysis

Change agents include visionary leaders, who have the right attitude and motivation to change and the workers who have to implement the change. According to McNay (1997), 'leaders make it wanted; managers [of change] make it happen and administrators, academics and ancillary staff make it work.' Of course, other components are important too such as the support mechanisms that include the physical infrastructure and resources, including their relationship with each other. However, the human or the people aspect is often neglected in the process of implementation. Robbins and Finley (1997) argue that organisational change does not work where strategies are over invested in grand theories or gestures about both the problem and the solution, for example, 're-engineering'. In their analysis, they conclude that

the most neglected aspect of the change process is the 'human factor'. Studies by Simkins and Lumby (2002) also support the view that insufficient attention is being paid to the 'people' side of change and innovation.

3.3.3 External and Internal Drivers of Change Process

Change is often sought when a mismatch is felt between current values and practice or when some members of an organisation become aware of strengths, weaknesses, opportunities or threats, particularly out of economic and other social pressures. That is, the process of change can sometimes be driven by some external forces. Change can also arise out of the personal need to know more or reflection or internal evaluation in an organisation or simply bored with existing practice. Personal drivers for change are usually significant for individuals, motivating them to change things or to accept changes made by others. Personal need for professional development and the hunger and thirst for new learning may also trigger the need for change. These, however, are unlikely to be sufficient or sustainable to bring about real change (Bennis *et al*, 1969).

The implementation of change initiatives usually involves winning the hearts of people to gain *ownership* of a planned change (Bennis *et al*, 1969). For example, teachers can be won into adopting change by involving them in making decisions about the planned change. One of the most effective ways to bring about the adoption of an innovation in educational organisation (or institution) is to engage every individual of the *whole* institution in a democratic process of planned change (Fullan, 1991; Carlopio, 1998). Besides that, the whole system needs to be supportive of individuals

pursuing relevant professional development activities; that they should/must be willing to share with the others what they have learnt; and the others must be willing to learn from their newly-acquired knowledge and/or skills.

According to Bennis (1973), change occurs in two primary ways, through trust and truth or through dissent and conflict. But dissent and conflict bring about change through combativeness and so in the short and possibly long term are maybe destructive to the organisation. Hence, the only real approach available is trust and truth. The challenges to the organisation then are to create an environment in which trust and truth can flourish and thereby lead to a constructive process of change. Trust and truth develop when an organisation embraces a vision that is founded upon clarity and participation. The vision creates the understanding, the necessity and the courage to embrace a new way of doing things.

'People need pressure to change' (Fullan, 1991). This may either operate externally or internally. The magnitude of this 'change' in turn would determine the nature of the complexity of the change. To illustrate this in the UK, for example, the increasing number of students entering further and higher education and the diversity of these students have pressurised the academics to review their approach to deliver their teaching methods through the use of new technology. One assumption was that the integration of ICT into the curriculum could potentially increase students' understanding by enabling them to start their study at an appropriate level and to work at their own pace through the materials. An unprecedented challenge for educators and trainers is therefore the need to train and equip students with the

appropriate analytic skills to enable them to access information and knowledge in an efficient and meaningful way. The pressure is increased by the growing emphasis on the ability to exercise higher-order thinking skills and analytic skills (Bates, 2000). The skills in question go beyond those merely being able to access information proficiently and competently from the Internet but also being able to make use of such information by turning it into meaningful and useful knowledge. Such 'information literacy' skills are essential in life-long learning. As Bates (2000) says, "*they need to know how to use technology to seek, organize, analyze, and apply information appropriately... If we're not teaching through technology, how can we expect them to develop these skills?*"

Therefore, internally-driven change forces in the UK Further and Higher Education sectors included the need to conform to new methods or procedures (Laurillard, 2002). This process forced academics to re-consider the content and delivery of courses and encouraged the introduction of innovative teaching methods. Other drivers of change in the educational settings include changing expectations of learners/students; changing expectations of different groups of staff exhibiting differing values and practices; staff being transferred from one location to another; internal reviews of roles, functions and structures; the need to improve or enhance productivity such as changing teachers or timetables, etc; new emphasis on a more learner-centred approach as opposed to traditional teacher-centred and increased emphasis on 'flexibility' and reduction in content (Green and Lucas, 1999). These 'change forces' (Fullan, 1993) are usually addressed through policy and programme documents all in the name of ensuring a more effective

and meaningful service to students who increasingly needed value-for-money in their educational experience.

Internal pressures for change may also be influenced by the authority and power exercised out of institutional politics. Networks and hierarchies of power and authority exist in every organisation but even more so in educational institutions (Craft, 1996). Some of these are formal and explicit. However, much more influential than the mere job title are the attitudes and personal factors which can influence the trust people have in each other at work, their commitment to team decisions and goals, the way decisions are made and carried out, including the general ethos of the institution. It is therefore crucial to be aware of the political context in which choices are made within an institution. As Craft (1996) puts it, "*being aware of the politics of work is like listening to 'the music behind the words'; just as in a song, the music can have far more impact and effect than the words alone*" (p.154).

3.3.4 Resistance to Change

The current literature is flooded with the subject of teachers' resistance to change in the educational settings. Since resistance is inevitable, it should not surprise the change agents. Understanding more about the sources and mechanism of resistance would enable change agents to anticipate and prepare accordingly.

According to Fullan (1991), resistance to change is a natural response to changes in the environment over which people have little or no control. Fullan argues that educators are neither trained nor expected to deal with or

overcome the major sources of resistance to change and that change typically involved punishment rather than reward. He also found that one of the most fundamental problems in education reform is that people do not have a clear and coherent sense of the reasons for change, what it is and how to proceed. Thus, there is much faddism, superficiality, confusion, and failure to change initiatives, unwarranted and misdirected resistance and misunderstood reform. Fullan maintains that teachers who resist change are not rejecting the need for change but are often expected to lead developments when they are given insufficient long-term opportunities to make sense of the change for themselves.

Maurer (1996) explores the 'lens' through which resistors view change and suggests a number of novel ways in which resistance may be understood, addressed, and engaged. While Senge *et al* (1999) identify ten processes that tend to limit change which include 'no time', 'no help', 'irrelevance', 'lack of demonstrable managerial support', 'fear and anxiety', 'negative assessment', 'isolation of innovators', 'lack of change in administrative structures', 'lack of diffusion' and 'lack of strategic engagement and ways to reduce resistance through each process'.

Dawes (1999) however contends that 'teacher resistance' has become a stereotyping of the profession. Such a convenient phrase arose from lack of understanding of the work that goes on in the institutions. Dawes (1999) argues that people need to really understand what happens during the implementation stage because armed with their professional knowledge, teachers make informed and rational choices about change initiatives and

materials they are asked or required to use. They take decisions that are intended to confirm their beliefs about the educational effectiveness of innovations. Rather than being labelled as 'resistant', teachers might more constructively be considered as selectively welcoming of suitable change.

3.3.5 Factors Supporting and Blocking Change

According to Fullan (1991), there are several reasons for lack of implementation of change. These include inadequacy of resources to support implementation, values rejection, and insufficient time for enabling change. He suggests that one must not start out with the expectation that many or most people will change but begin from the assumption that you will need an evolutionary plan. No amount of knowledge will ever make appropriate action clear. Decisions for action combine intuition with knowledge, political awareness and on-the-hoof decisions. Rather, one must begin from the assumption that the main agenda is for organisational and cultural change, not the implementation of single innovations. The goals should be organisational development and growth.

Fullan (1991) gives several principles when dealing with change. First is to begin with the assumption that one must exchange one's reality with others including those who will implement change, rather than implementing one's own view of reality. Second is to assume that individual implementers will have to work out their own meaning in order for innovation to result in change. This will come in large part through practice. Third is to realise that conflict and disagreement are absolutely fundamental to successful change. Fourth is to be aware that pressure is essential to enable change, but only if it

allows people to react, from their own views, interact with others who are implementing, etc. Fifth is to understand that effective change must be given time and to recognise that implementation of change happens developmentally.

Welch (1998) considers access to technical and educational expertise and collaboration to be important elements in the success of an innovation process. Welch (1998) identified the following barriers to an innovation initiative: *conceptual* (not recognising the importance of the other stakeholders to the problem in hand); *pragmatic* (often systematic factors); *attitudinal* – fears or unrealistic expectations; and *professional.* The last was described as 'most germane' (p.32) in educational environments.

Hall and Oldroyd (1991) identify three types of barrier to change and suggest that these barriers are often encountered in the following categorical order: *technical* (such as lack of resources, facilities, time, etc); *value* (where teachers' beliefs and attitudes are opposed to the change) and *power* (where the head of the organisation is against the change or there is not a 'critical mass' of staff in favour of it). They argue that, in settings where morale is low; change agents (i.e. those advocating or introducing change) are not respected; there is a track record of failed innovation; risk-taking is discouraged; leaders are inflexible in their attitudes; there is little outside support, teachers will be less motivated to support change strategies which are accompanied by practical training and support on-the-job; change strategies that do not adapt to developing circumstances; that do not recognise local needs; that offer no sense of collective 'ownership' and do not

build a 'critical mass' for change. Neither will teachers commit themselves to innovations which: are not seen as beneficial; cannot be clearly understood; are at odds with their professional beliefs and are inadequately resourced.

Similarly, Somekh *et al* (1997) espouse three factors, parallel to the above, that play a crucial role in either supporting or blocking the process of change in an educational setting. They are: the institutional (or organisational) culture, the management style and the micropolitics of the institution. If the institution and its leaders are not committed to adopting change, then if, for example, one teacher goes on a course, the rest could resist any new ideas which the unfortunate teacher brings back into the institution. The last thing the other teachers will then do is to change their practice.

The above points apply particularly to organisational change at the institutional level but can also create a climate in which even change at individual level is difficult. According to Whiteley (1995) there are three intersecting sets of *core values* that underlie an organisation culture – organisational (or institutional) values; group values and individual values. This may be understood as follows: An educational organisation usually consists of individuals – teaching staff, support and administrative staff. Each of them has their own differing goals, interests, perspectives on values and beliefs. As a result, they are structured in work groups – departments, divisions, sections, that have collective/systemic values which Becher and Trowler (2001) called 'academic tribes or territories' that define their cultures, structures, practices, policies, goals, objectives, initiatives, etc. All these different dimensions determine the success (or otherwise) of

the implementation of an innovation.

An institutional culture that is conducive to change at both individual and institutional level is often described as a "learning organisation" (Senge, 1990; Lumby, 1997). According to Holly and Southworth (1989) such an organisation is interactive and negotiative; creative and problem-solving; proactive and responsive; participative and collaborative; flexible and challenging; risk-taking and enterprising; evaluative and reflective; supportive and developmental. This is well supported by other recent key writers on learning organisations such as Pedler *et al.* (1993), Tann (1995), Starkey (1996), Argyris (1996), Senge (1996), Rowley (1998), Martin (1999) and Garratt (2000). A more detailed literature treatment on learning organisation and institutional culture and change will be given later in this chapter in sections 3.4.4 and 3.4.5.

3.3.6 Leadership and the Management of Change

According to Lumby (2001), the 1900s have seen a steady growth in the management literature and theories on leadership. Indeed, effective leadership and management in an organisation play a very pivotal role during process of innovation and change in that organisation (Eckel and Kezar, 2003).

Research conducted by Yee (2000) on the role of leaders in 10 schools that were enriched with IT in Canada, New Zealand and the United States identified several leadership styles which she categorised as – equitable in providing resources and time; learning-focussed envisioning; adventurous learning; patient teaching; protective enabling; constant monitoring;

entrepreneurial networking, and careful challenging. The leaders of change, according to her, can have an impact on the change process depending on the degree to which they are committed to their particular style leadership. Successful change requires a strategy or a framework; willingness to change (based on previous experience of accepting change) an agreed action plan and clear roles for those involved in the change. Once all these are in place during the 'implementing the change' stage, an organisation needs to clarify plans; integrate new practices; provide education and training; encourage ownership; give and receive feedback.

The results of Yee's work parallel other writers on leadership and management such as Sergiovanni (1990) – leaders need a deep level of commitment so that both leaders and those they led are focussed on higher level goals to continuously improve and aim at being the best; Drucker (1994) – espouses 'vision', 'empowerment' and 'teamwork' as the three most essential elements; and Schein (1997) – leadership may be embodied in what people do, not what they say.

One of the five core strategies for change identified by Eckel and Kezar (2003) is collaborative leadership. The other four are support from senior administrative staff, flexible vision, staff development and visible action. However, 'leadership... cannot be the responsibility of the few, a rare event, or a once-in-lifetime opportunity' (Heifetz and Laurie, 1997). Nor should leadership solely be identified with people at the top management level. As McNay says (1997)...[the] 'first lesson: leadership should not come from only one person and policies and processes need to be institutionalised, not

individual' (p.9). People in the middle of an organisation may be stimulated to initiate organisational change (Meyerson, 2003). Meyerson gives a lot of examples for provoking organisational change through small wins. People at every level of an organisation, therefore, need to be supported and encouraged to understand the goals, purposes and processes of any change programme to enable them to exercise effective leadership and management in order to bring about the desired change.

Leadership role is also vital in an institution aspiring to become a learning organisation (see section 3.4.4). Kofman & Senge (1995) suggest institutional leaders modelling 'servant leadership' – democratic behaviour, competent and concern for the well-being of those being led. As Handy points out, learning organisations are built upon an assumption of competence that is supported by.... Curiosity, forgiveness, trust and togetherness.... For too long organisations have operated on an assumptions of incompetence... [characterised by]... controls and directives, rules and procedures, layers of management and pyramids of power (Handy, 1995:46).

McNay (1997) writes 'new leaders tend to fall into two categories: transformational and transactional' (Burns, 1978; Bass, 1985; Middlehurst, 1993). While Coad and Berry (1998) research indicates that a personal learning orientation is associated with transformational leadership, Dever (1997) argues the need only for a strong individual leader – be it heroic transformational or politically transactional. Collin and Porras (1994) suggest, through their discussion of 'visionary companies' that leadership strength lies not in specific personality variables such as leader's individual charisma, but

in the capacity to design and build a vision shared throughout the organisation. Senge (1996) observes, 'many charismatic leaders... deals in visions and in crises, and little in between'. The painting of crises and subsequent visions for change may be used effectively to mobilise people in the short term. However, if those whom change will affect have no role in planning the change or if their suggestions and organisational knowledge are elicited in initial, never-to-be repeated meetings and then disregarded in favour of the leader's vision, it is likely that little learning will occur. Worse still, under these circumstances even mandated structural change is likely to be undermined by resistance and resolute retention of old mindsets, and the institution thus becomes internally divided, inefficient and often too caught up in internal angst and defence strategies to be able to respond appropriate to external threats and opportunities (Argyris, 1996).

The effective leader is therefore less necessarily a charismatic visionary than a collaborating designer (of organisational values, policies, strategies and learning), a steward (who leads by explicitly and visibly serving the interests of the organisational and wider community) and a teacher (who helps others discover their assumptions about the world and develop their full potential) (Senge, 1996; Tichy & Cohen, 1998). The effective leader is motivated primarily by a 'prosocial power motive' (Sashkin, 1992) – the desire to foster the interests of the organisation and its staff rather than self-interest.

Good leadership, while essential at the top, needs also to be seeded throughout the organisation. Thus, leadership training and team building activities, focussing on enhancing interpersonal communication, conflict

resolution and problem-solving skills (Cummings & Worley, 1997) must involve people from the highest to the lowest levels of staffing if an institution-wide learning is to be created. Teams need to be established with reference to what is known about the enabling factors associated with effective, self-managing teams – namely – clear goals, decision-making authority, accountability and responsibility, effective leadership, training and development, resources, and organisational support (Hunter *et al.,* 1996; Yeatts *et al.,* 1996; Harvey *et al.,* 1998).

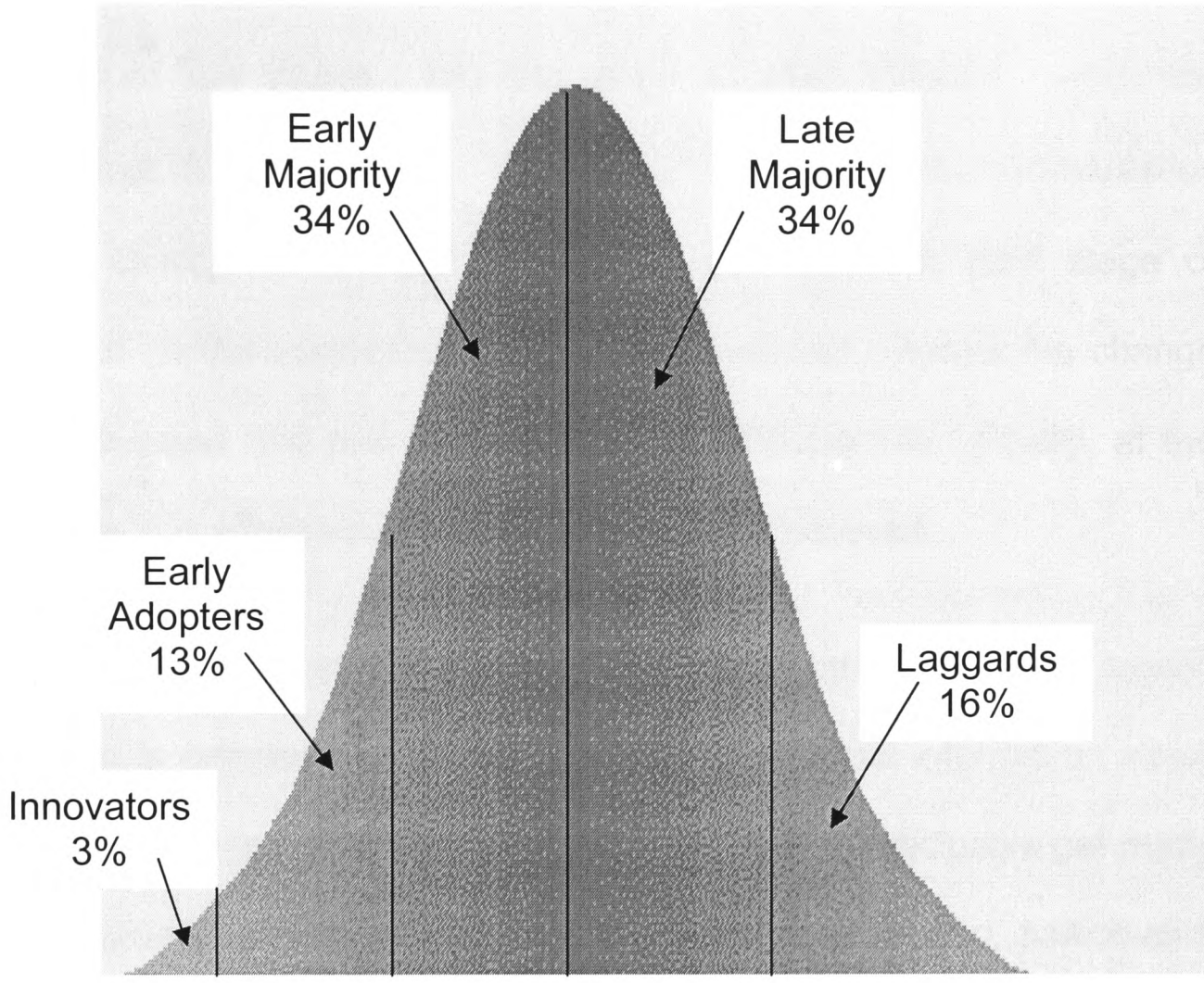
3.4 Internal Model of Change Process

3.4.1 Selected Models of Change and Innovation

Everett Rogers' (1995) model of diffusion of innovations provides a useful framework in which to consider the practical activity of change. It helps separate key factors about the innovation itself – the perceived attributes of the innovation such as its relative advantage, complexity and compatibility, from the context in which the innovation is presented to potential adopters. For example, if the potential adopter views the innovation as relatively not complex, compatible with their existing values and needs, bringing a relative advantage on the individual and observable results, then it is more likely to be adopted. Rogers (1995) categorises five personality types of individuals in terms of how they react to change – *innovators*, *early adopters*, *early majority*, *late majority* and *laggards*.

The "*innovators*" are the champions or change agents who bring in the idea for change. Their roles are so crucial to the success of innovation in organisations that new ideas find a champion or die. The role of these champions is important within an organisation to spearhead the change to enable "unfreezing" (Lewin, 1951). Then there are the "*early adopters*" who are in the vanguard of experimenting with new approaches. They are the "*role models*". People in the "*early majority*" are more circumspect and deliberate in their embracement of change. The "*late majority*" is characterised by scepticism, and more likely to be motivated by pressures of non adoption, such as economic losses and academic isolation. The final group is the "*laggards*". This group is unlikely to embrace the change until it has moved into the category of "traditional" practice or never, and they leave.

The types and distribution of adopters are illustrated in Figure 3.2.



Source: Rogers, E. (2003).

Figure 3.2 Type and Distribution of Adopters

Cooper and Zmud (1990) developed a six-stage model for implementation of IT innovation – based on Kurt Lewin's (1951) implementation model of change process. The first stage is a period of *initiation*, when active and/or passive scanning of problem/opportunities takes place. This then follows the stage of *adoption* – when negotiations for backing IT application implementation are carried out. In the next stage of *adaptation* – the IT application and organisational procedures are revised. At the next stage of *acceptance*, the organisational members are persuaded to commit to ICT application. During the next stage of *routinization*, the usage of IT application

is encouraged as a normal activity. The sixth stage is the *infusion* stage by which time, increased effectiveness is obtained by using the IT application.

Another internal model of change was developed by Michael Fullan (1991) and consisted of four stages. The first stage is called *initiation* – when the decision to adopt change is made. The second stage is called *implementation* – when the change is first put in place. And then the third stage of *continuation* or *institutionalisation* – this phase finds out whether the change becomes embedded and part and parcel of institutional life. Finally, at the *outcome* stage, the effectiveness of the change is discovered.

Somekh (1998) expanded Fullan's (1991) model into a six-stage model. The first stage is *orientation* – where participants seek out information about the innovation. This is followed by *preparation* – where participants get ready to begin the process of innovation. During the stage of *routing*, participants establish low-level routine use. At the *refinement* stage, participants seek to refine and improve their use of the innovation. During the *integration* stage, steps are taken to integrate their use of the innovation fully into practice. The sixth stage of *creative integration* is the stage where participants seek more effective ways of using the innovation.

3.4.2 Change Model through Teacher Development

Hargreaves and Fullan (1992) identify three different approaches to change through teacher development and training – teacher development as knowledge and skill development; teacher development as self-understanding; and teacher development as ecological change.

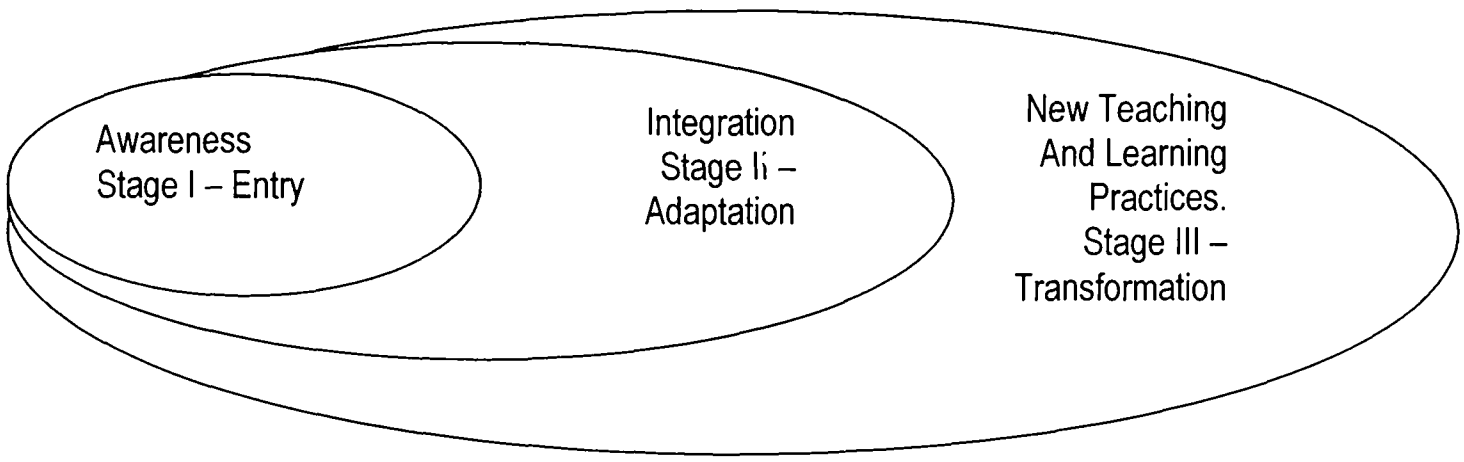
In the approach of knowledge and skill development, they contend that knowledge and skills-based approaches to teacher development are clearly focussed, easily organised and relatively self-contained. A disadvantage of this model is that it is one that is imposed on the staff and it presumes the staff to require only more knowledge or greater expertise. The teacher becomes only a 'receiver', while the 'giver' (holder of new knowledge) finds external validity through the validated certainty of expertise through research. This model aims to correct a skill or knowledge deficiency of a teacher or a whole staff.

The second kind of teacher development is derived from the notion of the teacher as a reflective practitioner (Schön, 1983) which places the teacher at the centre of the process, assessing and reassessing his/her own practice alongside colleagues. Hargreaves and Fullan (1992) suggest that meaningful professional learning sponsors teacher-initiated change, where in-service training implements other people's change.

Their third category is teacher development as ecological change. They described this model as the context for self understanding. Essentially, they found that individual change is successful within an environment that is sensible to reflection. This context could be viewed as the function of the leadership for the change agents. According to them, change is analogous to professional learning that is heavily contingent on the context of teachers' working environment and indeed the context of teaching itself.

A model that provides a useful schema of IT competencies for teachers is cited in Russell *et al.* (2000). Drawn from the *Apple Classrooms of Tomorrow*

(ACOT) research (Sandholtz *et al.* 1997), it gives a conceptual map that promotes ongoing learning and skills development in IT useful for both student teachers and teachers in the form of a professional competency continuum – in the form of three stages – *awareness*, *integration*, and *new teaching and learning practices*, upon which to build a schema of IT competencies for teachers. This model is presented graphically in Figure 3.3:



Stage I	Stage II	Stage III
At this stage, educators, students and the community are aware of the possibilities that technology holds for improving learning – but learning, teaching and the system remain relatively unchanged. Educators at this level lack access to technology and the requisite skills to implement and sustain significant changes in practice.	Technology is thoroughly integrated into the classroom in support of existing practice. Educators at this stage have developed skills related to the use of technology, but have primarily applied these skills to automate, accelerate and enhance the teaching and learning strategies already in place.	At this stage, technology is a catalyst for significant changes in learning practice. Students and teachers adopt new roles and relationships. New learning opportunities are possible through the creative application of technology to the entire school community.

Source: (Sandholtz *et al* .1997)

Figure 3.3 3-stage Model of IT Competency Continuum (after ACOT)

According to Russell *et al.* (2000), a professional development model which concentrates on the attainment of generic computing skills is likely to be inadequate. In terms of the professional competency continuum (Sandholdtz *et al.,* 1997) at best it will only assist teachers to move into the awareness

phase (stage I) and possibly enable them to exhibit some aspects of the integration phase (stage II). While this is necessary, it is not a sufficient condition for the effective use of IT in schools. Teachers will also require professional development in the pedagogical skills necessary to integrate the use of technology into the curriculum (stage II), and they will need to know the implications of their actions for the academic and social development of the students in their care. If technology is to be a catalyst for significant changes in learning practice, as described in Stage III, teachers will need to be sophisticated users of computer applications.

3.4.3 Strategies for Managing Change

Three broad strategies pioneered by Bennis *et al.* (1969) are still relevant and useful for analysing the approaches of introducing change. They are *power-coercive; rational-empirical* and *normative-re-educative.*

The *power-coercive* approach assumes that individuals change when formalised authority and power are imposed on them. The assumption is that real change happens through change in laws and regulations, where there are sanctions for non-compliance, and rewards for compliance. The shortcoming of this approach is that the use of power and authority often leads to conflict and hostility.

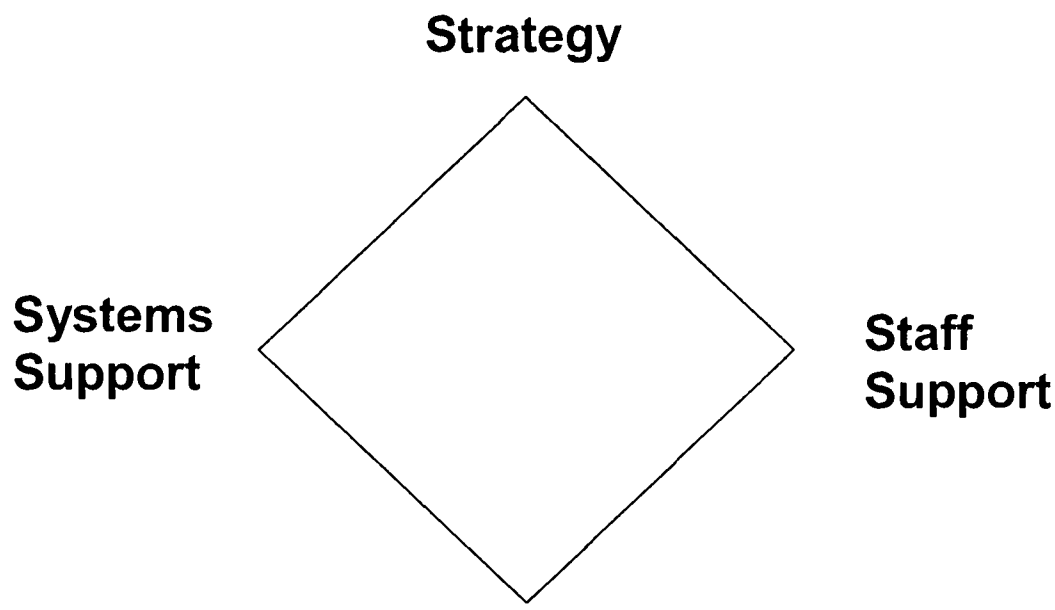
The *rational-empirical* approach assumes that individuals are rational and change in response to trustworthy information relating to their own self-interest. The assumption is that real change comes about through effective communication about the innovation and its benefits, with practical demonstration of the new technique and provision of the necessary

resources. The shortcomings of this approach include the problem that the real world and people are not purely 'rational'. There are competing values and 'rationalities' which lead to conflict of interest.

The *normative-re-educative* approach assumes individuals change when group social pressures realign their beliefs and behaviour. The assumption is that real change happens when significant formal and informal groups are identified and helped to explore the implications of the innovation themselves, examining and changing hostile attitudes through group discussion and training, developing a 'critical mass' of support for change that demands a lot of 'heart-buying'. The problem with this approach is that group norms are not easily influenced, and often small groups within an organisation cannot 'go it alone'. Also, even committed groups cannot overcome lack of rewards or shortage of resources.

The third approach of Bennis *et al.* (normative-re-educative) recognises the social and psychological complexity of change. However, during application, it may be necessary to combine two or even all these strategies. Individuals and groups should analyse change that is mandated to work out 'what is required and what is discretionary' (Goddard and Leask, 1992). They can then concentrate on implementing the required element and only those aspects of the discretionary elements that address their own needs. This allows for a degree of mutual adaptation and the use of a change strategy, which combines two or possibly all of the three strategies.

McNay's (2003) work on strategic management of organisational change in higher education suggests four alliterative elements which are essential in the management of change – strategy; system support; staff support and structures. This is illustrated by the diamond model shown in Figure 3.4:



Source: McNay (2003)

Figure 3.4 Key Elements in Change – Managing Change

McNay's diamond model central idea is that institutional change and effectiveness require interaction and balance between these four essential elements:

Strategy – Failure to progress towards the desired change can be due to the fact that the strategy for implementation has not been thought through. Strategy necessitates detailed analysis of necessary action and it requires analysis of the underlying problem so that appropriate means of tackling them is built into the strategy and it takes account of the other three elements. Only when this has been done will it be possible to sequence and co-ordinate the

various activities. Effective implementation of a change programme may require a change in the institutional culture (see section 3.4.5), and this also will need to be addressed by the strategy.

Systems – There are several factors that exert pressure on educational institutions to establish and operate effective systems across the organisation as a whole. The establishment of effective systems support across the organisation as a whole determines the success or otherwise of key strategic objectives. It is important to realise that the implementation of change is often blocked by problems relating to institutional systems.

Staff – Lack of progress in implementing a change initiative can be due to a failure to think through of the staffing implications. The support and involvement of right staff with the right knowledge, right skills and right attitudes is important – especially in terms of allocating responsibilities for the implementation of the change programme. For new initiatives to take roots, it is usually advantageous to prepare the ground first, through staff development and training.

Structures – Aspects of the existing organisational structure may be affecting the implementation of change initiatives. They may work for or against the implementation of key objectives. Hence, strategy calls for changes to structure. Any imbalance in the organisational structure can be caused as new functions evolve. This may be caused by a lack of enabling systems for different groups to work together which in turn may cause conflicts or confusion amongst staff and therefore can block the effective implementation of change initiatives.

3.4.4 Learning Organisations

The concept of the 'learning organisations' has sparked interest among many proponents of organisational change – especially those in the business and commercial sectors. In education, the term 'learning organisations' has attracted interest from many – 'as seeming to hold out the hope of providing new ideas' required by aspiring leaders and managers of educational institutions who desire institutional effectiveness and efficiency 'in times of unprecedented change' (Lumby, 1997).

Despite the belief that such organisations do not exist, many have sought to write about them – what learning organisations do to achieve this recognition, and the benefits that they reap (Senge, 1990; Argyris, 1991; Easterby-Smith and Araujo, 1992; Pedler *et al.*, 1993; Senge, 1995; Tann, 1995; Starkey, 1996; Argyris, 1996; Davenport and Prusak, 1997; Tsang (1997); Lumby, 1997; Garavan, 1997; Nonaka, 1998; Wenger, 1998; Rowley, 1998; Easterby-Smith *et al.*, 1999; Martin, 1999; Finger and Brand, 1999; Dixon, 2000; Garratt, 2000) – Many of these writers have sought to identify the ideal form which 'real organisations could attempt to emulate' (Easterby-Smith and Araujo, 1992:2). In this sense, the learning organisation is an ideal, 'towards which organisations have to evolve in order to be able to respond to the various pressures [of change] and is characterised by a recognition that 'individual and collective learning are key' (Finger and Brand, 1999:136).

Two important results arise from this. First, many support the view that a real-life example of a truly learning organisation is difficult to find. Garratt (2000) writes…a 'learning organisation is more of a continuing aspiration than

a product... Yet it is an idea which certainly stretches and motivates people and organisations for the long haul to achieve their vision' (p.x). Second, there is a distinct contrast between the key writers' theoretical framework for learning organisation and the concept of 'organisational learning' (Argyris and Schön, 1996). Although theorists of learning organisations have often drawn from organisational learning, the concerns between the two have been somewhat different and the two literatures have developed along divergent tracks (Tsang, 1997). The literature on organisational learning has concentrated on the detached collection and analysis of the processes involved in individual and collective learning inside organisations; whereas the learning organisations literature has an action orientation, and is geared toward using specific diagnostic and evaluative methodological tools which can help identify, promote and evaluate the quality of learning process inside organisation (Tsang, 1997). It can be argued that organisational learning is the 'activity and the process by which organisations eventually reach the ideal of a learning organisation' (Finger and Brand, 1999). Alternatively, 'organisational learning' indicates the existence of the type of processes which might produce a 'learning organisation' as an outcome (Garavan, 1997).

Salner's (1999) and Coopey's (1996) descriptions of organisational learning and the learning organisation highlight the issue that bedevils much of the discussion on organisational change and most attempts to achieve change – the false objectification of 'the organisation' (Garavan, 1997). These writers either ignore human heterogeneity in behaviour or motivation in order to provide descriptions (mostly from managers' and leaders' perspectives) of achievement due to 'shared vision'.

Pedler *et al.* (1988, quoted in Rowley, 1998) define 'a learning company as an organisation that facilitates the learning of all its members and continuously transforms itself'. According to them, the learning company is a vision of what might be possible. It is brought about simply by training individuals; it can only happen as a result of learning at the whole organisation level. Again the two key elements are individual learning and organisational learning and transformation (change). Pedler *et al.* (quoted in Rowley, 1998) elaborate the concept further... that a learning organisation is one which:

- has a climate in which individual members are encouraged to learn and to develop their full potential;
- extends this learning culture to include customers, suppliers and other significant stakeholders;
- makes human resource development strategy central to business policy; and
- is a continuous process of organisational transformation.

For Senge (1990), learning organisations are organisations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, which collective aspiration is set free, and where people are continually learning to see the whole together (Senge, 1990: 3). Senge (1990) writes... a learning organisation values, and derives competitive advantage from continual learning, both individual and collective. He adds... a learning organisation is a place where people are continually discovering how they create their reality and how they can change it using the five disciplines. The five disciplines are systems thinking, personal mastery, mental models, shared vision, and team

learning. Senge proposes that people put aside their old ways of thinking (mental models), learn to be open with others (personal mastery), understand how their company really works (systems thinking), form a plan everyone can agree on (shared vision), and then work together to achieve that vision (team learning).

None of these concepts are new, but Senge created something new and powerful by putting them together. According to him, it is the fifth discipline – (systems thinking) that makes understandable the subtlest aspect of the learning organisation the new way individuals perceive themselves and their world. At the heart of a learning organisation is 'a shift of mind' (metanoia) from seeing ourselves as separate from the world to connected to the world, from seeing problems as caused by someone or something "out there" to seeing how our own actions create the problems we experience.

It is along this theme that Martin (1999) takes up when she discusses learning in universities. Drawing upon Senge's strategies and student learning literature, Martin provides suggestions regarding the way universities might go about learning. The kind of learning suggested by Senge (adopted by Martin, 1999) would ideally result not just in the capacity to deal effectively with immediate challenges (single-loop learning) or in the capacity to examine assumptions about the environment and consequent beliefs about appropriate behaviour (double-loop learning) but also in the meta-cognition, or learning how to learn (Cummings & Worley, 1997). Underpinning such learning, one might expect there to be bottom-up as well as top-down flows of information and ideas (Rolls, 1995), reflection upon action (Redding & Catalanello, 1994)

and the elicitation of existing mindsets (De Gaus, 1996) for the purpose of developing flexibility as well as sharing perceptions, needs and expectations (Starkey, 1996). For Watkins and Marsick (1993), a learning organisation arises from structures and processes that

- create continuous learning opportunities
- promote inquiry and dialogue
- encourage collaboration and team learning
- establish systems to capture and share learning
- empower people toward a collective vision and
- connect the organisation to its environment.

When these principles are embedded in an organisation, they not only guide internal and organisational development but they necessarily also influence external relationships. Thus, internal and external strategy development promotes learning and the implementation of strategy provides feedback through which ongoing learning can also occur. In practical terms, these principles translate into the following essential characteristics of a learning organisation (Watkins and Marsick, 1993):

- Leaders who model calculated risk-taking and experimentation
- Decentralised decision-making and employee empowerment
- Skills inventories for sharing learning and using it
- Rewards and structures for employee initiatives
- Consideration of long-term consequences and impact on the work of others
- Frequent use of cross-functional work teams
- Opportunities to learn from experience on a daily-basis

- A culture of feedback and disclosure.

Martin (1999) touches on some of these characteristics, and the tensions they generate, when discussing how universities might deal with issues of shared vision, collaboration and independence and accountability and reward. However, she adopts an essentially sanguine view of the potential universities have for becoming learning organisations and scarcely questions the desirability of them doing so. Locating the responsibility for change primarily at the feet of individuals, issues relating to political control, power and leadership are addressed only obliquely via case studies of how those and with designated power brought about change and suggested about 'how vital it is not to feel a victim... [and to] work out what you as an individual can do to make things better – for yourself and others' (Martin, 1999:52).

The development of leadership and teamwork capacities and strategies for empowering staff and capturing learning become particularly important in the absence of top leadership commitment to developing the institution as a learning organisation. As Martin (1999) suggests, the common retreat into blaming the system for frustrations and lack of change does not have to occur. The failure of top management to envisage and support development of 'a type of organisation we would truly like to work within and which can thrive in a world of increasing interdependency and change' (Kofman and Senge, 1995), does not absolve us of our responsibility to try to create just such an organisation at a local level which we might have influence.

3.4.5 Institutional Culture

Many attempts to bring about change and innovation in educational institutions have failed because the focus was on the change itself, not on the needs and outcomes of the institutions and their clients as reflected by their *cultures*. We cannot continue to promote change for sake of change and we cannot mandate change (Fullan, 1992). Similarly we cannot mandate the use of ICT in educational institutions. ICT has significant benefits for teaching and learning, but we can't simply utilise ICT for ICT sake in order to satisfy political agendas that do not benefits students. Institutional culture is an important key for its acceptance and subsequent effective use. It needs to fit into the institutional cultures' structure, goals, curriculum and related activities and not vice versa.

Trying to understanding the term culture is a challenging endeavour, because the term itself has different meaning for different people. However, it is important because once 'we know what culture is, we begin to understand what needs to be change for culture to change. When we appreciate its nature, we can understand how it may be changed. When we know its role, we can comprehend its importance' (Williams *et al.*, 1989).

The definition of culture in Webster's dictionary, that perhaps appropriately fits the discussion in this literature review, reads "the concepts, habits, skills, arts, instruments, institutions, etc of a given people in a given period." This definition not only indicates that cultures do change, but it also reflects all the characteristics and attributes that make them distinctive. Individuals may significantly represent or display their cultural heritage. It is

therefore vital for leaders and managers of educational change to pursue the viable mechanisms and structures for accommodating individuals from diverse cultural orientations.

The culture of an institution can both influence and be influenced by 'change'. The kinds of change that may impact on cultures include social, political, economic and technological. Hence the focus of culture's ability to change is also important. This involves both cultures – the one being adopted (the adoptee) and the one that is adopting the other culture (the adopter). However the pecking order tells us that the adopter culture must survive at all costs.

The culture of an organisation can create an invisible barrier to change. A deeply held set of values and norms often produce a strategic myopia, meaning that members may miss the significance of external events and may be blinded by their strongly held beliefs (Fung, 1992). As a result, decisions and actions not only reflect the organisations' culture, but are constrained by it (Fung, 1992). Since most cultures are well established, changes that may occur, require commitments, take time, and need to be strategically integrated.

There are several ways of describing the kinds of cultures found in organisations. Handy (1993) has written about a wider range of (mainly business) organisations. Harper (1997) identified four dominant ones (based on Handy, 1993) which are found in Further Education institutions in the UK – they might also be found in VTE institutions in Brunei Darussalam. According to Harper, FE colleges normally exhibit a mixture of these but one culture may well be predominant. Harper (1997) describes these four cultures as follows:

- *Power culture* – where decisions and directions depend on senior staff – usually the principal or members of the senior management team. Decisions are taken somewhat arbitrary, rather than in accordance with logic or procedures. The main strength is that they can react quickly but the direction they take depends on the person in control – the central authority. Therefore the key levers to change the organisation of this culture, is that you must get the support of the central authority.

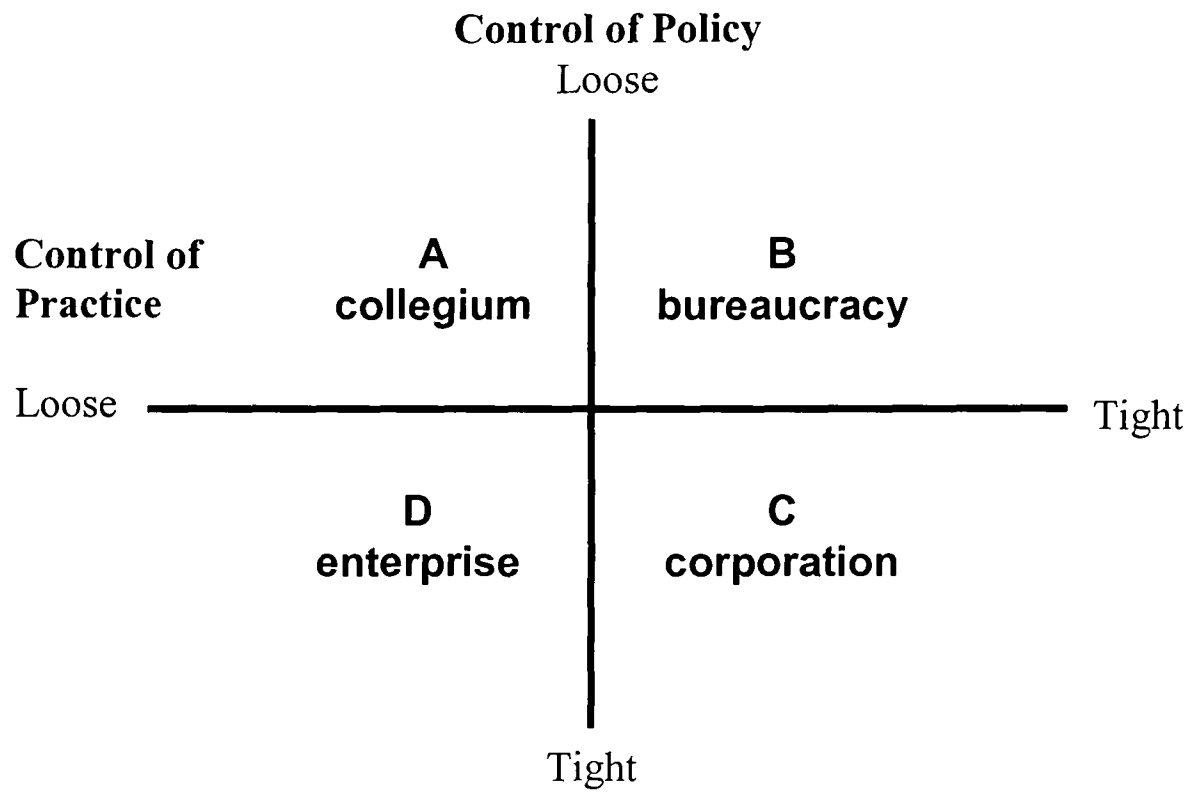
- *Role culture* – better known by its management term, bureaucracy, where the organisation is structured according to functions or expertise; roles and lines of responsibilities are clearly defined. The organisation's efficiency therefore depends less on the quality of individuals and more on the rationality of the allocation of work and responsibility. The success of this culture depends on a stable environment. Therefore the key levers to change the organisation of this culture, is that you must work up every member of the organisation – open communications with the individuals within the organisation is vital, following the structure and protocol.

- *Task culture* – emphasises the accomplishment of a task or project; organisation brings together appropriate qualified people to form flexible teams to deal with specific issues and allocates resources to them. The emphasis is on team-work – knowledge-, skills- and experience-sharing. Therefore the key levers to change the

organisation of this culture, is that you must buy the heart of the key decision makers and also gain support from most members.

- *People culture* –where emphasis is on caring for people. The purpose of the organisation is to serve the individual. Such organisations are rare and if they do exist would be very difficult to manage! Professors within a University who only think of getting on with their own interests fit this profile – usually they take time to meet organisational needs. The dominant feature is personal autonomy and freedom and a high degree of flexibility. For example, a teaching staff member within a VTE college may (outside college's working hours) run a private business or undertake private consultancy. Although these activities may add interest or value to the organisation, 'that is not the motive of pursuing them' (Harper, 1997). Therefore the key levers to change the organisation of this culture, is that you must effectively take everyone with you.

According to McNay (1995), since the 1960s the institutional culture in higher education (universities) has been evolving over time, from the collegial academy to corporate enterprise. McNay's work (1995) on the changing cultures of universities, developed from Weick's (1976) concept of universities as 'loosely coupled systems' identifies four domains of institutional culture – which he named *collegium*; *bureaucracy*; *corporation* and *enterprise*, 'depending on the degree of control over policy and of practice' (McNay, 1995). This is illustrated in Figure 3.5.



Source: McNay (1995)

Figure 3.5 Controls and Cultures in Education Institutions

Collegium denotes institutional freedom. In the bureaucracy, regulation becomes important. In the corporation, the executive asserts authority, and the key word is power. In the enterprise, client is the major concern; it carries with it connotations of the market, customers and of professionalism. Table 3.1 shows the summary of the four-part classifications and its relation to Clark's (1983) work and also to Handy's (1993) earlier classifications.

	McNay	*Clark 1 co-ordination*	*Clark 2 values*	*Handy cultures*
A	Collegium	Academic oligarchy	Liberty	Person
B	Bureaucracy	State bureaucratic process	Equity/social justice	Role
C	Corporation	State policy	Loyalty	Power
D	Enterprise	Market	Competence	Task

Source: McNay (1999)

Table 3.1 Summary of the Four-part Classifications

According to McNay, although the cultures of 'bureaucracy' and 'corporation' are common in many higher education institutions (universities) there is an 'inevitability of an increasing dominance of an enterprise culture' – this is even more so as higher education in the UK moved to a mass system (McNay, 1999). However, he holds the view that all four different cultures co-exist in most institutions, with different balances among them (McNay, 1995, 1997, 1999). These differences depend on a range of factors, including traditions, mission, leadership style and external pressures. It is therefore crucial for leaders and those who manage the change in institutions to strike a strategic fit to map out the mission, strategies, and the changing context.

A national culture also plays an important part in influencing and shaping the organisational culture (Robbins, 1994). Hofstede's (1994) work is valuable in investigating the influence of national culture on organisations. Back in 1980, he has undertaken a large study into the impact of national culture on a single multi-national organisation (Hofstede, 1980; quoted in Hofstede, 1994). On the basis of this study and a series of smaller projects that follow, he has identified four dimensions on which national cultures appear to vary. They are as follows:

- *Power distance* – indicates the extent to which society accepts that power in organisations is distributed unequally. For example, a large power distance is indicated by a belief that 'supervisors consider subordinates to be a different kind of people'. Hofstede's work shows that the Philippines and Indonesia score highly on this dimension, with Austria and Israel scoring low.

- *Uncertainty avoidance* – indicates the extent to which society feels threatened by ambiguity and tries to avoid such situations by the use of formality and structure. For example, strong uncertainty avoidance is indicated by a belief that 'deviant persons and ideas are dangerous'. Hofstede's work shows that Greece and Portugal score highly, with Denmark and Sweden scoring low.

- *Individualism/Collectivism* – indicates the extent to which society prefers loosely knit social framework or a tight framework with absolute loyalty. For example, individualism is associated with a calculative involvement. Hofstede's work shows that Australia and the USA are individualistic societies, while Pakistan and Venezuela are collectivist.

- *Masculinity/Feminity* – indicates the extent to which values in society are 'masculine' (e.g. assertive, domineering, uncaring) or 'feminine'. Hofstede's work shows that Japan, Venezuela and Mexico are 'masculine' societies; Sweden, Norway and Denmark are 'feminine'.

The above theoretical approaches provide a useful basis for discussing and investigating changes in organisational culture. Of course, there may be other aspects that might be used to analyse the data obtained from the study – for example the peoples' beliefs about the nature of the organisation's environment; beliefs about the acceptable levels of organisation performance; beliefs about the organisation appropriateness for success; beliefs about the organisation itself – its identity; role; importance; leadership and beliefs about work behaviour (both one's own and that of others – including interpersonal relationships).

3.5 Issues Specific to ICT Innovation

In the UK, there has been an exponential rise in the number of studies and research reports – exploring issues of current needs, reporting existing provisions, investigating the development of initiatives or projects to facilitate ICT as an effective learning tool (e.g. Beetham and Jones, 2000; Littlejohn *et al.*, 2001; Wiles and McCulloch, 2001; Talisman, 1995; Anstey, 2000; Harvey and Oliver, 2001). Beetham and Jones (2000) succeeded in identifying roles in the coordination, development, use and support of learning technologies more widely across UK Higher Education Institutions (HEIs). Littlejohn *et al.* (2001) recognising the fact that levels of support in the use of C&IT Teaching, Learning and Assessment do not meet current needs, have developed a structured programme – ELICIT (Enabling Large-Scale Institutional Implementation of C&IT) – in which courses to develop pedagogical skills and online modules have been crafted. In Scotland, Wiles and McCulloch (2001) have sought to identify needs that underpin and enhance the practice of staff developers in C&IT learning and teaching, covering a range of different HEIs.

There are also studies and reports on resource provision initiatives: from initial computer and printer purchase, to various laptop, CDRom, and Independent Learning schemes, leading to the launch of a national electronic network for schools (i.e. the *NGfL*) providing all staff and pupils individual access to the Web. There has also been a range of curriculum and teacher training directives. But, as Somekh reminds us, "each new initiative is launched with little evidence of evaluating or analysing the last" (Somekh, 2000). There is relatively little work at attempting to understand this situation.

Most focus on the apparent reluctance of teachers to use IT in their classrooms, relating this to a deficit model of teachers who are characterised as technophobic, or too traditional in their teaching style, or reluctant to adopt change (Gardner *et al.*, 1992; Watson, 1993; Stevenson, 1997; Pelgrum and Plomp, 1991; Pelgrum and Anderson, 1999; Williams *et al.*, 2000).

Hence it seems that although many institutions in the UK appear to have made significant progress in terms of ICT implementation, the process and outcome of institutional changes in ICT still remain 'patchy' (Somekh *et al.*, 1997). Several reasons given by Somekh *et al.* (1997) might still be relevant today.

First, non-users of ICT very often alienate themselves from novice users. This so-called *cultural alienation* (Somekh *et al*, 1997) is partly due to the inheritance of a number of ingrained past beliefs that prove difficult to alter. Dialogues between them could sometimes be likened to two people with contrasting beliefs trying to convince and win each into the other's belief system. They resist or refuse to accept changes because they strongly abide by their past beliefs which are often perceived as a threat to their 'culture and values' and in turn this often results in 'high costs of giving them training'. They often use defensive statements in their argument, for example "*computers are for them (those who teach Mathematics, Engineering, Sciences) and not for us*"; "*computing is the province of the male*"; etc.

Second, computers and their accessories have often been located in computer laboratories and given to some 'department of computing' to take charge of the running. This *compartmentalisation* (Somekh *et al.*, 1997) often

results in others thinking that access to ICT resources is difficult or sometimes impossible as they are often locked away and only 'those computing staff' are allowed to utilise them and therefore others 'got no chance'. These firmly entrenched perceptions have proved very difficult to change.

Third, the management style and the political process exercised by the heads of institutions. These heads usually have the power and control over the institutional budget and can create disparity and the feeling of unfairness among the staff. An equitable allocation of budget for ICT resources could potentially prove difficult as these resources are very often capital intensive.

Fourth, certain individuals in an institution are given responsibilities to oversee the adequacy of ICT resources and/or the IT training needs of staff and very often they are teachers in the 'department of computing' or the like (IT experts or teachers of IT) . The problem arises when they are not given enough control or power in terms of decision-making especially regarding the allocation of money for the purchase and the maintenance of ICT resources – especially in other departments – the needs of the latter is very often overlooked. Somekh *et al.* (1997) called this common practice *responsibility without power.*

The involvement of senior management or a champion is thus necessary to effectively manage the desired change. This is not to say that change has to be led by the senior management but rather those given the responsibilities to initiate or promote change should access those people above them so that they are not left to their own devices. They should not continue to be 'frustrated by the very features of organisational structure and culture that

need to be changed' (Somekh *et al* 1997, p190).

3.5.1 Change Barriers and Resistance to Change

Barriers to change could arise from the attitudes of individuals and groups. An important personal factor in the introduction of ICT was the differences in attitudes that teachers brought with them to the innovation (Somekh, 1996). This has to do with the wider and differing beliefs and discourses they have about education. Therefore, innovation in ICT is not simply a question of experience with or interest one has with ICT.

Conflicting interests of different groups may also pose a barrier to change. For example, in an evaluation of the Education Department's Superhighways Initiative (EDSI) in Scotland and analysing the work of serving multiple stakeholders, Somekh *et al.* (1999) came to several 'well-known' conclusions about a particular group – the civil servants – they do not share the same realities as teachers and learners; their (civil servants') policies are difficult to implement; they have a poor understanding of the time needed to get a complex initiative underway; and they often compound problems by failing to specify projects sufficiently clearly.

Another barrier is the lack of support for change (Somekh & Davis, 1997; Bates, 2000). This might be in terms of access to resources. This kind of support will also be needed by students who are also the beneficiaries of their ICT skills and knowledge. The kinds of support teachers might need from their superiors (e.g. HODs, principals) and from their institutions in their use of ICT are usually reasonable access to hardware and software; technical back-up in terms of enough technical staff to take care of unexpected eventualities

such as breakdowns or viral attacks; a 'non-judgemental and non-punitive' culture - this is crucial at every level - individual, departmental and institutional; and an administrative structure that promotes a culture of sharing of knowledge and skills and not 'penny-pinching' (Somekh & Davis, 1997) and competition for resources.

Research evidence points up that successful change depends on the support from the leaders or people at the top (Phillips, 1986; Vaughan, 1992; Wideen, 1992; Day, 1993; Veen, 1993; Pelgrum, 1993; Waggoner, 1994). However, for many teachers the computer remains an innovation and a variety of conditions will need to be met if their perceptions are to change. According to Phillips (1986) the use of computers will flourish only within schools that encourage it. Where there are expectations of professional development teachers respond well to new challenges like computers (Vaughan, 1992). Such conditions require enlightened head-teachers who advocate collaboration rather than competition between colleagues (Wideen, 1992; Day, 1993). They also require leaders' support in terms of the maintenance of colleagues' professional self-esteem during periods of transition (Leithwood, 1992) and providing adequate time, training and technical support (Wideen, 1992; Veen, 1993). Indeed, where leaders lack insight and understanding, where there are poor attitudes towards technology, computer integration will be limited (Veen, 1993; Pelgrum, 1993). Whilst the perceptions of members of staff in various parts of an institution are important in determining the receptivity or otherwise of ICT innovations, support and encouragement from management is also needed in terms of giving cognizance to the time and resources for the various members of staff to

develop (Waggoner, 1994).

Robertson *et al.*, (1996) carried out a study that looked at the IT skills of staff and year 8 students in a secondary school prior to receiving palmtop computers after a short acquaintance with them. They found that access to the palmtop increased the staff's use of generic applications in their work, particularly for administration (e.g. class registers and assessment scores). They argued that teachers' resistance to computer use was divided into several broad-based themes – resistance to organizational change; resistance to outside intervention; time management problems; lack of support from the administration; teachers' perceptions; and personal and psychological factors. Robertson *et al.*, (1996) concluded that there is a need for adequate and careful training so that teachers become aware of the range of uses and possible benefits of ICT.

In his worldwide survey of representative samples of schools in 26 countries including Singapore, Japan, Thailand, NZ, HK, Canada and a number of European nations, Pelgrum (2001) identified several obstacles that impede the realization of ICT-related goals. The top ten obstacles found in the study (sorted by average percentage respondents across countries) are insufficient number of computers; teachers lack knowledge/skills; difficult to integrate in instruction (teaching); scheduling computing time; insufficient peripherals; not enough copies of software; insufficient teacher time; WWW: not enough simultaneous access; not enough supervision staff; and lack of technical assistance.

There is no reason to suppose that once these barriers are overcome

teachers will be able to use computers effectively because another barrier to change is the lack of infrastructure that gives rise to the lack of use. According to Szabo (online), decision makers have neither a strong vision of what instruction can become nor a willingness to commit to the necessary resources. Szabo states that the three common factors associated with the lack of use of ICT are inability to use rapidly changing instructional technology; lack of infrastructure and support; and the unwillingness to change. Of these three, according to Szabo, the last is the hardest to overcome but the most important. To deal with these three factors, a strategy was developed that involved the creation of temporary Task Forces (TFs), with *a priori* support, to provide leadership to others. TFs are trained to become exemplary users, who train and support colleagues, and develop multi-year changeover plans. The strategy emphasizes professional development, ownership of change through empowerment, multipliers to meet the demand, support in a timely and understandable fashion, high credibility, embedded expertise, and leverage of change. Such strategy works very well and echoes the good practice from the change research literature.

3.5.2 Reasons for Slow Diffusion or Uptake of ICT

Given access to technology does not necessarily mean teachers will then make full use of it. Becker (1999), for example, found that despite the fact that over 90% of teachers had access to the Internet, only 16% of the teachers communicated by e-mail with teachers from other schools as often as five times during the school year. In another study, Lauder *et al.* (1998) found that the main use of IT was for administrative and productive purposes. Studying the evaluation of the development of IT in a college of nursing and

midwifery in the UK, Lauder *et al.* (1998) found that there was little evidence of the use of IT in the practice of teaching and learning.

Reviewing earlier studies by Rosen & Weil (1995); Winnans and Brown (1992); Dupagne & Krendl (1992); Hadley & Sheingold (1993), Mumtaz (2000) concluded that teachers do not use computers in their teaching due to several commonly known 'inhibitors' – lack of teaching experience with ICT; lack of on-site support for teachers using technology; lack of help supervising children when using computers; lack of ICT specialist teachers to teach students computer skills; lack of computer availability; lack of time required to successfully integrate technology into the curriculum; and lack of financial support.

Cox *et al.* (1999) carried out a study examining the factors relating to the uptake of ICT in teaching. Using questionnaires, they collected evidence from computer-using teachers and other educators about their ICT experiences, expertise and use in teaching, their attitudes to the value of ICT for teaching and learning, the training they had received and when relevant, their reasons for being a member of an ICT-related association in the UK. Their findings showed that teachers who are already regular users of ICT have confidence in using ICT; perceive ICT to be useful for their personal work and for their teaching and plan to extend their use further in the future. To these teachers, the most important factors were – making lessons more interesting, easier, more fun for them and their pupils, more diverse, more motivating for the pupils and more enjoyable. Additional personal factors include improving presentation of materials, allowing greater access to computers for personal

use, giving more power to the teacher in the school, giving teacher more prestige, making the teachers' administration more efficient and providing professional support through the Internet.

According to Cox *et al.* (1999), there has been a disappointingly slow uptake of ICT in schools by the majority of teachers in spite of teacher training programmes, an increase in ICT resources, and the requirements of national curricula. Cuban (1993) provides an explanation as to why new technologies have not changed schools as much as other organizations. First, cultural beliefs about what teaching is, how learning occurs, what knowledge is proper in schools, and the student-teacher (not student-machine) relationship dominate popular views of proper schooling. Second, the age-grade school, an organizational invention of the late nineteenth century, has profoundly shaped what teachers do and do not do in classrooms, including the persistent adaptation of innovation to fit the contours of these age-graded settings (p. 186).

Veen (1993) carried out a study to describe the day-to-day practice of four teachers from a Dutch secondary school who were implementing ICT in their classrooms. The teachers were provided with a computer at home, and a computer and an LCD in their classrooms. Veen found that institutional factors such as the essential technical support of 20 hours per week in their schools and the positive attitude of the principal, played important roles in how the teachers made use of their computers. However, Veen also found that the teachers' personal factors outweighed the institutional factors. The individual (teacher's) level factors were grouped into two subcategories: beliefs and

skills. Teachers' beliefs relate to what should be in the curricula (content) and the way in which the subjects should be taught (pedagogy). Teachers' skills relate to teachers' competence in managing classroom activities; their pedagogical skills *and less importantly*, their computer-handling technical skills. Veen's most important finding is that if the software matched the teacher's pedagogy, they would use it.

Andrews (1999), in his analysis of interviews of 38 mathematics teachers from different secondary schools in Manchester, UK, identified two categories of whole school policy: one that insisted IT should be taught by specialist teachers and the other that transferred the teaching responsibility to the subject teachers. He found that both categories were 'problematic'. Andrews found that a minority of schools appeared to have no coherent policy; departmental policies were generally created as a consequence of the enthusiasms of an individual or 'impending school inspection' and rarely indicated coherent views on the impact of computers on teaching and learning. He also found that teachers' use of computers was frequently dependent upon the willing and able IT co-ordinator. However, few co-ordinators had sufficient time to offer support in systematic and consistent ways.

Bailey (2001) argues that effective strategies for development in the area of ICT are in part predicated on the ability of an institution to manage cultural change. Senior management have a leadership responsibility for coordinating strategies that are germane to improving standards in learning and teaching and importantly integral for overseeing the effective integration of ICT and ICT skills within the learning institutions. Bailey argues that this imperative is

incumbent upon senior staff whose role is partially defined in terms of a need to support and lead in the propagation and embedding of learning technologies within an institution.

3.5.3 The Relevancy of ICT

Many of the studies on the use of ICT in Education describe goals of learner-centred learning, co-operation and collaboration, enhanced information evaluation, problem-solving skills, and lifelong learning. These studies talk about students who become "better citizens, better consumers, better communicators, better thinkers – in short, better people" (Johnson, 1996). Writers such as Riel (1993), Mean (1993), and Mean and Olson (1994) relate these ideas to the educational reform that is taking place (particularly in the more developed countries) and describe a conviction that the technologies are now being applied to an appropriate model for education. The current literature is overwhelmingly too positive about the potential of a variety of technologies to be powerful components in accomplishing current educational goals. The visions include helping students to develop a broad, deep, and creative understanding of community, culture, economics and international politics, past and present, and to acquire social skills to work across differences and distances (Riel, 1993); providing an array of tools for acquiring information and for thinking and expression allowing more intending learners more ways to enter the learning enterprise successfully; and providing skills and experiences that will enable students to live productive lives in the global, digital, information-based future they all face (Dwyer, 1994).

McKenzie (1995) states that "*the most substantial research into….learning*

with technologies has examined performance on lower order tasks and basic skills…too little work as been done measuring gains in higher order skills". He and many others who write on this topic (such as Hawkins and Honey, 1993; Riel, 1993) discuss the need to focus on large scale change and for careful planning, including the provision of professional development opportunities related to technology to enable the maximum benefits for learners to occur.

According to Somekh (2000), there are six assumptions in favour of re-structuring the system of schooling incorporating the use of new technology. First, the new technology applications that are already revolutionising the business world will soon be used to revolutionise many aspects of schooling. Second, the cost of the speed and power of new technology will continue to drop at a dramatic rate. (On the basis of Moore's Law, computer power increases tenfold every five years.). Third, the speed and navigability of the web will continue to improve, and full colour video and still images will soon be available without any perceptible delay. Through the National Grid for Learning, schools will have unlimited access to the Internet, including a selected range of commercial sites, for a single annual subscription. LEAs or regional groups of LEAs will have their own local grids. Fourth, in addition to its educative purpose, the system of schooling has a legal duty of care in *loco parentis* for the nation's children. Fifth, schools have a socialising function that helps to prepare young people for adult life. And sixth, changes to the organisation of schools need to build upon current policy trends but they also need to have a revolutionary element. Considerable beneficial change would be possible immediately with existing technology.

Peck & Dorricott (1994) summarise several reasons for technology use in education to match its relevance with educational goals. Amongst others, the top ten reasons include individualisation (learner-centred learning); increasing proficiency at accessing, evaluating and communicating information; increasing quantity and quality of students' thinking and writing; improving students' ability to solve complex problems (a skill that cannot be 'taught' or transferred directly from the teacher to the learner, but which appears to develop in a more focussed manner when productivity tools are available); nurturing artistic expression (because many flexible tools are available); increasing global awareness; creating opportunities for students to do meaningful work (work that reaches out and has value outside school – e.g. is presented to an audience other than the teacher); providing access to high-level and high-interest courses (even in places where some courses have been impossible to offer); making students feel comfortable with the tools of the Information Age (which they are almost certain to use in their future) and increasing the productivity and efficiency of schools.

Of course these benefits do not happen in some miraculous way simply because the technology has been provided. Research literature (e.g. Mean, 1993; Aust & Padmanabhan, 1994) also suggests that to accomplish the profound changes in integrating technology with the overall learning environment, there is a real need for training and support in terms of continuous professional development. This is reflected in ACOT's mission statement (Dwyer 1994): "*Change the way people think about and use technology for learning*"... and in Mean's (1995) observation that "*sites most successful in infusing technology throughout their entire programs were*

schools and projects that also devoted a good deal of effort to creating a school-wide instructional vision – a consensus around instructional goals and a shared philosophy concerning the kinds of activities that would support those goals. What appears to be important is not the point at which technology becomes part of the vision but the coherence of the vision and the extent to which it is a unifying force among teachers."

Literature also suggests that the roles of teachers and those of learners are changing. Laurillard (1993) puts it as follows: "*Teachers...are slowly accepting the fact that they have to become more professional in their approach to teaching...there is a growing recognition that the technological media have the potential to improve student learning, or at least teaching efficiency"* and O'Donnell (1996) says much the same thing: "*The real roles of the professor of an information-rich world will not be to provide information but to guide and encourage students wading through deep waters of information flood*". And perhaps, a final quote from Kinnaman (1995:86) is appropriate: "*One thing is clear, ...advance of technology makes constructing new and richer contexts for teaching and learning ever more tenable and more necessary*".

3.5.4 Teachers' Professional Development

Teacher Professional Development is a broad-ranging term that encompasses the kinds of learning experiences that contribute to the development of the teacher over the course of his/her career. The term has long been considered by educationalists as a strategic element of maintaining high standards of teaching and supporting teacher professionalism and

morale. It has also gained significant attention from policy directors and reformers seeking to implement new thinking or effect change in the education systems. Recent attempts by school systems and pre-service tertiary education institutions have been characterised by the provision of minimal skills in educational technology for teachers in pre-service education training courses (Hardy, 1998). Bigum (2000) even goes as far as advising schools "*to forget about the kids and worry about the teachers. Unless they are adequately prepared, you are wasting your time and the taxpayer's money*" (p.14). Coughlin & Lemke (1999) concurs with the view that teachers should be the main concern: "*... the key to success isn't in the computers...It is liberated educators, whose understanding and creative use of technology can help them to achieve undreamed-of levels of excellence for themselves and for their students*".

According to Somekh and Davis (1997), there are three broad challenges that ICT brings to the practice and process of learning and teaching – curriculum; the management and practice of learning and teaching; and teacher education. The first challenge is curriculum. Traditional approaches to curriculum delivery as well as methods of assessment are collectively being challenged. The second challenge is the management and practice of teaching and learning. How teaching is delivered implied the need for support in terms of resources and staff training. The third challenge is the course content of teacher education and how the programme is structured. These three, according to them, are interdependent on each other, and changing any one of the components requires changing the other components as well. That is why it is necessary to take a 'holistic view' of the professional

development of teachers in ICT (Somekh and Davis, 1997:p.4).

Literature on teacher education courses suggests that teachers are not sufficiently prepared to integrate ICT in teaching or they may not be sufficiently equipped to feel prepared (Bakar and Mohamed, 1998; Lang, 2000). Bakar and Mohamed (1998) studied certain Malaysian schools teachers teaching vocational subjects and found that a majority of the teachers would like to attend training in the use of computers for instruction because they are not sufficiently prepared to integrate computer technology in teaching vocational and technology subjects. It was found that 'teachers did not have a high level of general knowledge about computers; the teachers perceived that they were not proficient in using computer software such as electronic spreadsheet (57.1%), word-processing and desktop publishing (50.8%), and database management (67.9%); and almost two-thirds of the respondents 'cannot do programming' (Bakar and Mohamed, 1998). Similarly, in Germany, Lang (2000) found that certain content areas for teacher training are still insufficient: for example, the training lacks on the 'use of computers for networking' and 'the application of multimedia in education'. Lang's (2000) studies reveal that although teachers' attitudes to learning something about computer-use are positive and that the training need and their self-confidence to learn something about computers are relatively high, the support received in terms of formal training in their schools was limited in terms of the needs for teachers for different subjects. As a consequence, teachers develop their skills through self-studies. Lang also reports that the finding is consistent with other similar International Association for the Evaluation of Educational Achievement (IEA) studies conducted elsewhere. Lang proposes a

'classroom-based teaching and learning approach in a collaborative network' as a new perspective for educational change in these areas.

Often, as many studies have shown, teachers are 'not given to questioning their professional practice' (Underwood, 1997). Once they have finished their initial training they do not expect to need much further training and therefore do not take the initiative to improve their practice and learn new skills. Therefore if teachers see no need for change or question their current professional practice they may not accept the use of ICT in their teaching.

The picture is similar in the United States. According to the US CEO Forum research report (CEO Forum, 1999), despite progress in the provision of computers and networks in American schools, research indicates that inadequate progress in the provision of professional development programs is still likely to reduce the anticipated potential of technology to deliver improvements in education. This observation led former US President Clinton to include professional development as one of the 'Four Pillars' of Technology Literacy Challenge which faced American schools.

In Australia, Russell *et al.* (2000) found that the preparation of teachers in the use of IT is characterised by the provision of minimal skills. They argue that a professional development model which concentrates on the attainment of generic computing skills is likely to be inadequate. Teachers were found to be strong supporters of the use of IT in schools. The challenge for those institutions and organisations involved with teacher education will be to revise training and professional development provisions at both the pre-service and in-service levels, to match teacher preparation with students' future lives in a

digital world.

Somekh and Davis (1997) found that 'effective use of IT as a tool for learning', 'effective staff development in IT' and 'effective development across a whole school or a university department' are always as a result of 'individuals exploring and experimenting with IT'. They concluded that change should therefore be viewed from 'individual active learning' experience and that learning is integral with action and development. Learning is sometimes best done by actually doing it and eventually the skills become theirs to own (ownership of attitudes, skills and knowledge). Their contention is that change 'can be promoted' if teachers are 'encouraged to investigate their own practice' (p5).

Somekh and Davis (1997) stress that the development of skill competence with ICT is not only important for those who are at the early stages of their development of competence but also continues to be important in enabling them to keep up afresh and abreast with the rapid pace of technological change (Somekh and Davis 1997, p6). Some of the characteristics of competent users that might qualify them as potential change agents to influence others are that: they are willing to further investigate the use of ICT either with their colleagues or with their students; they are prepared to admit that they are still learning and always humble – giving the impression that they are not 'experts' even though they might be seen as experts already by their students or their colleagues; and they are curious and enthusiastic about the full potentials of the use of ICT in learning and teaching.

3.5.5 Staff Development and Training

Staff development is a key institutional role which has been implied by many other recent studies such as Anstey (2000), Beetham and Jones (2000), Wiles and McCulloch (2001), FEILT (1999) and LSDA (2001). It is crucial in providing an institutional perspective on the questions of ICT skills and knowledge needs, coordination of effective training programmes and recommendations for best practice. The motivation for research in staff development in ICT is driven by the belief that staff development is a potential mechanism through which teachers in a variety of different roles can be motivated to develop and upgrade their knowledge and skills of ICT (Milligan, 2001). Findings from the National Learning Network in the United Kingdom (NLN, 2001) view staff development as an essential component in promoting progress in ICT and the professional development of teachers has been identified internationally as the primary factor in enabling effective integration of ICTs into schools.

In recent years, there has been an increasing need for staff development in the area of ICT for a very obvious reason - teachers are expected to use ICT effectively in their teaching. However many teachers still lack the knowledge and skills required. In the United Kingdom, the Teacher Training Agency, TTA outlined proposals for an Initial Teacher Training Curriculum for the use of Information and Communications Technology in Subject Teaching (TTA, 1998) to address the problem at the level of those entering the teaching profession. The document (TTA, 1998) specifies an "*essential core knowledge, understanding and skills*", equipping trainee teachers "*to make sound decisions about when, when not, and how to use ICT effectively in*

teaching particular subjects". It places a responsibility on ITT providers to ensure that training is "*firmly rooted within the relevant subject and phase, rather than teaching how to use ICT generically or as an end in itself*". The document also states that teachers will be expected, throughout their careers, to "*continue to improve their skills in using ICT for professional purposes*", and to "*keep up to date with the use of ICT in the subject they teach*". For the large part, the responsibility for this professional development has fallen on schools and teachers themselves (TTA, 1998).

Similarly, FENTO (2000) standards are calling for lecturing staff in FE to use a variety of suitable teaching and learning methods and to bring information and learning technology (ILT) in the workplace. In order to do this lecturing staff have to be able to use IT to a relatively high standard. This, of course has implications for staff development – how does a college ensure that its staff have the skill and knowledge to keep up with the students in IT?

Powell and Davies (2001) highlighted a report by the British Educational Communications and Technology Agency (BECTa) regarding the position of IT in FE colleges in November 2001. According to them, the typical college has 5 computers to every 1 full-time student and 1 internet-cabled computer for every 2 permanent staff members. 94% of colleges use their Local Area Network for learning materials, and increase from 60% in 1999. Despite this only 48% of staff felt they were competent in the use of ICT, only a slight increase from the previous year. These results highlight that there is room for improvement in the staff use of ICT in their teaching.

Much has been written about the strategies colleges have developed to

meet this challenge. These strategies tend to be divided into two types: those that try to improve the IT skills of all staff and those that focus on the skills of a small number of targeted staff. One common policy with regard to the former is to hold a programme of large staff development events to develop the use of ILT in teaching and learning. Jenkins (1999) review the system of IT staff development at Oxford Brookes University – where the university has an IT team where staff are involved in an number of IT activities, which include seminars in the use of IT, workshops on aspects of IT and a 'non-traditional teaching' week where lecturers were encouraged to use more innovative, student-centred activities. Although the strategy was seen as a success, it was seen as ineffective as the events had taken a huge amount of planning and resources and had taken a large amount of staff time (Jenkins, 1999). Where such activities are innovative the cost and time involved would undoubtedly be prohibitive in FE institutions. Staff in FE already have a large number of pulls on their time and even those most keen on IT might begrudge the time given to such activities. Those whose disposition does not favour IT are likely to use the time factor as ammunition in their quest to avoid the activities. It is also questionable whether staff would benefit from such a number of events over a short period of time. Jenkins (1999) found that a programme of specific IT staff development events throughout the academic year may be more beneficial. According to him, successful IT teams needed to work alongside a more prolonged programme of IT development.

A similar programme has been developed by Barnsley College, as reported by Goulding (1999). At Barnsley, staff at all level are encouraged to take part in in-house IT training at an appropriate level. It also gives every

full-time member of staff approximately 2 hours a week off their time-table to develop and apply their ICT skills and ensures that all staff have either a PC or a laptop. A planned programme such as this does not appear to be successful in improving the standard of ICT among staff. Although any programme will cost time and money and will need the help of a number of support staff, holding students free days is likely to encourage staff to feel positively about any training events. Allowing for time off the time-table may overcome the practical problems associated with developing new skills and does highlight the importance a college adds to ICT but any such programme will need to be monitored to ensure staff are focussing on ICT and not just using the time to do their regular administration work.

Another type of training involves focussing on the skills of a limited number of staff. According to Goulding (1999), staff at Barnsley enrol to specific class in IT related subjects for which they can achieve an IT qualification such as CLAIT. These classes can be manned or staff can use flexible learning packages. In terms of improving the skills of specific staff members, this approach does allow resources to be directed where they are most needed and it if beneficial for staff to receive a qualification if they are spending time and effort developing their skills. The downside is that staff who are not involved in the project may feel resentful.

Oromaner (1998) argued that "*the overwhelming vision of the future of...colleges is that staff development programs should play an increasingly important role in all aspects of campus life*". Oromaner (1998) contends that one of the main factors that led to the emergence and growing importance of

staff development initiatives is the 'information technology explosion'. He suggests that a college may begin a staff development programme by asking questions of what, where, who and how, and that these questions must be 'revisited' when a college changes its institutional environment, mission, goals, objectives and resources. *What*? – A staff development program should enhance the knowledge, skills, attitudes and work performance of the staff. However, he cautions about the need to confront the issues of the role of the employee within the organisation and the availability of resources. The deeper question that needs to be asked is "does the staff development program enhance the person as a whole or as a player in a particular role and to what degree are resources available for both?" *Where*? – If the program is to serve all employee categories it must be seen as a "neutral" office. To the degree possible, it should be perceived as independent of the major divisions within the organisation. *Who*? – This questions who is to be served by the staff development program. This is a question of 'inclusiveness'. Are they only for teachers or are they for all? *How*? – "*...colleagues should advise you and your program...committee members will contribute good ideas of their own and help you solicit other ones. They will provide you with more credibility and increase the sense of 'ownership' by your colleagues.*" The program developers must also have a strong support from their senior management.

Oromaner (1998) adds that in addition to having to confront the issue of 'staff participation' ways need to be found to bring awareness of importance, for example, in terms of internalised professional development, enhance sense of ownership of skills and knowledge and project values. He further

suggests the necessity to make it a compulsory 'formal requirement' by writing career norms and values concerning development into development plans. According to Oromaner (1998), the use of monetary incentives have been 'proven quite successful'.

Funding models which increase the provision of hardware and software in a school but fail to train teachers who are to implement them, must be seen as inadequate (Russell *et al.,* 2000). An appropriate teacher development model will include a need for knowledge of curriculum issues for successful classroom implementation; the ability to integrate technology across the curriculum in a supportive school environment; sustained and broad-ranging staff development in the use of IT; time to design a plan for using IT software in the classroom, and to restructure curriculum around technology; and knowledge of what teachers can achieve through the informed use of IT; knowledge of what is available for educational uses of technology.

Russell *et al.* (2000) draw out various models of effective IT professional development from a number of literature sources. Among them – "teachers need knowledge of curriculum issues for successful classroom implementation" (Oliver, 1994); "teachers are better able to integrate the use of technology in the curriculum in a supportive school environment" (Becker, 1994); "teachers are better able to integrate the use of technology in the curriculum when they have received sustained and broad-ranging staff development program in the use of IT" (Becker, 1994); "teachers need specific instruction on how to integrate technology into their instruction (Schoefield, 1995); "teachers need time to design a plan for using IT software in the

classroom and time to restructure curriculum around technology (Bosner & Daugherty, 1994); "teachers need knowledge of what is available to them through technology (Wilburg, 1997); "student learning is enhanced when teachers use curriculum approaches which feature 'situated' information management projects that provide a service to the community" (Wolfson & Willinsky, 1998); and "teachers have effective professional development when a framework is used having characteristics used in some Apple Classrooms of Tomorrow schools, namely – small-group collaboration between teachers; takes place in working classrooms and schools; builds upon teachers' existing knowledge about curriculum and practice; provides opportunities for experimentation and reflection on new experiences" (Yocam & Wilmore, 1995).

Another key issue raised in the literature is *time*. For example, "time within the institutional schedule, to learn how to use the technology, experiment with the technology, and learn how to integrate it into the curriculum". Teachers lack time in the college schedule to learn how to use the technology, experiment with the technology, integrate technology into effective lesson plans, and learn how to apply it to classroom projects (Dupagne & Krendl 1992, Winnans & Brown 1992, Bosner & Daugherty, 1994, Rosen & Weil 1995, Somekh & Davis 1997). Laferrière (1998) agrees that "for most teachers there is too little time left to learn about technology, and to develop pedagogies for students to learn with technology."

Bryson and de Castell (1998) suggest that "teachers' working conditions were negatively affected to a much greater degree by the time demands of

implementation processes, including the requirement for participation in developmental activities, than was the case for computer coordinators and principals." Their study of technology implementation in primary schooling emphasizes the conditions of school settings and the key factors, including time that must be considered if teachers are to successfully adopt information and communications technologies as a part of their repertoire of teaching strategies. They also note the disparity in expectations about time for technology training and implementation as seen from the perspective of teachers, and as seen from the perspective of technology advocates within the school system.

3.6 Summary of Literature Review Findings and Their Utilisation in the Present Study

In this chapter, a selected range of literature on the topics related to the area under investigation has been reviewed. Relevant points to frame an understanding of the nature of the imperative of change for ICT will now be considered and the utilisation of the findings will be explained.

In summary, the foregoing literature points to the fact that we live in a time of multiple and continuous change; and that change is a complex process, socially and psychologically. Change is influenced by beliefs, assumptions, values and skills and behaviour of individuals on one level and for the organisation, culture and systems of an institution on another (level). Change often prompts initial feelings of insecurity, which need to be addressed. An overly rational approach to change or relying solely on power, position or sanction to produce change is likely to lead to less real change than a strategy that involves a normative-re-educative approach. Professional development needs to be a major part of a successful strategy for change, and the key to successful change within an institution lies in the development of a culture conducive to evaluating and handling change at whole institutional level and promoting individual growth.

The findings from the literature review reveal several key conditions for successful management of change. In summary, there needs to be maximum ownership of the process of change in an organisation; there needs to be a clear understanding of the process of change. There must be a critical mass of change agents to motor innovation and change and there must be

champions at the top of organisations supporting change. Change issues are people issues. They cannot be separated from professional development of a major resource – the intellectual capability and leadership of personnel. People most affected by the change must be empowered to make the decisions and control the direction the change proceeds. Change is driven by the development of a mutually shared vision of what could be. It requires commitment and sacrifices which should be visibly embraced by all affected; it involves taking risks and taking risks involves making mistakes. People should be encouraged to take calculated risks – certainly not penalized. Change must be concentrated in areas where there is maximum leverage. The human factor must be fully understood within change strategies. The culture or cultures and subcultures of an organisation matter. Above all, successful change management needs a 'high trust' culture. Change agents must involve, consult and inform all concerned colleagues about their work. Effective change requires effective communication at all levels. Convincing others of the need for change requires the generation of quality evidence in its support. Change must be ethical and thus be sensitive to questions of fairness. Decision making mechanisms and resource allocations must be reviewed for their efficiency, cost effectiveness and relevance to quality teaching and learning. Further, for change to be successful, people must be willing to challenge some of the organizational principles they have built for generations into their work environment and have come to accept as the way they do things.

It is thus clear from the literature that meaningful and lasting change within an organization can only emerge from a process characterized by respect for

shared values, sensitivity to the anxieties which change may elicit reinforcement for those who are willing to take reasonable risks, tolerance for a path of trial and error and incentives to motivate participants. The institutions that have enjoyed successful programs of change are those that promote a supporting environment. Essentially, a supportive environment avoids change for the sake of change. It is one that builds support for change among like-minded people and plan for change from a solid conceptual base and understands that the rhetoric of change is quick and easy but substantive change is the only real objective, not over-promise inasmuch as visions of future greatness may lead to disillusion and failure to appreciate more realistic accomplishments. A supportive environment develops an attitude which sees change as a positive attribute and a belief that we need not lose those things which are already done well while at the same time adding to our greatness; and creates a sense of urgency and receptivity for change. Such an understanding of the nature of change and the awareness of the needs of managing change are essential and useful in guiding the categorisation of the interview data used in the study.

The literature review also reveals that changes in the process of learning and teaching are dependent on changes in instructional or learning technology. Depending on how these change issues are addressed, issues that are concerned with culture, roles and values could potentially affect the outcome of an innovation process. Each technology creates its own challenges and throws up particular barriers to successful implementation. Innovation of ICT in educational institutions affects the roles of both teachers and learners and in doing so may impact on the wider organisational culture,

leading to resistance to change as individuals in the organisation seeks to stabilise the situation and defend their own positions within it. In addition to having unexpected complexities and challenges, managers in organisations may actually use this as an instrument to find ways how to manage the complexity and multiplicity of change. Successful and widespread implementation of technological innovation depends on the awareness that it takes time to achieve; the technology must be practical to use and supportive professional development must be provided. The concept of learning organisation is seen as a viable model for managing change brought about by the advancement of ICT. Educators will need to become life-long learners in a shared environment of constant change. Leaders and managers have the duty to create positive antecedents to change that are reflected in the culture of the organisation. This will involve teamwork, empowering, communication, co-ordination and involvement at all levels of the organisation.

On the theme of organisational culture, Bruneian society as a whole, either the mainstream Bruneian Malay or the minority ethnic groups, is a strongly community conscious society – a trait that points to the potential for the collectivistic nature of the people to work in peer support fashion. My own positive experiences with trainee VTE teachers who were assigned group projects attest to their ability to work well in a peer support manner. Hence the community spirit of the people should be harnessed to develop a peer support system that is not only in tune with the nature of the society, but also for the development of an effective professional development programme for VTE teachers which is systematic and reward orientated.

Although many of the issues presented in the literature sound too prescriptive in presenting solutions – sometimes giving the impression that is the only way that issues are stated, nevertheless, the summarised sketches presented above provide a useful guide 'map' in framing a checklist for assessing the factors and conditions that support successful implementation of ICT in the VTE institutions. It was also used as a guide to the structuring of a questionnaire which served as an instrument for reducing massive interview data and assessing the consensus of the respondents on the findings from the interviews.

Chapter Four
Methodology and Research Design

4.1 Introduction

This chapter begins with a brief literature review of two of the major research orientations in section 4.2 – *quantitative* and *qualitative* – commonly used in educational research. This is then followed by a brief explanation of the nature of the qualitative approach and a description of the nature of the case-study approach and the justifications and reasons for its adoption and utilisation in this research study in section 4.3. In sections 4.4 and 4.5, I will describe the research design outlining the details of the data-collection techniques, data analysis, their inter-relationship and leading on to the development of the case study report.

4.2 Quantitative and Qualitative Research Paradigms

The literature on research methodology points to two categories of research orientations, namely *quantitative* and *qualitative*. The categorisation evolved from the various philosophical assumptions about how people view their world. The review in this chapter is based on the work of a number of research experts such as Guba and Lincoln (1985), Merriam (1988), Cohen and Manion (1994), Denzin and Lincoln (1994 & 2000), Creswell (1994), Bassey (1999) and Cohen, Manion & Morrison (2000).

Quantitative approaches assume 'social reality' to be external – 'it's out there', measurable and quantifiable and 'objective'. In presenting research findings, numerical forms (e.g. scores, frequency tables and their distributions) are often used. The emphasis is on the reliability of measurement and statistical analysis. Researchers test out 'designed' hypotheses and establish various general principles that govern given phenomena. The research environment can thus be predicted and controlled. Deductive reasoning is used to explain relationships, effects and causes of variables.

On the other hand, qualitative approaches assume social reality to be internal – 'it can be sensed or felt within'. The meaning of an event or a phenomenon is personal. It is based on the person's 'subjective construction'. Therefore it places more emphasis on subjective experiences of individuals in constructing their own meanings of 'social reality'. The research findings are often expressed and/or described in verbal or narrative forms. Researchers seek to generate a hypothesis or build abstractions or concepts rather than testing an existing theory. Very often research of this

nature leads to the discovery of a 'grounded theory' (Glaser & Strauss, 1967). The research process is 'inductive' and the social phenomena are interpreted holistically in their natural setting.

Authors such as Merriam (1988), Cohen and Manion (1994), Cohen *et al.* (2000), Guba and Lincoln (1985), Denzin and Lincoln (1994), Creswell (1994), Bassey (1999) and many others discuss these differences extensively. Table 4.1 summarises these differences drawn from these sources.

Table 4.1 Differences between Quantitative and Qualitative Research Orientations

Characteristics	Quantitative Paradigm	Qualitative Paradigm
Associated terms	Positivism, 'scientific' method, traditional, objective	Interpretative, naturalistic, ethnographic, subjective
Origin/root	Physical and natural sciences such as agriculture, chemistry, physics, biology	Social sciences such as anthropology, sociology, psychology, history
Process	Deduction – reasoning from principles to specific situations	Inductive – reasoning from specific situation to a general conclusion
Epistemology	Research emphasis is on facts, relationships, and causes and effects. Researchers place great value on outcomes and products	Research emphasis is on holistic interpretation of meanings specific to the natural setting (naturalist paradigm) and its conditions. Researchers place emphasis on the impact of the process as well as the outcomes and products
Purpose	Establish general laws or principles to give a firm basis for prediction and control of environment	Understand and illuminate meanings of phenomena, events in natural settings
Approach	Scientific – nomothetic, hypothesis driven	Naturalistic – ideographic, grounded theory development
Assumption	Social reality is objective and external to the individual	Social reality is regarded as a creation of individual consciousness
Model	Incorporating objectivity, reliability, generality, reductionism – from outsider's view	Subjectivity, reliability, validity – from insider perspective
'Truth'	Fixed and singular, reflective of a causal, factual view of reality	Holistic, multidimensional, ever-changing, subjective construct view of reality
Central Focus	Measurement and control of variables	Language-based data collected under naturalistic conditions/natural settings to be interpreted subjectively
Orientation	Verification of theory	Discovery of grounded theory

Traditionally, quantitative methodologies have dominated the field of educational research. However, in the past three decades or so, there has been a shift towards a more qualitative approach (Hitchcock & Hughes 1995). Although there has been a continuing debate on the superiority of one paradigm over the other, many researchers now contend that the two methodologies are complementary to each other (Denzin and Lincoln, 1994). As Bassey (1999) says, 'The public world is positivist; the private world is interpretive' (p.44), which suggests that the two paradigms are both needed for presenting a holistic picture. Many researchers have now recognised that qualitative methodologies are as legitimate in conducting research as quantitative methodologies. The once-preferred quantitative methodology alone cannot provide adequate insights into all human and social issues and hence it is logical to adopt a combination of approaches if a holistic picture is desired. As Gillham (2000, p.11) points out: 'How people behave, feel, think, can only be understood if you get to know their world and what they are trying to do in it'. 'Objectivity' can ignore data important for an adequate understanding. Norman Denzin, in an attempt to characterise the nature, scope and variety of qualitative research as a site of multiple methodologies, says that:

> ...qualitative research, as a set of interpretative practices, privileges no single methodology over any other. As a site of discussion, or discourse, qualitative research is difficult to define clearly. It has no theory, or paradigm, that is distinctly its own... qualitative research is used in many separate disciplines... it does not belong to a single discipline. Nor does qualitative research have a distinct set of methods

that are entirely its own...

(Denzin and Lincoln 1994, p.3)

Guba and Lincoln (1994) present some of the shortcomings of quantitative methodology and assert that such shortcomings could be rectified through the employment of qualitative methodology. This may be summarised as follows:

- In quantitative studies, the 'context' is normally not taken into consideration. Qualitative data can thus better provide contextual information than quantitative data.
- In quantitative studies meanings and purposes attached by people to their activities are generally excluded. But these are important in providing more insight into social phenomena which qualitative studies can provide.
- The hypotheses proposed to be tested in quantitative studies may not involve 'insider' views and therefore local contexts are not taken into consideration, leaving the hypotheses not fully 'grounded'. Qualitative data are obtained mainly to uncover insider views to provide such grounding to validate the hypotheses.
- The general data obtained from quantitative studies are not applicable to individual cases. Qualitative data provide specific information for individual cases but are not generalisable.
- Quantitative studies usually involve testing a *priori* theory or hypotheses. This process often discourages the discovery dimension of inquiry. Qualitative studies can provide the source of those hypotheses, which are normally obtained through the discovery process.

Hence the limitations of quantitative approaches, to some extent, pave the

way for increasing recognition of qualitative methodology as a complementary or an alternative route to understanding and explaining social reality. Indeed, according to Denzin and Lincoln (2000), there has been a growing popularity of qualitative methodology in educational research and this is also reflected by the increasing number of publications on the topic (Burgess, 1985; Denzin & Lincoln, 2000).

Merriam (1988) points out that the decision to adopt one or other methodology is often related to theoretical and ideological commitments of the researcher. This implies that the researcher needs to shape his/her own methodology according to his/her needs, perspectives and preferences. One should therefore not regard one methodology as alternative or superior to the other. 'We, for our part, should attempt to present...perspectives in a complementary light and will try to lessen the tension that is sometimes generated between them' (Cohen *et al.* 2000, p.45). Both should be viewed as complementary. An investigative study may involve both in sequence. For example, qualitative methods are used to generate hypotheses or grounded theory, later to be followed by quantitative approaches to generalise the hypothesis or test out the grounded theory. This was the approach adopted for this research study.

4.3 Case-Study Approach

4.3.1 What is a 'Case Study'?

Bassey (1999, p22) says that 'this is a good example of a question easy to ask and difficult to answer'. Whilst Yin (1984), an American research expert in case study of the social sciences, tends to write along the lines of the positivist or scientific paradigm, Stake (1995), another American who has written extensively about case study, tends to be firmly within the qualitative or interpretative paradigm. The interpretations of these two key figures and the work of others are considered.

Yin (1984) defined a case study as 'an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomena and context are not clearly evident'. Other writers view 'case' as a 'bounded system' (Burns, 1994), or 'inquiry around an instance' (Adelman *et al*, 1980), or 'bounding problems' (Guba and Lincoln, 1985), or 'unit of analysis' (Merriam, 1988). And according to Merriam (1988), in a *unit of analysis* there may be numerous events, participants, or phases of a process subsumed under the unit.

Stake (1995) described case study as 'the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances'. Although they appear to have evolved from the world of qualitative research where emphasis is focussed on the understanding and the interpretation of meanings derived from natural and holistic settings, it is clear that case studies can be both quantitative and qualitative or a mix of both, depending on the purpose of the research study.

In support of Stake's (1995) view of the case study approach as a means of inquiry, it is important to note that it is not because it is among the many methods of inquiry from which a selection can be made but rather because of the interest of researchers in the individual cases. In other words, the case study approach should be chosen with the knowledge that it could optimise the understanding of the topic under investigation as well as its context rather than for its generalisation beyond the case. Thus the term '*case study*' is referred to a choice of 'objects' to be studied rather than a 'methodological' choice. Gillham (2000, p.1, *bold emphasis mine*) writes, 'A case study is one which investigates.. [an **individual** or a **group** or an **institution** or a **community**]...to answer specific research inquiries (that may be fairly loose to begin with) and which seeks a range of different kinds of evidence, evidence which is there in the case setting, and which has to be abstracted and collated to get the best possible answers to the research inquiries. No one kind or source of evidence is likely to be sufficient (or sufficiently valid) on its own.'

Therefore, the use of multiple sources of evidence, each with its strengths and weaknesses, is essential in a case study research.

4.3.2 Why Did I Choose Case Study Approach?

Here are some of the reasons why I have decided to choose a case study approach for this research study:

First, the study concerns the use of ICT in a local setting within a 'bounded' environment – that is Vocational and Technical Education (VTE) in

Brunei Darussalam. The VTE sector forms the boundary of the case, which means that the findings derived from the study and the outcome of the study are specific to the setting and conditions within the VTE environment in Brunei Darussalam.

Second, the aim of the study is to investigate the use of ICT in the context of the VTE environment in Brunei Darussalam. This is essentially a process-bound event in a natural setting – in an environment which is subjected to the political, economical, social and technological climates. Thus the case involves 'multiple realities' that depend on the conditions and 'changes' on these climates. The world of social science dealing with human beings that often deals with feeling, opinion, perceptions, etc is not like the world of pure science, which lends itself to 'quantification'.

Third, the study attempts to understand the views and perceptions from a small number of participants (VTE teachers and managers). A case-study approach in line with descriptive and interpretative approaches was thought to be the most appropriate choice.

Fourth, the study is unique to the cultural setting of the VTE system in Brunei Darussalam. The case study approach enables in-depth understanding of the system; identification of nuances (that are often missed in a positivist or scientific approach) and rich first-person verbal data can be obtained.

4.3.3 The Strength of the Case Study Approach

Writers such as Yin (1984), Merriam (1988), Stake (1995), Burns (1994) Bassey (1999), Gillham (2000) discuss the subject of the strength of the case study approach extensively. Based on these selected sources, the following features were identified as being the strengths of this approach:

- It offers a means of examining or investigating contemporary events or complex social phenomena where the relevant behaviours or variables to be investigated cannot be manipulated or controlled, thus enabling in-depth understanding of the entity being studied in its greatest strength.

- It generates rich, holistic and subjective data that can satisfy the needs of multiple audiences as the interpretations and explanations detailed in the reports are usually simple and free from 'often' incomprehensible statistical data. The ideas and view-points recorded can be interpreted in many ways and re-interpreted as the need arises, thereby stimulating ideas, providing food for thought, and bringing to light variables, phenomena, processes and relationships which can lead to hypothesis generation for future research, thereby advancing the knowledge based on the field investigated.

- It gives flexibility to the researchers as it enables the use of multiple sources of evidence from the data obtained from interviews, documents, questionnaires and other artifacts – which enables complex phenomena to be explored and examined in depth.

- Although case studies are not employed primarily as a means of proving

or disproving a certain hypothesis, they nevertheless may be taken as evidence that illustrates the more general findings. Likewise, they may also be taken as evidence to refute existing generalisations. Thus a single case can make a significant contribution in theory-building and re-directing future investigations in the refuted area.

4.3.4 The Limitations of Case Study Approach

While it is recognised that case studies have the above attractive features, the very same features could pose some problems which limit their usefulness. The earlier review of the literature points to a number of these limitations, some of which are listed below:

- While rich description is desirable and demonstrates a strong claim of the case-study approach, the limit of time and other resources can be an obstacle. Even if time is not a limit in the preparation of the case-study report and simple and easily-understood language is used that might reach a wide audience, in particular policy-makers and heads of the institutions and VTE teachers, they may not have the time to read and use the 'thick' and comprehensive report.

- Limitation of time may also force case-study researchers to be selective in the kinds of data to be included in the case-study report. Such selective behaviour may also be induced as a result of political interference such as satisfying the need of those who funded the research. Thus a case study approach is limited by one's sensitivity and integrity. The reliance on the human researcher as the instrument of data collection, therefore, poses

dangers of subjective bias and prejudice in data collection and interpretation.

- As there is no way of knowing how typical the chosen case really is, this approach is not ideal for making generalisations or comparison between cases. It might be unreliable to make generalisations based on a single case!
- A research focus on a single case could, and very often does raise the questions of reliability and validity of data interpretation.
- There is a high probability for readers of case-study reports to be able to recognise the informants in the case studies as such studies normally involve a small number of participants. This may not only inhibit the informants' willingness to participate in future research (let's suppose they are discovered), but also may exert pressure on future researchers who may not be given full support in terms of access and sharing of data.

The technique used to counter these limitations was enhancing the validity and reliability of case study approach employed in the different contexts and during the analysis of the cases. This is discussed in the two following sections (4.35 and 4.36).

4.3.5 Validity and Reliability of Case Study Approach

'Trustworthiness' is the term that is often cited by practitioners of case study approaches in buying the hearts of the end-users of the study. In other words, the study has to be valid (both internally and externally) as well as reliable (Merriam 1988; Cohen & Manion, 1994). The concepts of validity and

reliability in case study approach are rather problematic (Bassey 1999). For this reason, Guba & Lincoln (1985) propose the concept of 'trustworthiness' for internal validity, and 'transferability' for external validity and 'consistency' for reliability.

Internal validity concerns the match between the findings from the study and the reality from people's construction of the world – how they understand it. Usually the smaller the gap between these two, the more valid the study is. That is from the qualitative point of view. In other words, the validity of a case study is high if what is interpreted and reported by the researcher represents the actual views and experiences of the informants. Very often the gap between the outcome of the case study and the reality as perceived by the participants is caused by the biases and prejudices on the part of the informants as well as the researcher during the course of data collection and interpretation.

External validity concerns the extent to which the study findings in one setting can be applied to other settings – i.e. its transferability. It is closely related to generalisation – 'a process whereby a particular set of observations or findings can be applied to a much larger set of circumstances or population' (Hitchcock & Hughes, 1989, p.26). In quantitative studies, the results of a study based on a sample of a population can be generalised to a larger population, provided that the sample is representative of the population from which it was drawn. This is maximised through careful control of sample size and random sampling (Cohen *et al.*, 2000). However, the idea of random sampling in qualitative case study is somewhat contradictory, in the sense

that the approach is chosen because of the desire to understand the particular case in greater depth rather than to try to generalise the findings to other populations of many cases. Hence the concept of generalisability needs to be viewed differently. Merriam (1988), for example, viewed 'generalisibility' by thinking in terms of the reader or end-user of the study. In other words, it is up to the readers to decide whether or not the findings from the study are applicable to their own contexts, as they are the users of the study. To enable this to happen, the researchers have to provide a detailed account of the contexts of the study so that the information is sufficient for the readers to be able to assess and make decisions.

Reliability concerns whether or not the findings of the study are replicable. It is 'the extent to which a test or a procedure produces similar results under constant conditions on all occasions' (Bell, 1993). It is based on the assumption that 'there is a single reality which if studied repeatedly will give the same results' (Merriam, 1988, p.170). This conception of reliability is central to traditional scientific research – e.g. experimental quantitative research. The purpose is to discover causal relationships among variables in order to establish stable causal laws. However, this concept does not fit with qualitative inquiry which emphasises possible multiple meanings of an event and hence produces multiple interpretations. Thus, reliability in the traditional sense would not be established. In other words, replication of the same study might not yield the same results and the situation is not replicable; cases are time-bound and situated in a unique context. This in itself should not be seen as a problem as the same data could be interpreted to fit the qualitative inquiry from a different perspective. The audience can be convinced that the

results of the study are reliable, not from the point of view that repeated studies produce the same results, but rather from the point of view that the results are 'dependable' because they make sense given the data collected (Guba & Lincoln, 1985) at a given time and place. To enable this to happen, detailed reports of the study had to be provided to allow the 'dependability' of results to be assessed in relation to the data collected.

4.3.6 Overcoming the Problems of Validity and Reliability

For this research study, the following steps have been taken to enhance the validity and reliability of the study. They are based on the suggestions drawn from various sources such as Guba and Lincoln (1985); Merriam (1988); Stake (1995); Bassey (1999); Stake (2000) and Gillham (2000).

Using triangulation technique

This is based on the idea that data collected and analysed using multiple methods strengthens internal validity as well as reliability (Merriam, 1988). It is 'a process of using multiple [sources] to clarify meaning, verifying the repeatability of an observation or interpretation' (Stake, 2000, p.443). The triangulation technique used in this study is based on the comparison of the results from different methods – that is, interviews, documents, field notes from observations and questionnaire. Thus the use of questionnaire and analysis of documents, for example, served to cross-check or validate the data obtained from the interviews. The underlying argument here is that if different methods of investigation produce the same results then the data might be taken as valid and reliable.

Showing the interview transcripts and the final case study report to the participants

The interview transcripts were shown to the interviewees so that they could validate the translated transcription or check that my interpretation reflected their ideas and perceptions or they could verify the findings of the study. The final case study reports were also given to the participants in both U.K. and Brunei Darussalam for them to comment on whether or not the reports reflected their reality. Their feedback provided indications of the 'validity' of the study.

Employing a semi-structured interview technique

A semi-structured interview technique was employed in the study as opposed to purely structured or unstructured interviews. This offered me flexibility in terms of varying my questioning style depending on the personality of the interviewees (May, 1993). Employing this technique has also helped reduce the flaws in questioning techniques or changes in the question wording.

Tape-recording with participants' approval

A micro-cassette recorder was used in all of the interview sessions except for two cases in which its use was not agreed. The use of micro-cassette recording ensured that everything that was 'said' was faithfully recorded for analysis, whereas if I were to rely on note-taking or on my memory, I could have missed out many of the important points raised.

Presenting detailed data-collection methods

The methods of data collection were presented in detail in the case-study

report so as to allow a replication study to be made by other researchers if they wish to do so.

Declaring possible biases

Inevitably, the said biases might have arisen from how the selection of the respondents was made and how they were to be included in the case-study report. These possible biases were declared in the report so that readers could make their own judgement as to the validity of the findings from the study or if they were to apply them to different settings. These steps should reduce the likelihood of bias and prejudices which might have affected the validity and reliability of the data collection and interpretation.

4.3.7 Ethical Considerations in the Case Study

To safeguard the rights of the participants and to have a high regard for the image and credibility of the case study research, the following procedures were followed in the conduct of the study:

- The officials at the Department of Technical Education, the Director of ITB, the College Principals, the deputies and the participants in the research were informed of the research study; the purpose of the study; what the study entailed; how long it would last; who were to be involved; and what benefit they would or might gain out of the study;

- The participants (both in the interviews and questionnaire survey) were given assurance of their right to privacy and protection from emotional discomfort. This was done by upholding confidentiality and anonymity. In this thesis, their identities are coded. Taped or recorded material was kept

in a secure place;

- The participants were involved on the basis of their likelihood of contributing to the understanding of the phenomena investigated and on their willingness to be involved in the study, i.e. they were free to withdraw at any time if they so wished;

- The information (all data/evidence) provided was used specifically for the purpose for which it was obtained and not for any other purposes;

- My own interpretations in the report of the case study reporting were clearly differentiated from the research data/evidence.

4.4 Research Design

4.4.1 The Emerging Design Concept

Although both qualitative and quantitative methods were employed in the research design; the methodology was not predetermined at the outset. Rather, the design was one which was of the open and loose-type, which went through repeated changes, progressively being refined as I gradually gained more understanding of the theory and practice of research processes and as I began to engage and gain more understanding of the research enquiry.

The idea behind this design and the decision to begin with a qualitative approach was inspired by work of Elliott (1996). Elliott investigated the impact of UK government policy and college procedures upon FE teachers' own reflective practice (Schön, 1987). He used a multi-method approach to gather data – such as participant observations, conversations, meetings and in-depth qualitative interviews. He employed the notions of 'foreshadowed problems' and 'preconceived notions' to progressively focus and inform his design. Both of these notions are crucial in an 'open' methodological stance which is 'sensitive to emerging issues and problems' (p.38) which was also anticipated in my research study. According to Elliott, 'foreshadowed problems are issues which are identified from any source which are likely to be significant' (ibid) and 'preconceived notions' are ideas, thoughts, assumptions, perspectives and opinions that the researcher(s) bring with them into the research situation. My own interpretation of this is 'everything or anything that the researchers think or perceive they know already about the research problem prior to even begin tackling the problem'.

Having discussed my plans with my supervisors, I then decided to precede the field study with small pilot case studies in a number of UK FE colleges to gain insight from the colleges in relation to the use of ICT. As well as enabling me to gain 'field' experience and research training, the small case studies of UK colleges would be used to frame factors and issues which might be relevant for Brunei Darussalam thereby progressively informing and improving the case-study design for a major case study.

The methodological stance taken for the design was one that assumed *very* little prior knowledge of UK FE colleges in terms of the context of the study. Hence, adopting Elliott's approach seemed very appropriate and relevant. In order to access a broad range of data from a number of sources, the methodological stance of 'grounded data' (Glaser and Strauss, 1967) was to be used also to progressively inform the design as well as for data collection and analysis for the Brunei Darussalam's major study. The methodological approach adopted for the study was consistent with the objective of the study – that is to produce a research report of a descriptive and interpretive nature on the use of ICT in supporting teachers' professional development needs. The detailed field reports of the UK case study will be presented in chapter 5.

4.4.2 Data Collection

Careful and extensive thoughts were given to the formulation of the research questions and how the data collection was to be made in the Brunei fieldwork – based on the experience gained from the work following the small case studies of the UK FE colleges. The nature of the research questions, to

some extent, determined the method used as well as the people chosen to provide the data required. Hence, the data-collection procedures varied in relation to the nature of the question. How each method was utilised in the study for each research question is summarised in table 4.2.

Table 4.2 Emerging Research Questions and Data-collection procedures

Research Questions	Data-collection Procedures
What values are held by VTE teachers towards ICT? How competent/ready are they with ICT?	1) Analysis of documents 2) Interviews with VTE teachers and their managers 3) Questionnaires of VTE teachers and their managers
What attitudes do VTE teachers' hold towards ICT?	1) Interviews with VTE teachers and their managers 2) Questionnaires of VTE teachers and their managers
What are the factors and conditions that support (or fail to support) successful implementation of ICT in the VTE institutions?	1) Observation of institutional factors and present conditions 2) Interviews with VTE teachers and their managers 3) Questionnaires of VTE teachers and their managers 4) Analysis of documents
How adequate is resource provision for effective implementation of ICT?	1) Observation of institutional resource provision and ICT facilities 2) Interviews with VTE teachers and their managers 3) Questionnaires of VTE teachers and their managers 4) Analysis of documents
What are the strategies employed by VTE institutions in bringing about change?	1) Observation of institutional management practice 2) Interviews with VTE teachers and their managers 3) Questionnaires of VTE teachers and their managers 4) Analysis of documents
What model of 'best practices' from other countries might be culturally-transferred to the VTE system in Brunei Darussalam?	1) Literature review 2) Documents 3) Interviews and Questionnaires

The above research questions were concurrently investigated using semi-structured interviews, field notes from observations and documents throughout the fieldwork. The questionnaire was implemented separately at a later stage, after the completion of the analysis of the interviews and issues that arose from them were identified. This was because the development of the questionnaire required the input from the outcomes of the analyses of interviews, and review of documents and literature.

4.4.2.1 Semi-structured Interviews

The technique of semi-structured interview used in this research study was considered to be appropriate because it offers more flexibility than using either *structured interview* (conducted in accordance to or with the aid of standardised interview questions) or *unstructured interview* (free-flowing conversation technique with no standardised questions) (May, 1993). It allows an interviewer to vary his/her approach of questioning from an open-ended type to a more structured type based on the points on the interview schedule (– see appendix B) depending on the circumstances of the interview session (May, 1993, p.93). For example, I did not have to ask many questions when dealing with 'talkative' interviewees. As 'there is no single style of interview to fit every occasion or all respondents' (Converse and Schuman, 1974, p.53), varying the style of interview to fit the contexts and circumstances helps to establish a balanced rapport between those who were 'too casual and friendly' on the one hand and those who were 'too directive and impersonal' on the other (Converse and Schuman, 1974).

Fontana and Frey (1994) observe that in practice interviews can never be

like what was planned – there is a need to use a specific interview mode from time to time. According to them, there are three common errors in interviewing:

- interviewees may hide or omit information from an interviewer;
- interviewees may 'invent' responses just to please the interviewer;
- questions may be wrongly worded, and there could be flaws in questioning techniques or changes in the question wording.

Employing semi-structured interviews helps to minimise these errors. Rather than having a specific interview schedule or none at all, an interview guide may be developed for some parts of the study in which a direction is given to the interview so that the question focuses on the crucial issues of the study. This permits greater flexibility than the closed-ended type and permits a more valid response from the informant's perception of reality (Burns, 1994).

During the first meeting with the participants to seek their agreements and arrange possible dates, they were informed of the purpose of the study. Forms of consent for them to fill in, if they agreed to participate, were distributed. I also explained to them the manner in which the recording of responses was to be made and their consent was sought regarding the use of a micro-cassette recorder. The interviewees were also assured about their right to privacy and protection from emotional discomfort, should the possibility of this arise. The interview schedule, which was developed on the basis of the research questions, input from the literature and issues that arose from the UK pilot-study were also given to them. Ample time was given (at least three days) before a mutually-agreed and convenient time was decided

for the subsequent interview session.

During the interview session, the participants were encouraged to share their views on other relevant issues beyond those listed in the interview schedule. This was to enable the recording of as much data as possible so that an in-depth understanding was developed of the other issues linked to the area under study. This encouragement also served to allow the free flowing of information from the interviewees with little or no interruption from the interviewer. As my role, in this case study, was that of a data-collection agent, every effort was made to prevent the interviewees from being influenced by the biases that might arise from me. Therefore, necessary measures in the procedure of collecting the interview data were observed to ensure that the data generated were the genuine perceptions of the participants. This included the following set of protocols:

- making sure the interviewees felt at ease throughout the interview session;
- allowing them to talk freely especially on those issues which have relevance to the research questions;
- asking questions which were not threatening to the interviewees and
- asking questions which were focussed and specific in nature and which allowed wide-ranging and comprehensive answers.

In a later part of the research process, another meeting with the interview participants was arranged, the purpose of which was to show them the interview transcripts so that they could verify the translation (from Malay into English) and also that the contents of the transcripts reflected the ideas and opinions they expressed during the interviews. This process of 'respondent

validation' (Silverman 2000, p.177) also provided the opportunity to clarify any point which was not clear or contradictory and to extend or add to the comments obtained earlier.

In order to gain valuable insight and rich interview data, the selection of the participants was carried out using a technique known as '*purposive sampling'* (Erlanson *et al.* 1993, p.33). In this technique, the most likely people selected were those who were involved in or knowledgeable about the case under investigation. This included the people in charge of ICT needs, the people in charge of staff development and training as well as the key decision makers in each college. These people in turn would direct me to other key informants for the case study.

4.4.2.2 Documents

According to Cohen & Manion (1994), the basic assumption behind using documents, is that individuals or groups often reveal their beliefs, attitudes, values and ideas in the documents written by them, such as files, official departmental reports, minutes of meetings, circulars and memoranda. By using content analysis, these key documents, according to them, could be categorised and this could contribute to the understanding of a particular event or a phenomenon in a social setting through the repeated occurrence of various words, statements, concepts and images.

In this study, these documents were obtained from DTE and the VTE institutions under its umbrella as well as other Brunei government organisations. The organisations approached include the Ministry of

Communications, the Ministry of Development and the Prime Minister's office. The documents obtained were sampled in the light of their relevance in terms of individual and organisational contributions to national development as well as the development of ICT at individual, institutional and national level. The documents consulted and reviewed most extensively were those from the DTE and the individual VTE institutions. The analysis of documents was specifically employed in this study to supplement the data obtained by interviews and questionnaire as well as in the development of chapter 2 – the context of the study.

Merriam (1988) notes a number of problems in relation to the use of documents for research purposes:

- the materials might not be suitable or relevant as they were not written for research purposes
- they might be found to be incomplete or the contexts in which they were produced might not be the same context as that for which they were obtained
- there may be problems of authenticity and accuracy.

As stated earlier, to overcome the above problems, this research utilised multiple methods of collecting data so that the data obtained in this way could be cross-checked against that obtained by other methods.

4.4.2.3 Questionnaire

The data collected by semi-structured interviews, documents and field notes from observation had a number of deficiencies:

- They were too detailed and voluminous and so needed to be reduced into categories of key findings so that they were useful, meaningful and directional for guiding strategies for further analysis
- They were obtained from a small number of participants and from three VTE institutions instead of the intended all seven VTE institutions. The ideas and opinions of this sample did not necessarily represent the perceptions of the whole population being investigated. Hence, it was necessary to cross-check the 'key findings' from the interviews against a larger sample of teachers and managers from across the seven VTE institutions.
- The interviews left a number of 'gaps' or potholes – for example, some ideas and issues addressed in the literature were not covered by the interview participants. To have a greater level of understanding of the subject studied, it was necessary to obtain responses on these ideas and issues to enrich the data already obtained from the interview.
- It was inevitable that the interview data were not completely free from '*interviewer bias*' (May, 1993, p96) from my part (who concurrently had to play the roles of data collector, interviewer, transcript reader, translator, and data analyser and interpreter) plus the fact that almost all of people interviewed knew me as their past colleague in the VTE organisation. Hence, it was necessary to minimise some of these biases to increase credibility and the validity and reliability of the data obtained earlier.

To overcome the above deficiencies, the questionnaire was built into the research design. In order to enrich and give more meaning to the interview data, the construction and the analysis of the questionnaire was carried out separately. It was done when all the analyses of interviews were cleared.

The questionnaire (see Appendix C) was developed as the final stage of the data-collection stage. Adequate time was given to it to ensure careful thought to its construction. The items included in the questionnaire comprised issues that arose from the findings of the interviews, the analysis of documents and input from the literature review. These were administered to the seven VTE institutions including the three whose staff had participated in the interviews.

The questionnaire consisted of a mix of open-ended, closed, dichotomous (i.e. yes/no types) questions and others with 5-point Likert rating scales (Cohen and Manion, 1994). The 5 point Likert scale was used on a number of items to measure the respondents' degree of agreement on a number of findings from the interviews. The "neither disagree nor agree" option was included in the scale so as not to lure the respondents to select between the 'favourable' and 'unfavourable' options for areas which they were not familiar with or about which they had no knowledge or because of the imprecision of this category.

4.4.2.4 Data Triangulation

The main source of the data-collection procedures in this case study was from semi-structured interviews. The other data-collection procedures such

as documents and field notes from observation served as supplementary, while the questionnaire, to some extent, served as confirmatory (cross-checking) as well as to further elicit supplementary evidence. This technique of multiple methods of data collection that supplemented each other and where each confirmed findings from the other is known as *triangulation* (Silverman, 1993, p.152).

There were two main reasons why I decided to use this 'multi-method' approach. The first reason was that this approach provided a means of data enrichment. For example, if any piece of data/evidence by one technique was missed out, then the other techniques could be used as a 'backup' – so as to fill the gap of the missing piece of information. And as explained earlier (in section 4.3.3), the use of multiple data-collection methods is one of the major strengths of the qualitative case study (Merriam, 1988). The second reason was that multiple data-collection techniques would assist in overcoming the deficiencies inherent in any one technique (Denzin & Lincoln, 1994). For example, in the interview technique, as the main data-collection instrument is the researcher himself, it is inevitable that some data collected might be affected by the researcher's bias. Therefore, such triangulation should help in improving internal validity (see section 4.3.6) and enhance the credibility of the research findings. I have also found that the multiple sources of data/evidence that came out of this approach facilitated the cross-checking of data.

4.4.3 Data Analysis

4.4.3.1 Transcribing Interview Data

The data analysis of the interviews began as soon as the full transcripts of the tape-recorded data from the first few interviews were available. According to Merriam (1988), verbatim (word for word) transcription of the recorded interviews provided the best data base for analysis. Some writers, (e.g. Atkinson and Heritage, 1984; Siedman, 1998) are of the opinion that the most effective and efficient method of analysing the interview is to listen to the tape several times and draw out important statements or ideas expressed by the interviewees and perhaps use the number displayed on the tape counter to locate a particular word or phrase or statement of the interviewee. I did venture into this technique of partial transcription and found that it was rather cumbersome, tedious and more 'time-consuming', when compared to the technique of utilising the full transcripts. Thus, I adopted the technique of full verbatim transcription of all of the recorded interviews, even if it was at the expense of spending considerable hours transcribing. In total, transcribing probably took more than 300 hours. Nevertheless, it also helped me get familiar with the data.

Opinions and ideas communicated in a mixture of local language (Brunei Malay) and English were translated fully into (transcribed) English; disjointed discourses were joined together; in some cases, amplified and expanded in order to capture the main ideas and opinions conveyed by the interviewees. These transcripts were later shown to the respective interviewees to ensure that the translation and the transcription reflected their perceptions and opinions on the research questions they responded to during

the interviews. I, myself, carried out the business of transcribing and translating instead of having someone else do the job as this would have introduced another layer of 'error' in the process. This point was made clear by Fontana and Frey (1994) on the practices of some researchers who tend to rely on interpreters, and thus become vulnerable to an added layer of meanings, biases and interpretation that may lead to disastrous misunderstanding.

These transcripts formed the main 'case-study data base' for subsequent analysis. Yin (1984) refers to the case-study data base as the organised, retrievable, and manageable primary resource package, developed by bringing together all the information related to the problem areas and distinguishes it from the final 'case-study report'.

4.4.3.2 Data Categorisation and Coding

In dealing with voluminous amount of data obtained from the interview transcript database, I have employed two levels of coding following the suggestion of Miles and Huberman (1984). The first level involved categorising the interview responses. The second further coding process was carried out in order to group the initial coding into a smaller number of themes. In carrying out this process of data reduction, I have followed the coding technique suggested by Robson (1993). The steps followed were as follows:

- identify 'genuine' categories and give them a (provisional) name
- relate these categories specifically to the contexts in which they occur
- see how these categories relate to each other and build sub-categories if

necessary

- always do this on the basis of specific data, underlining or highlighting each occurrence; reference frequently, giving page, line, etc
- develop core categories, relating all categories and sub-categories to the core
- discard totally and largely unrelated categories, unless you can find some way of linking them to the core

The above categorisation process represents one level of coding. However a further coding process is necessary to select and organise the contents into sub-categories. This further procedure was carried out in order to bring up the said sub-categories in the form of specific themes, issues, topics, concepts and propositions. The data categories were then subjected to content analysis and submitted to scoring such as responses counting or frequency of occurrence. The intention was to eliminate repetitive statements in order to come to some conclusions or identify some meanings or acquire some insights which would illuminate issues or research areas under investigation.

4.4.3.3 Phases of Data Analysis, Data Reduction, Coding and Interpretation

The data collected from the interviews were basically descriptive accounts of the phenomena under investigation and most of these needed little analysis or interpretation. However, they were generally disorganised and often overlapped in the sense that the same response could be taken as an answer to other questions on the interview schedule. In overcoming this problem,

three phases of analysis were adopted.

The first phase of analysis involved re-organising the raw data from a single source (i.e. from an interviewee's transcript) into a number of emerging categories in accordance with the research questions. This constituted the main process of categorisation. Thus, for example, category #01 collected from interviewee #01, was grouped in category #01; the next category #02 obtained from the same interviewee #01, was grouped in category #02 and so on. This treatment was applied to the rest of the interview transcripts until all of the emerging categories were exhausted. Mind-mapping software (*MindManager Smart*) and Windows® application tools such as *Microsoft Word* were used heavily throughout this process of categorisation. The mix-mode use of these software tools demonstrates their powerful ability to manage folders and other data-handling and also the discrete useful steps such as 'copy' and 'paste'. The output of this analysis represents the first phase of analysis of the data from the interviews.

The second phase of analysis involved bringing together the responses from all of the sources (i.e. from all interviewees) within a single category in relation to the emerging themes. Thus, for example, the responses pertaining to theme #01 from all of the interviewees were grouped together in theme #01; the responses pertaining to the theme #02 from all of the interviewees were grouped together in theme #02 and so on. The same procedure was followed for the rest of the emerging categories. This was where the use of the mind-mapping software, *MindManager Smart* played a significant role in helping to organise these categories, structure them as well as in making linkages between those categories. The outcome of this phase of analysis enabled me

to count the number of occurrences of repetitive statements or phrases or sentences given by different interviewees and thus facilitated the identification and development of sub-categories if it was necessary to do so. Appendix D (mindmaps) shows the result of this phase of analysis.

The third and final phase of analysis involved organising the output of the above two phases by adding and/or cross-checking with the data obtained from other methods of data collection such as documents, field notes from observation and the questionnaire. The data obtained from the questionnaire, however, were analysed using simple descriptive statistical analysis before the findings were inputted to this level of data organisation. A further phase of data coding was introduced at this level of analysis for data consolidation, reduction, and interpretation. The purpose of these procedures was to remove any overlapping and repetitive statements. The narrative description of the subjects investigated was then composed to produce the final case-study report. This included the quoting of the relevant texts of the interview transcripts as part of the supporting evidence. The choice of quotations from the interview data was based on comments which illuminated and supported the key findings. Lengthy comments were edited to make them brief and clearer.

4.5 The Fieldwork

The fieldwork conducted in Brunei Darussalam was undertaken in five different periods as shown in the table below:-

Table 4.3 Periods of Fieldwork

Period	Activity/Method	Purpose
May – June 1999	Unstructured Interviews, Document collection, Field notes from observation, Research Seminar	Meet director and other staff of DTE, negotiate access and discuss nature of project, collect contextual information/organisational data, visit institutions (sites), meet director of ITB and his staff, principals of other VTE institutions and their staff, view institutional resources, familiarise the context of the study
May – Aug 2000	Semi-structured Interviews, Document collection, Field notes from observation	Meet assistant director of DTE, re-negotiate access, collect more organisational data, conduct interviews at three VTE institutions
Jan – Feb 2001	Respondent validation, Document collection, Field notes from observation	Meet interview participants, verify interview transcript, collect more contextual information/data/ evidence, gain insight of new changes,
June – Aug 2001	Semi-structured Interviews, Document collection, Field notes from observation, Design and pilot questionnaire	Meet and interview new participants, note new changes that took place since previous summer
November 2001	Survey questionnaire	To obtain quantitative and qualitative data from all VTE institutions under DTE

4.5.1 Access to Fieldwork Sites

Prior to the first period of fieldwork, a letter about the research project was sent to the director of DTE in Brunei Darussalam. The letter informed the director about my desire to conduct a research study in the VTE institutions for a period of about three years, i.e. from May 1999 to Dec 2001. The

purpose of the study, its possible and potential benefits to the organisation, how the study was to be conducted and who would be involved in the study were clearly explained in the letter (see Appendix E). The director of DTE was also assured that the confidentiality of information and anonymity of the research participants would be maintained.

My first visit to the DTE was made on May 13, 1999. At that time, the director of DTE was on an official trip overseas. It was the assistant director of DTE who conveyed to me the assurance that I could expect full support and co-operation from the department. Subsequently, a memo to the *Heads* (*Director* in the case of ITB and *Principals* in the other institutions) of each of the seven institutions was written. Copies of this memo and my earlier letter to the director of DTE were then hand-delivered to them during my visits to the participating institutions.

During my meetings with the heads of the VTE institutions, I briefly explained to them the research study based on the points that I raised with the Assistant Director of DTE. In addition I explained to them my need to involve the various managers and teaching staff in the project. It was then mutually agreed that the selection of the interviewees would be on the basis of their willingness to be interviewed and their likelihood of providing meaningful information. Because I had to let these Heads do the selection, I advised them to be '*representative*' in their selection of the interviewees – such as a reasonable mix of male and female, local and expatriate staff and possibly, user- and non-user of ICT. This was necessary for the purpose of enriching the qualitative data collection rather than for meeting the

quantitative sense of population sampling.

Because of the relevance of the research to Brunei Darussalam in general and VTE in particular and my rapport with them over eleven years as a colleague in the VTE system and my own credibility as a lecturer at UBD, who strives to help serve the professional development needs of their teachers, the heads of the institutions were very supportive of the project. In addition to providing names of interviewees, they themselves expressed their willingness to participate in the interviews.

During my meetings with them, I also brought along letters of invitation to participate in the project and the letter of consent forms as well as the interview schedule to be distributed to the interviewees. The heads of VTE institutions were requested to write the names of the selected interviewees on the letter prior to distributing the letter of invitation. In the letter of invitation to participate in the project, the interviewees were informed of the kind of information expected and they were advised that the interview would not take more than one hour, and that they were free to withdraw without any repercussion if they did not wish to continue, and that the confidentiality of information and anonymity of interviewees would be maintained, and that they should fill in the consent form. The consent forms were received directly from the interviewees themselves. In some cases where this was not possible, the forms were returned through their principals. From the response that they gave, I took note of their time of availability for interview and prepared a time-table for the interviews. This was to ensure that the time fitted in to suit the interviewees' time of availability as well as to be within the time permissible for

the fieldwork.

Except for two cases, where the interviewees were somewhat cautious about what they said, I did not encounter any major problems during the fieldwork interviews. For example, the use of micro-cassette recorder during the interview sessions generally did not present any major problems, although two interviewees did not like the idea of being tape-recorded in which case I had to rely solely on my ability to take notes. A few interviewees requested for "*off the record*" for certain information about a number of persons where names were mentioned.

Overall, the easy access to the field and readiness of interviewees to assist in the project was expected. The principle of *muafakat* was clearly demonstrated. (*Muafakat* is a principle derived from the philosophy of MIB; It is the principle of willingness to help and is commonly practised among Bruneians as it is inherent in their culture). I believe that this was probably the main reason why most of the local interviewees were willing to spend their time and made an effort for the interview. Siedman (1998) warns that '*the interviewer and the participant need to have enough distance from each other that they take nothing for granted*' (p.36). While his warnings were heeded, I did not experience any such tensions or role conflicts during the interview sessions. This was presumably because the nature of the investigation which was to bring about change in the organisation through the involvement of the key people and partly because the study expresses ideas and opinions from the perspectives of the interviewees' own experiences rather than from the perspectives of the researcher. Nevertheless, one possible danger, which I

was well aware of, was that the responses of the interviewees could be directed towards trying to 'please' me rather than expressing genuine/honest opinions. This problem was minimised by the adoption of the multi-method data collection techniques which allowed triangulation to be done (see section 4.4.2.4). This was also necessary to guard against the bias that I might introduce into the interpretation and also my relationship with the interviewees. The use of anonymous questionnaires in the later stage of the project was expected to minimise some of these problems.

4.5.2 The Interviews

22 VTE teachers and managers were interviewed in the summer of 2000 and another 6 in the summer of 2001. Most interviews were conducted (in private) either in the office of the interviewees or in special rooms (principal's room, guest staff room) allocated specifically for interview sessions. The duration of the interview sessions varied from 30 minutes to 1.5 hours. It was made clear at the outset that the interview would require less than one hour. However, many interviewees in fact did not mind going over the time limit as they were keen to contribute their views and opinions, possibly because they realised that the outcome of the research study could bring great benefits to them as well as their college.

In general, the interviewees were not nervous about the interview and many of them were comfortable with the use of the mini-cassette recorder. This was probably because they had faith in my assurance of confidentiality and anonymity. That was why, in a number of cases, the interviewees were very critical and frank to the extent that names of people

were mentioned.

Many of the interviewees were aware about my previous positions and responsibilities in the VTE system and the fact that I now serve in a 'higher' level institution. I took pains to reduce the *halo effect* as this might be a possibility. For example, I did not wear a tie as this could be seen as a deterrent to the frankness of the interviewees. In Brunei Darussalam, people consider 'wearing a tie' as being 'official' or 'formal' – so they might regard me as an official from the MOE rather than a researcher or an officer outside his formal duties. On the other hand, it is considered to be 'courteous' to wear a tie when meeting a higher ranking officer – for example the Principals or the Director of DTE or his Deputy. The dress code, therefore, facilitated access but would not have affected the openness of the interviewees of higher rank.

The interview questions and schedule were written in English instead of *Bahasa Melayu* (Malay), the local language. The assumption made here was that all interviewees would not have difficulty with the use of English. They had gone through English language education locally and nearly all of them had gone abroad, mainly to the United Kingdom, for their tertiary education. Their understanding of English made it unnecessary for the research questions to be translated into Malay. However, it is a common practice in Brunei Darussalam that people code-switch from one language to the other in ordinary conversation, even in formal situation. This was reflected in the interviews conducted with the local interviewees where some of the information provided was in Brunei Malay.

The tape-recorded interviews were transcribed verbatim. Words or

sentences expressed in Malay Language were translated into English. As part of the respondent validation process, the transcriptions were later shown to the interviewees to ensure them that the translated versions reflected their views and opinions expressed during the interviews. All interviewees accepted the interview transcripts presented to them with a number of minor changes. These changes involved re-expressing their original remarks and opinions into less sensitive or more diplomatic format. In general, the changes made to contents of the original transcripts were not significant.

4.5.3 Documents

During my visits to the Department of Technical Education and the VTE institutions, a number of documents (reports, minutes of meetings, handbooks, etc) were collected, although the number was few. In most cases, the information available was not in a format that is readily accessible. This was further complicated by the fact that many of the documents were not endorsed and it was quite difficult to draw the line between 'official' and 'personal' opinion. Hence I had to be selective and cautious in the use of the available documents.

4.5.4 Questionnaire

The first draft of the questionnaire was shown to the researcher's supervisors and research colleagues in the University of Greenwich, to obtain their comments and input. Taking into consideration the feedback received, the questionnaire underwent a number of alterations and corrections. Most of the revisions were to do with changing difficult words to easier ones, simplifying question items to enhance clarity and avoiding ambiguity such as

double-barrelled questions.

The questionnaire was then piloted on eight (four males, four females) teaching staff in the School of Education and Training, University of Greenwich, four of whom were in the supervisory team of this study. This piloted survey provided the opportunity to check whether the respondents understood the meaning of the items or statements and whether the level of difficulty was of an appropriate level. Subsequently, improvements in a number of items were made as a result of this pilot (See Appendix C).

The questionnaire was then sent to a very well-trusted person, my wife Stephanie, in Brunei Darussalam through e-mail as an attached document. She then made about 150 copies of the questionnaire and, at my request, she herself made the delivery of the questionnaire personally to a number of *assigned contact persons* in each of the seven institutions. These trustworthy contact persons, in whom I had full confidence, a confidence developed through my long-time friendship, collaboration and communication, had earlier agreed to help me with the questionnaire. They then administered the questionnaires to the teachers and managers. They were reminded of the representative-ness of the sample in their selection – i.e. by maintaining the balance right across all the departments or sections within each institution, such as male and female, and local and expatriate teaching staff. This happened during the first week of November 2001. To facilitate and encourage returns, stamped-addressed envelopes were provided with the questionnaires. The respondents were requested to return the questionnaire before November 30, 2001 either directly to Stephanie or through the

assigned contact persons who would then pass them back to Stephanie. Detailed instructions and assurances of confidentiality of information and anonymity of respondents were contained on the front page of the questionnaire.

The overall rate of return of the questionnaire was 66% which was considered to be higher than normal. The normal level of return is about 40% (Cohen *et al.* 2000). This high return demonstrates the interest shown by the respondents and shows their desire to assist in making a contribution to the research work carried out about the current concern of Brunei Darussalam in general and the VTE system in particular, in relation to the use of ICT in Education.

The process of analysing the data from the questionnaire was carried out in two stages. In the first stage, data from Colleges A, B and C were analysed with a view to validating the earlier findings obtained from the interviews with teachers and managers in these colleges. The three colleges (A, B and C) were involved in the earlier part of the study – (see Chapter 6). This stage of the analysis was also used to find out if anything had changed in the 15 months since summer 2000 – with a view to drawing out, if any, new findings. In the second stage, data obtained from another three VTE colleges (D, E and F) was studied. These three colleges were not involved in the earlier part of the study. The aim of the second stage was to compare findings from the first group (A, B and C) with this group of colleges (D, E and F) – with a view to validating the first sample by replication and drawing out more broadly based findings from all of the VTE institutions.

Chapter Five
The UK Case Studies

5.1 Introduction

This aim of this chapter is to present the findings of small-scale case studies conducted in three FE colleges in the UK. In each of these colleges, I had set out to focus on the concept of *staff development* as the main vehicle to explore *the development of ICT* in these colleges. This sets the boundary for the three cases. The treatment deployed in this preliminary phase of the study was that of a pilot. The main goal was to inform the case-study approach research design.

This chapter is divided into four sections. This section (5.1) introduces the chapter. The next section (5.2) focuses on the pilot study in the three FE colleges – the objectives, the context and the research methodology employed. Section 5.3 presents the findings from the three case study colleges. Finally in section 5.4, these findings are discussed and how they would be utilised in the research study is explained.

5.2 The Pilot Study

Although the eventual theme of my investigation was change and innovation of ICT in FE Colleges, the ultimate goal was to allow me to design a framework for analysing the factors in the context of the Vocational and Technical Education (VTE) in Brunei Darussalam. Hence the treatment of this preliminary phase of the research was that of a pilot. For this specific purpose, three main objectives were devised:

- To investigate how ICT is being used at the individual and institutional levels and to understand how the process of change and innovation brought about by ICT had led to the initiatives for ICT provision and staff development in the colleges at that time.

- To identify the relevant issues and 'foreshadowed problems' in relation to ICT and staff development, which might be significant in terms of helping me to inform, shape and improve the research design for the subsequent Brunei Darussalam VTE Case Study (see section 4.4.1),

- To enable me to gain the research apprenticeship and training through real-world practice in the field after having gained some theoretical foundations from the research methods courses and also from my self-study and search – in particular the specific area of the practice and art of interviewing.

Because I knew very little about the attitudes and perceptions of the teaching staff in the colleges in terms of FE teachers' learning, skills and knowledge of ICT, apart from those gathered from the literature at that time;

and moreover I was just beginning to immerse myself in the literature on the subject, I had to somehow rely on the utilisation of 'grounded theory' (Glaser and Strauss, 1967; Charmaz, 2000) to guide me through the theoretical framework for the study. According to Charmaz, grounded theory is 'the study of experience from the standpoint of those who live it' (p.522). The end product of such a study is the building up of substantive theory that emerges from or is grounded on the data. I also understood that I, being the investigator, was the primary instrument for data collection and analysis, and that the mode of inquiry was inductive. According to Strauss and Corbin (1990) 'one does not begin with a theory, and then prove it. Rather, one begins with an area of study and what is relevant to that area is allowed to emerge' (p. 23). Though substantive, the theory is not grand, but about some facet of professional practice, about real-world situations or like Charmaz says, it is about "*slices of social life*" (Charmaz, 2000, p. 522). The slices of social life that were of interest to me were the teachers' and managers' learning experiences with ICT and staff development in their colleges.

5.2.1 The Context of the Pilot Study

Although the treatment of this phase of the research study was such that it would not be extensive or elaborate, several assumptions were made before and during the investigation based on the prevailing (on-going) pressures for change affecting the FE sector at that time. This included the continual pressure for increased competition, for cost-effectiveness emanating from agencies such as the Further Education Funding Council (FEFC) and pressure to change because of the new expectations held by and for learners

of the FE colleges, all of which demands pro-active strategic management of the organisational setting as well as the external environment. Since the time when the FE sector entered into the era of 'incorporation' almost a decade ago, (Glatter and Levacic, 1997), FE colleges have been encouraged to set up their own enterprises - to progress, change and innovate on their own in a business-like environment. Their competitive performance was inspected regularly by the Further Education Funding Council (FEFC). Colleges were expected to 'demonstrate effectiveness' (Glatter and Levacic, 1997, p.16) and 'contribute to the economic success of its locality and hence the nation' (ibid). Indeed, 'strategy' has been the keyword used by the FEFC to sustain the impetus of change innovation within colleges (FEFC (E), 1995). In addition, it was also assumed that the FE colleges were sensitive to the following:

- the challenge brought by the intensive UK government's initiatives to improve the standard and profile of ICT in the FE sector with emphasis on learning and skills specifications, in particular on life-long learning (FEFC, 1999a).
- the need for FE colleges to respond to the (then) publicised recommendations of the Further Education Information and Learning Technology Committee (FEILTC) that all colleges in the sector were to have a 'robust, integrated and sustainable IT strategy' (FEFC, 1999b)
- and the need to respond to the standards calling for all educators in FE to use a variety of suitable teaching and learning methods and to bring ICT to the workplace as echoed in the recent document by FENTO (FENTO, 2001).

5.2.2 The Methodology

The study was conducted in the months between February and April 2000, prior to the major fieldwork in Brunei Darussalam. Semi-structured interviews were employed to facilitate the collection of data and this was supplemented by field notes from observation and the analysis of collected documents. Although the study was treated as 'a pilot', it does however, attempt to present some snapshots of what is happening in the FE colleges in relation to ICT innovation and the process of change by taking a closer look at the issues of staff development and the related processes. The analysis of data gave me the opportunity to practise handling real data and then to report it as three separate case studies.

Throughout the study the following research questions had been used to guide the small-scale investigation:

1. What is going on in terms of the development of ICT?
2. What perceptions, values, attitudes, and beliefs do FE teachers have in relation to how ICT is used in their colleges?
3. What staff development activities or programmes are there (if any) in the area of ICT?
4. What are the factors that support/encourage (or hamper/discourage) teachers to acquire the skills and knowledge of ICT?

The study employs a case-study approach (see section 4.3). In summary, it was consistent with the qualitative paradigm based on a number of methodological assumptions:

First, the study was context-bound set by the natural settings of the three FE colleges. The findings derived from the study will therefore be unique to these colleges although the case reporting is based on my interpretations and the sense that I made from them.

Second, the study involved fieldwork – it involved going to the colleges, negotiating access, conducting interviews and collecting other data, recording and observing the behaviour of people and the processes without altering or controlling the processes being investigated. However, it would be disingenuous to assume that there would be no disturbance at all as there will always be some effect, for example - 'interview effect' which cannot be ignored.

Third, the people involved in the study were small in number. 'Generalisation' beyond the case was not the primary purpose. The aim was to obtain rich and relevant data from the processes or events in these FE colleges. My main interest was in the analysis of the people's experiences with the processes taking place in the FE colleges and the meaning that they attach to those experiences.

Fourth was the fact that I was the research instrument who went out there in person to collect data, carried out the subsequent analysis and mediated the interpretation of the case through a qualitatively descriptive case study 'story-telling' report (Bassey, 1999, p.62).

The access points to the colleges were gained through communications with reliable contact persons provided to me by my main supervisor. The process of negotiating access, both at the institutional and

individual levels, was facilitated through letters, emails and phone calls. In each of the colleges, upon my request, I was directed to the person(s) in charge of staff development and the IT personnel. These people were purposely approached as they were identified as key informants who might be able to give me a big picture of the events and processes as well as reliable data for the study – based on their willingness to contribute. Although no major obstacles were faced, I did, however, encounter problems in getting teachers to participate in the interviews. I found that most teachers were tied up with their daily activities and commitments. What I found later was that most of them were busy not only with full time-tables but also having to face administrative challenges and escalating paperwork. Because of this, I had to rely on 'whoever was available' at that time. When I managed to get hold of someone, I sought their co-operation. In other words, I asked those teachers who were willing to be interviewed if they could introduce me to other teachers who might be interested in participating. So three sampling strategies had been used – 'purposive', 'convenient' and 'snowball' sampling (Rose, 1982).

My main source of data was the qualitative interviews. This was further supplemented by the data collected through field notes from direct observation and the collection of documents. As well as enriching the interview data, this multi-method data collection approach was employed with a view to triangulating and corroborating the main data obtained from the interviews (Robson, 1993; Yin, 1994; Bassey, 1999).

Direct observation provided me with the means to record specific events

as they occurred, in particular those related to the current context in the use of ICT in the colleges and staff development activities. These observational data were recorded through the writing of descriptive field notes.

Some of the documents collected included Colleges' prospectuses, course offered information, strategic plans, draft ICT policy-formulation documents, staff development documents, annual reviews, FEFC inspection reports and other documents relevant to the study. Some of these were downloaded and printed out from the college's intranets with the full consent of the college.

All the interviews took place within the colleges' premises – some were conducted in the staffrooms, some in the interviewee's workroom, and some in the common room. In the case of one participant in one college, it was conducted in the canteen and in another case it was in an empty classroom. Apart from slight interference from 'outside' noise, there were no major problems with the interviews.

Five members of staff were interviewed at Western College; including a staff development manager, an IT trainer, two full-time teachers and a member of the support staff. At Southern College, there were seven interviewees – an Assistant Principal, a quality assurance manager, the head of IT, two full-time teachers and two part-time teachers. At Northern College, there were nine interview participants - the Vice Principal, a newly-appointed staff development officer, a project manager for ILT who also managed the college website, a manager of learning development who was responsible for the college's ILT strategy, a programme manager for IT, and four full-time teachers. Table 5.1 shows the number of the interview participants and their

profiles:

Table 5.1 The Number of the Interview Participants

Colleges	Managers	Teachers	Support	Total
Western	2	2	1	5
Southern	3	4	-	7
Northern	4	4	1	9

An interview schedule was used to guide me with the interview sessions although the questions were continually changed and modified to progressively focus on the emerging issues that arose from the investigations. The themes used to elicit interview data were:

- the innovation process and ICT development
- the context in the use of ICT
- the management of change
- the attitudes and perceptions of teachers and managers.

Although the interview sessions were progressively moving towards semi-structured, the first few attempts were more or less 'unstructured' although still within the framework of the above research themes. Probing was used to allow the interviewees to express their views freely on issues that I thought would benefit from further exploration.

The duration of each interview varied between thirty minutes and one hour. With the full consent of the interviewees, all interview sessions were tape-recorded on minicassettes.

The analysis of the interview data began with the verbatim transcription of the tape-recorded interviews. As anticipated, the interview data was

voluminous and demanded the process of data reduction prior to carrying out with the analysis proper (Siedman, 1998). As part of the analysis of interview data, the following procedure adapted from Gilbert (1993) was followed:

- Reading and re-reading the interview transcripts to gain understanding and to draw out emerging themes and categories
- deciding on words or titles to describe the theme and category
- highlighting (using highlighter) the identified sections of the transcript and tagging them with the appropriate themes/categories
- extracting the appropriate quotations from the transcripts and including them under the appropriate themes
- going back to the transcripts to check whether all the themes/categories have been covered and/or in case more categories are needed and/or if there was a need to revise the original selected listing

The use of 'find', 'cut' or 'copy' and 'paste' functions on Microsoft Word was very useful in facilitating the above task.

The final part of the jigsaw is the re-construction of the story to tell for the case report using a 'linear-analytic structure' approach (Yin, 1994, p.137). Precautionary measures were taken to ensure that respect for truth and respect for person and institutions were maintained throughout the study (Bassey, 1999). This was made through the assurance of anonymising the identities of the informants and their colleges' names as well as checking with individuals again about the validity of the statements through the process of 'respondent validation' prior to using them for the purpose of case reporting.

5.3 The Findings from the UK Pilot Study

5.3.1 Case 1: Western College

5.3.1.1 Background

This college has three sites which were dispersed within the inner London area. The study was conducted on the main site. When I first set my foot on the premises of this site, I was impressed not only by its well-constructed and well-secured building, facilities and location, but also by the commitment of the staff that I met, most of whom displayed their strong desire to improve the service to the diverse and multi-cultural community that they serve.

The college has twelve teaching divisions offering a wide range of courses and qualifications including postgraduate and professional courses serving the needs of post-16 students, parents, employers, taxpayers and the community at large. The range of qualifications includes GNVQs and NVQs up to level 5, A level, GCSEs, BTEC, HNCs and HNDs among others.

The ICT/ILT resource provision was much to be admired. Although I had not visited nor viewed other FE colleges since my teaching practice placement more than a decade ago, I dared to believe that this college had set the standard model for colleges of the future. What I saw matched what was written in the college 97/98 annual review in which the college claims that it is 'leading the way in new technology' and that 'it is well on its way to becoming one of the best equipped colleges in the UK'. The ICT facilities include:

- a video conferencing system linking all the three sites and also providing communication links with institutions within the UK as well as outside (e.g.

to the United States)

- IT and computing facilities in at least seven 'Computer Suites', a Learning Centre (a 'converted' library with facilities such as books, a large number of PC terminals and other learning resources plus a student study area), a Key Skills Centre, an Adult IT Skills Centre (for short courses) a TV Studio (for media and design courses), a 'Design Centre' (for staff to go and have their learning materials designed and placed onto what is called the 'Student Learning Web') – all of these have full Internet access through staff intranet, student intranet and also the 'learning web' (see later).

The use of ICT in the management of the college was evident. For example, because of the dispersed locations, communications between the college managers at the three different sites were often carried out using the video-conferencing facility. Senior management often 'meet electronically' using the staff intranet to supplement face-to face meetings. This, as perceived by the managers I interviewed, was effective and efficient in terms of the use of time. For example, since senior managers have access to each other's electronic diaries and meeting agendas on top of the college information, bulletin boards and the means of alerting others to meetings, certain issues that do not require face-to-face meetings might be discussed or resolved on-line prior to the actual face-to-face meetings. It remains to be seen though, to what extent has this 'good practice' been able to encourage or inspire other managers and the college staff under them to acquire the essential ICT skills. According to one manager, the emphasis on the use of ICT has been driven from the top and being pushed down to every level of the college infrastructure.

Teaching staff have access to PC terminals in their workrooms although in most cases these machines were to be shared – in one case, one PC between seven members of staff. However, teaching staff were also encouraged to use the open access area (called the 'Design Centre') which was also used as the training room for staff. This training room housed over twenty latest multimedia PCs, scanners, laser printers plus other learning and development resources. Teaching staff might also develop their IT skills because IT experts were also available to give instant support.

Like other FE colleges, during the study period, the college was responding to the requirements of the FEFC for an 'IT strategy'. The draft IT strategy revealed that the college was responding to the UK government's objectives for 'life-long learning'. The college's IT vision statements considered the inclusion of having 'effective staff development programmes', 'continuous development and improvement of the student learning web' and 'promoting support for development projects related to IT and approaches to it in the various teaching divisions'. The document clearly specifies that 'students are the main beneficiaries of the IT strategy'.

It can be inferred that the staff intranet and the student intranet (the learning web) provide the 'backbones' for the on-going development of the ICT infrastructure in the college. The staff use the staff intranet to obtain college and administrative information as well as facilities such as staff e-mail. Students could only use the learning web or the student intranet. It was meant to assist them with their independent learning and ICT needs, and supplement their classroom work.

Staff development was a key feature in the college. A Staff Development Manager was appointed to oversee the training and development needs of all staff in the college. A document describing the college's annual activities revealed that during 1997-1998, the college had offered 'Information and Learning Technology training for all staff in addition to many other non-IT-related staff development programmes'. According to the Staff Development Manager, all of the programmes were 'strategically focussed' to the needs of the college. The effective implementation of such programmes was confirmed by the recent statement of the FEFC inspection which says that, "*the staff development in the college is strategically focussed*".

One of the strategies employed by the college to enhance the use of IT by staff in their daily work, as teachers and college administrators, was to encourage them to take up compulsory IT training provided by the staff development division of the college. (Later I found that the compulsory training commonly referred to as level 1 in the college was equivalent to the standard NVQ level 2). At the end of the training, which covered a range of skills area (which include the use of the Internet, emails, word-processing, saving documents as webpage, using the college's information, enrolment and enquiry system), staff were required to take an assessment test. As an incentive as well as to motivate staff to take this test, staff who successfully completed the compulsory IT training and passed the assessment test were awarded a certificate and given an e-mail account as an added bonus incentive.

According to the staff development manager, 94% of the college staff had successfully completed the training and passed the assessment test. Hence

this strategy was perceived to be an effective way for the college to achieve a significant level of IT competence among its staff. (It was neither clear nor relevant to me at that time whether or not the 94% figure included college staff across all categories).

5.3.1.2 Issues that emerged from the analysis of the interviews

A number of issues that impinge on the change and innovation process emerged from the interviews with the managers and the teachers. These issues will be presented under the following headings/themes:-

- Teachers' perceptions of current use
- The student learning web
- Staff development and compulsory IT training
- Other success factors

Teachers' Perceptions of Current Use

The data from the interviews shows that the teachers and managers in the college, in general, have a positive attitude towards ICT. The following interview quotes present just two of the typical views of the teachers on the perceived current use of IT in the college. The first quote raised two critical issues that might impinge on the process of innovation; the issue of equity and provision of IT resources for teacher and the issue of availability of time to learn/explore or develop skills in its use:

> I think generally people are interested in using IT. But they don't know how to or they don't really have the time to [learn/explore]. We are lucky here because we've got this one room with four people and two machines. In a lot of staff rooms there'll be one machine between four people. ... upstairs one

machine between seven..

[Teacher A]

This next quote exemplifies the view of typical 'senior' teachers (older generation) who might be resistant to change because they are so used to the 'traditional' or usual ways of doing things.

> I think it [the compulsory IT training] is possibly to encourage those who shy away from computers. Quite a few of us here, like me, are in our fifties. We started our working lives [long] before there was anything like a computer. I bet you can't imagine what the world was like [then]... and I thought back to the nineteen sixties when I was a student. I went to see a film about what the future was going to be when computers were first coming in...the expectation was that there would be no more papers in offices, it would be clean and wonderful world... but look around you, we haven't come to that of course...
>
> **[Teacher C]**

The interview data also shows that teachers need a lot of encouragement and support in their skills and knowledge development and that they need a clear path as to where ICT is taking them professionally. As one of them said:

> As far as the technology is concerned, because it is so volatile, it is constantly changing; 'staff development' is something that needs to be addressed on a regular basis.
>
> **[Manager B]**

The Student Learning Web

All of the managers and the teachers mentioned '*the student learning web*' in their discussion during the interviews. This might imply that this student intranet could/would increasingly gaining attention and importance in terms of further spearheading the direction in which the college was heading in terms of ICT. Although at that time, the learning web was still at an infancy stage, more and more material was being added into it and already there had been a number of issues and criticisms being raised over its implementation. For example, several criticisms point to the degree of control over the administration of the student learning web because the quality assurance of the materials in terms of their suitability and relevance was carried out by a team called the 'IT focus group'. This group has the power to control in terms of giving access to the posted materials to staff and students. Because the process of posting material involves a number of stages, it might take several days before it appeared on the learning web. This had created conflicts among some teachers, for example in terms of planning their time-tables.

One teacher raised concerns about the quality of the material added onto the learning web. He explained that although the designer of the learning web was a competent and skilled technician, his limited knowledge of 'pedagogy' might inhibit the students' access to learning:

> We are in a situation where we've got materials on the student learning web. But the format of the student learning web wasn't put up by teachers; it was put up by technicians. So technically it works and technically it's easy to administer. But for students, it's not necessarily very accessible...
>
> **[Teacher A]**

Another criticism to the learning web points to the concern about how students might lose sight of how they might use ICT effectively and this raises the question of how much learning could actually take place with and through ICT:

> They [students] can always find something to occupy themselves but they may be working unproductively. Or simply doing something else.. simply browsing the web or on the chat line. But even if they are in the program they are meant to be using, they can be using it in a very unproductive way if you are not careful. Because the computer itself is a distraction, so we must be very very critical of it
>
> **[Teacher B]**

One teacher carried the view that change at the institutional level might require a lot of 'convincing' in terms of winning the hearts of the people regarding the value and potential of ICT and that it might take some time for an innovation such as the student learning web to be put in place:

> ...I don't think the college is actually convinced yet that it's worth investing a lot [of money] in the student learning web. Maybe it's convinced that it is but it doesn't want to do it yet. It wants to see that it comes from below, which is quite a slow process. There have been various projects this year of individual people or individual small groups producing materials to use in the student learning web. But again, it hasn't really taken off...
>
> **[Teacher A]**

The previous quote also implies that change at the institutional level might require change at the individual level; not just top-down driven. The perceptions of the teaching staff regarding the learning web might have to

change with respect to its values and the benefits it might bring to the learners and the end-users. Such values and benefits will have to be made clearly obvious, demonstrated and communicated to every staff.

Staff Development and Compulsory IT Training

According to the Staff Development Manager, teaching and support staff are encouraged to take up as many staff development and training opportunities as possible. However, for many teachers, access to these opportunities is not always possible. The following interview quote reflects a typical attitude of teachers towards training:

> ...the pressure to learn is great. But the pressure to postpone learning is even greater sometimes. There's always something more urgent to do than attend the training session on IT...
>
> **[Manager B]**

The following quote shows that the 'lack of time for training' might pose one of the greatest barriers to learning and change:

> ...and people have got so many things to do. So many meetings, so much marking and preparation to do. You have to give extra time, your own time, to develop, which is not going to happen. There won't be enough people who do that in the long term..
>
> **[Teacher A]**

Teachers and managers have mixed reactions over the imposition of compulsory IT training plus the end assessment test. However, in general, they were positive about what the college was trying to achieve in terms of

enriching its staff IT skills for their own benefits as well as their college's, as the following interview quotes seem to suggest:

> People who were initially resistant for a variety of reasons were saying to me, "the programme of training and the test have been useful and we have learnt skills that I now use and I now value and that is really satisfying"...
>
> **[Manager B]**

> It's daunting to have to face the compulsory IT test if your skills are low, as mine were when I first came in. But it drives you to enhance these skills and your ability, by making it compulsory rather than optional. And what we found is that many staff went through and got it. Other staff were reluctant and went through it because they were [encouraged] by the managers but then they found the benefits of it"
>
> **[Manager A]**

And positive reactions were also received from the teachers:

> I think it's brilliant. Once it is decided that this is the direction in which we are going to go, you have to set up a good structure. I think what's being done here has been absolutely brilliant. Given that people have to deliver IT themselves and given that this is what your senior management wants you to do, I think they have done extremely well. Very very good. And it works. There are far more people who are now computer literate than there were, say, two years ago...
>
> **[Teacher C]**

> In terms of basic IT skills, they are very good. And I think also, there was pressure put for staff as well to get to level 1. But level 1 is very easy. Then I think the problem at the moment is there is no clear path for people to take

> after that. There are a lot of different things that people can do. But people don't have the time to do it. So basically, very few people have taken it from level one on to something else. I don't think there's a very clear training programme for people to gain the skills that they need to produce their own web-pages for example. I think we should be using the student learning web itself to train staff
>
> **[Teacher A]**

It is therefore clear that in this college, benefits had been received through the promotion of 'compulsory' training for the professional growth of its staff. To the staff development division of the college, the 'success story' might be as a result of their 'clear and focussed' strategy, although as the last quote implies, it might raise the issue of 'what comes next?' Whether or not the staff actually need those skills and demonstrate their usefulness in their professional duties as teachers and managers still remain as issues that may need to be addressed.

Other Success Factors

In addition to the successful implementation of the staff development strategy, a number of factors were identified as contributory to the success of ICT in the college. One of these factors is the continuous commitment of two dedicated technical support staff - the network manager and the technical manager. They were said to have been working side-by-side for more than a decade. They both had plenty of vision that led to proposals for development and implementation, most of which had come into existence today. For example, the computer-based administration of the college had been up and running for a decade; the computer-based enrolment and internal memo

system had been running for almost six years. Their continual support was seen as crucial to the continual implementation of the IT strategy that the college developed in addition to the support given by a team of good technicians.

Another factor that contributes to success is the quality of leadership modelled by the college managers. For example, in terms of the principal's attitude towards ICT, he has been described by many as being 'open to change', 'enthusiastic' and 'knowledgeable'. These traits were perceived by staff as being essential elements for success not only because they increased the staff's confidence but also their belief in ICT encouraged them to embrace ICT. The following interview quote describes the leadership style as perceived by one of the managers:

> You need a vision and you need a direction and you need a practitioner. When he [the principal] presents information...he uses PowerPoint presentation, he sends you email with attachment, he runs meetings electronically, he makes it compulsory for all staff, including the lower grade support staff to get their basic certificate...
>
> **[Manager A]**

Another important factor is the confidence and assurance given to staff on the reliability of the ICT systems, in particular the college local-area network. An IT manager shared his experiences with other colleges that had failed in this key component:

> Many colleges are stuck with very low level of skills of staff... most with great resistance to innovation and often because the [IT systems] were poorly

> managed. And partly implementing an IT system which doesn't work or else hard to use and soon any enthusiasm that they [the staff] might have soon dissipated. Teachers who are being forced to learn new skills will only become very resentful if the system they meant to learn is often letting them down, and that happens a lot in badly planned IT networks...and you could lose people's goodwill immediately. People are being forced to change and they doubt a system which is letting them down...[this in turn generates a] high[er] level of resentment and resistance to further change...
>
> **[Manager B]**

Another factor that contributes to the success of IT is the dynamic partnership and collaboration practised by all parties in the college – the management, the staff development unit, the teaching divisions, the staff and the students. This is a common feature of a 'learning organisation'. One example is the support given to the college's 'IT champions' to further improve their qualifications – at least two teaching staff are on Master's degree courses partly funded by the staff development budget and partly from the adult curriculum unit. These champions were then expected to share their knowledge and skills with other staff to enable the 'cascading' of their experiences and sharing of professional development:

> ...if they're actually going to get the funding then they need to pass on the skills. So that's the absolute bottom line in terms of making staff development more strategically effective. Whereas in the past, and still, we throw a lot of money really, on courses that people get and they don't have the time or aren't encouraged to apply the knowledge...
>
> **[Manager A]**

To sum up, the main success factors identified by the college among others are clear vision, resource investment, strategically-focussed staff development programmes, support given to and by the staff, dynamic leadership, reliable systems and collaborative learning based on peer-support and partnership.

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5.3.2 Case 2: Southern College

5.3.2.1 Background

When I began the work in this college, it was in the midst of a 'big' change – merging (or 'amalgamating' was the term used by many people there to describe the process) with another college along with other 'smaller' changes as direct consequences. Situated in an area of Outer London, the college comprised two large sites and many smaller sites which they referred to as 'centres'. The study was conducted on the main site. The college offers both qualification courses (A level, NVQs, GNVQs) as well as non-qualification (general interest) courses.

The college has seven curriculum departments with more than 200 teachers, who may either be on a full-time or part-time contract; the part-timers may either be on fractional (e.g 0.5, 0.6, 0.7 etc) or on hourly-paid contracts. These teachers are entrusted to take an active role in carrying out the college's mission - which includes 'development and regeneration' of the region and beyond and also 'by responding with others to the education and training needs of our community, in a manner that is dynamic and dedicated to high standards' (taken from the College's Mission Statement).

ICT was seen as one of the change drivers, as the college sought to find ways to respond to the recently-announced (then in 2000) ICT funding strategy – the FEFC had put in up to £78 million over the next three years. However, it was also announced that most of that funding would be made available in the final year. It was obvious that colleges, such as Western and Southern, would not wish to 'miss the boat'. Many challenges and risk takings would have to be faced along the way as the college seeks to overcome problems such as competition with other colleges, for example, in getting enough students that one day may not recognise the existence of 'geographical area' as it was probable that more and more programmes be delivered through on-line.

The main access to ICT for students is the IT suite, which houses more than 100 PCs. These PCs are connected to a server within the suite. Only about half of those machines have access to the Internet. The IT suite is primarily used for teaching and IT training.

Teachers have limited access to IT for professional work other than for teaching (in the IT suite). There was a limited number of PCs in the workrooms (offices) of the teaching staff – most of those machines were old and due for replacement. According to the IT manager, there were plans to increase the number of PCs to provide better access for staff. The teachers' needs for more computing facilities were obvious because the twenty laptops made available for staff to borrow from the college were always fully booked!

The process of bringing ICT to the college was made very clear by the IT manager during an interview where he highlighted a number of issues that the

college needed to confront while going through the process of change:

> we've got a very ambitious plan for the next two and a half years. However, to get there what we need to do....a number of things. We need the infrastructure in place; we need to develop our staff and train them for ICT; we need a change in the mindset on the part of the staff; we need to make sure the facilities and materials are in the right places as well. And then the final part of that jig-saw, which I think - our principal has absolutely the right idea to say that within two years, twenty percent of all of our curriculum will be delivered using ICT. What he is looking for is to use ILT to deliver twenty percent of our curriculum in two years' time. That, in fact, is the impetus for change - that's the thing which, in fact, is guiding the development work here [in the IT department] to make sure that those other things [those mentioned above] are put in place. We're [kind of] 'struggling'... we're very much, at the moment, in the development of the infrastructure. Because at the moment, our staff haven't got enough access to the internet, they haven't got the latest computers in their rooms, but we're working on it...and we're getting there..."
>
> **[Manager A]**

Some of the issues highlighted by Manager A above were similar to those identified in Western College. Keeping in line with the above plans for change, the following events/ processes/ activities/ strategic plans have been identified as the then 'current-happenings' during the period of my fieldwork there:

- The college was very much involved in the process of formulating its ICT strategy; however, according to the IT manager, it was yet 'to have a clear vision for ICT'.

- Part of the developmental work for putting in place the ICT infrastructure

had been completed since the summer of 1999 - all classrooms have been 'ready-wired' for connection to the college network although PCs and other ILT resources were yet to be brought in.

- The IT teaching team was looking at various ways of delivering a programme of events for staff development and trying to identify the training needs of the teaching and other staff.

- On the administration side, the college was upgrading the Management Information System (MIS). The new MIS was said to be more user-friendly than their previous one, although it raised the issue of staff still to be trained to use it.

- A 'new building' was proposed following the 'amalgamation'. The construction work was said to begin within the next twelve months. The new building was planned to house a modern, technology-rich 'integrated learning centre'.

- Other ICT developmental work included working collaboratively with other colleges – for example, participation in the UfI's *LearnDirect* initiative.

According to the manager in charge of staff development, *'staff development'* is an essential element in achieving the college's strategic objectives and mission and the college was well aware that those objectives and mission can only be achieved if all staff are fully trained. Therefore the college devotes a high level of energy and resources to staff development and training in view of its commitment to maintain the 'Investor in People' standards - a status it had gained in 1997. In addition to supporting the

College Strategic Plan and operation priorities, staff development also enabled staff to update and extend their professional skills, knowledge and expertise.

In the area of IT, a number of approaches had been used to bring staff up to speed with the ICT development, through staff development. These ranged from providing instant help on an informal basis to providing a more formal programme of training on areas that were identified from the process of 'training needs analysis' where in some cases the managers or the teachers themselves identified their own training needs. It was understood that the support provided by the IT experts and the IT teachers was the most preferred by teachers. However, the problem with this kind of help is that it may not always be available because the helpers might not be available when the help was needed.

In the document *'Staff Development'* published by the college, the statements linked to '*Participation Policy*' mention that "*staff development opportunities will be available for all full-time and part-time, teaching and support staff*". It also states the aim of the policy is "*to ensure equality of access for all staff and relevance to college objectives*". However, an issue arose during my interview with one person over the meaning of '*staff*' in this context which raised the question of whether the college was prepared to fund just '*any*' staff for IT training:

> I think to be honest, any sort of staff development where management makes their own criteria, for example... 'all staff must be up to level 2 in IT by a certain time', they will find it hard to fulfil, because what does 'staff' mean? Does 'staff' mean 'full time, permanent' or does 'staff' mean 'someone

who comes in two hours per week for an evening class? It's fine if you're permanent and full-time or even when you're fractional like me, I mean...I can go for training in my hours, when I am being paid by the college to be here. What do hourly paid staff do? Are they going to pay them to go on training? I don't think so..."

[Teacher A]

5.3.2.2 Issues that emerged from the analysis of the interviews

As the study seeks to identify factors that determine the success of ICT implementation in the college as well as issues that challenge the process of innovation and change brought about by the development of ICT in the college, the analysis of the interviews was carried out with these themes in mind. From the analysis, it was found that most of the issues that emerged arose from the discussion surrounding staff development and IT training that the college tried to promote or had already organised. Therefore, it seemed appropriate to consider just this one theme – *staff development and training*, and to draw out relevant issues that might be useful to frame the subsequent work in Brunei Darussalam.

Staff Development and Training

I began by asking about the availability of IT training for teachers, and it appeared that such training was only made available when the needs arose or when it was relevant for them:

There was an Internet training a while back, and that went quite well. A lot of people did that. So normally, it's something that they identify and then it's put on..."

[Teacher A]

Identifying training needs and making provision relevant to the needs of the staff are necessary because insufficient funds for training were always an issue. Funding is identified as an important factor in the implementation of an innovation such as ICT. Not only is it needed for training, but also to ensure that the funds are always enough and available throughout the process of innovation. As one manager says:

> ...technology is a continually changing area. If money is not injected into it constantly then we begin to get dated... we did [updating and buying in new machines] all those upstairs last year...but already, it's beginning to date...so you need to get a constant influx of money in order to do that..
>
> **[Manager A]**

The college was about to introduce IT skills training for all staff. However, concerns were raised about its actual value and the benefits that it would bring to individuals. Such concerns would arise if its purpose was not adequately communicated to the teachers. An example of such concern was raised by one teacher:

> Most staff are okay about it [the IT skills training]. They feel that it could be beneficial to them, but I don't know how they're using this that's for sure. They are all different, they teach different subjects, [and different] curriculum areas...
>
> **[Teacher B]**

And then there was an issue of providing teachers with a paper qualification when the actual focus was on 'key skills':

> I think you need the skills and how to use it. The qualifications, they are not always approriate, but then that's fine because that's increasing people's

breadth of achievements so it's a good thing

[Manager C]

As the college was going through a transitional period of rapid change in terms of getting ready the infrastructure for ICT, there was reason to believe that the managers were looking at the various options to train their staff (teaching as well as support) to be IT literate, as one manager relates:

> One other thing that we've been looking at is using software to train people in IT skills. We have it [the software] on the system which tests the individual, asks questions and so on about their knowledge and aspects of IT usage. And then feeds them into a learning program depending on their answers and there's another test and so on...and takes people through. So individuals can sit [in front of] the computer and do it as and when they've got the time available. And we'd like to try and use that

[Manager B]

As has already been highlighted in the case of Western College, 'time' is a key factor in determining success or failure. However, the time available for them in the college may not be sufficient for them to get the necessary training. One teacher gave a comment that the training organised by the college in the past had been…

> not really adequate... apart from the fact that they'd never covered the basic things, like getting into the computer, starting it up, doing some simple word processing, that's never been offered, as far as I know, to any staff. We do get some training programmes...I've been on the PowerPoint. But they're only open to fractional and full-time members of staff...

[Teacher A]

Although the above view is not typical, it does however, highlight the issue of equity. It implies that the IT training was not, or not equally made available to 'all staff' despite the policy rhetoric, and that the offers so far are of training 'at low level' – I have reason to believe that it was only basic IT skills training such as use of word-processing, spreadsheets and the use of the Internet because the level in question was NVQ level 2. There seems to be the threshold level that was also found in Western College. It appears that NVQ level 2 has been set as a benchmark for 'computer literacy' as confirmed and suggested by the following interviewee:

> There has been IT training of various kinds, but they don't achieve a qualification... people just got trained and then they go away. The senior managers now want the staff to have a paper qualification, that's what their vision is – that everybody does this qualification to bring them up to level 2 [NVQ] to become what they called 'computer literate'..
>
> **[Teacher B]**

The above quote confirmed that there has been IT training in the college in the past. It also revealed that such 'past' training was insufficient in terms of preparing teachers for ICT.

Another issue related to poor attendance was brought up by a manager:

> some [training sessions] were in very elementary Windows and introduction to *Word* and others were more advanced spreadsheets, *Works* and so on. Quite often staff and managers found themselves unable to go because of pressures of other work. So sometimes the attendance for the events was a bit disappointing
>
> **[Manager B]**

Once again, the issues of 'time' and 'work pressure' were highlighted as barriers. However, there were other concerns too, as the following interview quote reveals:

> Every year there's more and more pressure put on to the use of the IT suite... we [have] increased it by about a hundred machines, in that room and still there's hardly any time when you can go up there that you can get another class in there... And for next year, there is the Curriculum 2000...and every single student - A level, GNVQ...have all got to have IT key skills and that means another hour for every student in the IT suite. So...looking at 300-400 students that's 400 hours so that's a lot...that's on top of the usage at the moment!
>
> **[Teacher B]**

The above not only shows the well-known fact that as the demand for more IT skills training increases, the pressure put on the training provider also increases, but it also highlights other issues such as 'lack of facilities and/or resources'; pressure to change arising from new or changed curriculum. The introduction of *Curriculum 2000* which emphasises so much the development of 'key skills' – IT being one of them – puts tremendous pressure on teachers of IT. For them, the plan of the college to train 'all staff' (which could be understood by them as 'all teaching staff') was indeed supported:

> I think it will be good for all the staff, whatever subject they have...to have the IT knowledge. Once everybody is used to this basic knowledge of IT, then they will have to put it more and more into their [practice of teaching]....now...there are not enough IT tutors, at present, and when everybody knows it, the work of basic IT teachers will be reduced
>
> **[Teacher C]**

However, there were concerns that teachers who had gained so much out of IT training provided by the college, may leave for 'better pastures elsewhere' in the IT industries (and business organisations are always on the look for skilled IT personnel, as there seems to be not enough of them around!). What is increasingly evident is that these 'other' organisations are prepared to pay a much higher salary, as one teacher participant said:

> FE could never compete with the industry...the kind of money that they are offering people with the right skills...
>
> **[Teacher C]**

And then there was a perception that IT could be a distraction to the main role or professional duty of a teacher:

> fine, if you just want to get information that can benefit you in your teaching, but what I am very wary of, the fact that things like using IT to run your career or to help your career may impinge on the teaching itself... I came here because I am a teacher, I like teaching, I want to stand in front of a class and interact with people and impart information and hope that learning occurs which I think it does. I don't want to spend all day logging into my laptop and looking at my email...
>
> **[Teacher A]**

The above quote also illustrates an element of the fear of change. Besides there is a realisation that the college needs to be sensitive to the changing needs of its learners especially those that come into the FE sector, as one manager said, there was a need for higher skills:

> there's a market out there for it [IT skills training]. But I can't see they'll be there [say] five, six years [from] now, because everybody leaving schools will have those skills, the market for that is going to start dwindling. Children or

young adults...leaving schools with those skills; they are not going to come here to learn word-processing, spreadsheet and database, they will have done it at school already..."

[Manager B]

Although there were differences in the progress of development in the colleges' infrastructure, in many respects, the needs of the staff for professional development in ICT were not much different from those in Western College. Both colleges were actively involved in formulating the strategies for ICT in response to the call of government agencies such as the FEFC. Such reaction was also felt in the case of Northern College.

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5.3.3 Case 3: Northern College

5.3.3.1 Background

Northern College is a medium sized FE college located *outside London* in a rapidly expanding commercial and business community. Closely located to the college are two major commercial sites and an industrial area which attracts many multinational companies.

The college is a major provider of GCE A level and AS courses, GCSE and vocational courses. Its other strength is working in partnership with its regional business communities. The college has extensive links with local industries and key companies such as British Aerospace, Rolls Royce, Hewlett Packard, Ministry of Defence, etc.

The college employs about 290 full-time equivalent (FTE) staff, of whom

171 are teachers. The college is managed by a team of senior management that comprises the principal, a vice principal, three curriculum directors and three other directors. The curriculum directors manage the courses with the assistance of a number of curriculum managers, while the other directors look after the cross-college functions such as finance and information; marketing and business development; and personnel.

As in other FE colleges, the drive to move forward with ICT was partly in response to the external pressures introduced by the government – in particular the introduction of *Curriculum 2000* and strong emphasis on *key skills*. As one manager relates:

> When the national body changes, the government changes how the curriculum will be. So, everybody needs to be involved in *key skills* and it means that everybody has to be aware of IT, communications and numbers – the three key areas, which we should surely be skilled at, as in education we should surely have those three key skills ourselves. The college is trying to enable us to get there.
>
> **[Manager E]**

In the past year, the college had been involved in getting the ICT infrastructure in place to deliver some of its initial strategies. This includes:

- Development of the college Intranet and the Internet website
- Improving the provision of physical resources (hardware) for staff
- Improving the college's Management Information Systems (MIS)
- Working towards ensuring return on investment to the FEFC
- Working in partnership with seven other colleges in the development of an on-line learning platform

- Participating in the *University for Industry's LearnDirect* initiative in partnership with one other college and
- Developing a more focussed Information and Learning Technology strategy.

Two distinct approaches were adopted by the college for the development of its ICT – *ICT for the curriculum* and *ICT for the business.* According to a manager responsible for the College ICT Strategy, the college was a long way behind a lot of colleges in terms of its ICT development. He said this was due to the lack of early investment in ICT:

> There were times in the past when this college had gone through a period where there were limited funds. However, the funding pressures were eased when the government started to invest in ICT. Support was also given by a new principal who firmly believes that ICT is the way forward.
>
> **[Manager C]**

The main access to the college ICT for students was the 'Flexible IT Centre'. Members of staff have limited access to this facility as it was mainly used for teaching and training purposes. However, for their work related to teaching and learning, staff may book to use the machines in the open-access 'Learning Centre' which housed many computers and made available for students and staff to use through the booking system.

Getting access to appropriate ICT facilities remained a big challenge for teachers and managers:

> I can go to the library [the learning centre], and sign time there but sometimes in the day, I can't really know what kind of time I am going to have. So if I got the chance, I go up there [but] maybe all the equipment are booked out by the

students....or for all the design stuff, I go to the design department, cos their packages they've got up to date equipment there

[Teacher B]

In the staff room you're lucky to have one computer. And I don't know if you've seen any, but everybody is competing to use that one computer. So even if they do learn IT skills with us, they can't remember enough because they are not having the opportunity to use it sufficiently. There aren't enough computers

[Manager B]

In the whole college, we have one projector that can actually project from a laptop. So you can imagine, with 120 permanent staff and another 200 part-time staff..320 people sharing one projector means that's a little bit difficult for people to grasp...So we have to bear in mind there's no point in pushing people too far, because we don't have the materials for them to be able to deliver in the way that we are suggesting they should do in the future

[Manager D]

The above quotes show that the lack of physical resources triggered other challenges that affect the process of innovation. For example, teachers gave their comments on having to cope with old and slow machines and outdated resources in the college:

> If I ever do any word-processing here, I go to the learning centre [library] to do it, because in our workroom, the computer we've got is slow and the printer doesn't work and so I've given up trying to use that. I'd go book a computer in the learning centre

[Teacher A]

Here are some of the replies when I asked them on the availability of computers or PCs in their office or workrooms:

> Not in our office, no. I either have got to go to the library or go via the secretary or do it personally at home. Sometimes you need something immediately. The little time we have to communicate as a department and to have been in the same workplace...
>
> **[Teacher B]**

> In my workroom, there are two computers of not very high standards. There are sometimes as many as ten people in the room. So I certainly don't get immediate access to my own computer. So we often queue up to do things if we want to. There's one computer in the room that is networked. Although it's very slow, actually there's no hard-disk in there, it's a very strange set-up, so it's very slow...we obviously need to have a password to get into the network. Some of us ...have that and some don't...it takes things a long time to happen, I mean we've been talking about networking in this college for at least two years and it's still not finished
>
> **[Teacher C]**

> We've got a range of software available, however that tends to be mostly stand-alone and I think that needs to be upgraded...we need to connect the network versions...because it's very costly to have stand-alones.
>
> **[Manager E]**

Because of this, teachers might be less motivated to use the ICT facilities provided by the college. Two teachers indicated their preference to use their own machines at home:

> There are four of us here and there is only one machine, but we get very little

time anyway between lessons, so it's better to do it [preparation work using word-processing] at home really . ..We need better facilities in our workroom, it's not good enough, the one we've got is out of date and very slow and so I don't use it very often

[Teacher A]

I've got a PC at home and I use it quite a lot

[Teacher C]

There were, however, signs of improvement as new resources were steadily being brought in and old systems were being replaced or upgraded as confirmed by the two managers:

the plan is they [PCs, machines] will be replaced in September... We are a bit behind with Internet and Intranet resources which is our current focus; other colleges are very much ahead..

[Manager E]

September before last, they got in a lot of computers and we upgraded the machines to *Windows 95.* Until then we were on *3.1 version 6* and we still have computers throughout the college that have got that....But I don't think we are worse off than anyone else. And it's better than it was. Much much better than it was. Things are getting better I hope

[Manager B]

The above quotes give some evidence that the college was still at the early stage of its ICT development. No doubt, during this time various strategies and plans were being laid out including ICT training and staff development. This assertion is also supported by the following quotes:

What I think we are hoping to do for managers is actually encourage them to

undertake some sort of IT training and we are hoping to use the 'key skills' as the way forward. So for example, I am going to take up key skill IT level 3. That will be my IT training. If that's too high a level, I have to come down to level 2. It will at least drive me into getting some sort of formal training in IT

[Manager A]

Our website is still at very early stage...we've got people start to look at to try to convert learning materials to put it up...and I think we will go through a process of just taking existing stuff and have to be familiar with it and how easy it is and post it up, and then we will move on to doing more exciting stuff like assessment on-line and then we might start and hit the really exciting stuff,...where the learning become intuitive and more exciting. But, a lot of the materials that are there aren't very good yet

[Manager C]

there have already been some initiatives on training people through things like 'communications via e-mail' which in itself helps to get people more interested in IT...what I am trying to do, again through talking to the people who are out there delivering training, really what they are interested in at this stage, is how can they improve their very basic IT skills..for example using a computer to produce handouts to students ..actually wordprocessing...I think at the moment what we are still working through is where are we going to be and we are looking at that based on how much IT equipment have we got for people to use and how much have we done in terms of bringing their skills up to a standard

[Manager D]

Although the college support for staff development in ICT was clearly shown by both teachers and managers alike through the repeated mentioning

of the emphasis on *key skills*, the current focus of the college was, however, on getting the infrastructure in place. It appeared that a lot of time had been spent in trying to get it right at the expense of other key areas such as professional development of staff in the area of ICT:

> There is a massive drive on staff development for IT as well for next year, which then will enable people to make better use of IT. The problem is I think is that in the past it [staff development] has been a bit disjointed. Whereas now, I think..well because we've got the new key skills qualification, so everybody has to get their IT key skills qualification; so they will have to develop their IT skills...how we do that, I don't know. But that's gonna be put in place
>
> **[Manager E]**

> the trouble with doing that [focussing on infrastructure development] is you tend to 'neglect' the need for staff training...and the actual integration of ILT to some extent and I suppose that's an issue that we've not moved fast enough in that [staff development] area
>
> **[Manager C]**

5.3.3.2 Issues that emerged from the analysis of the interviews

Staff Development and Training in ICT

All of the interview participants agreed that teachers need to have a certain minimum level of ICT skills and knowledge. One manager believes that teachers need to be equipped with the necessary ICT skills because of the expectations of the incoming learners and also perhaps more importantly to prepare them to start thinking about change:

> If people come in to this college, particularly from business, where they have

been using new technology and then we start using 'white board'...they are going to find that very strange. I think that's really quite important....it isn't just about the IT skills. You have to get people to think in a slightly different way as well. .... A lot of people in FE will have been teaching using the same methods for a long time. And they are very comfortable with that. Their teaching is based on the fact that you can see your students and you can talk to them...so to actually start from the beginning and say, 'okay, I need to deliver whatever it is using IT', you need to completely rethink how you put the courses together, how you deliver it, what things you do to get students to work for themselves....because in the classroom you can set an exercise, but when you are delivering on-line, the students have to work really on a particular program and really it is a completely different way of delivery. And I think for some people, it is like learning to teach all over again

[Manager D]

Three teachers shared their experiences with learning and acquiring ICT skills. Their views show the challenges that they went through, the fear of being left behind, their need to catch up with the younger generation - especially students who were perceived to have acquired 'more' ICT knowledge and skills:

> Before I was scared of computers, if you know what I mean. I hated it, I wouldn't go anywhere near it. I was frightened of it, I thought I didn't know how to use it. It made me feel inadequate; I also wasn't very interested to it. And then I thought, well I've got to get myself into what was then the late 20th century, and I am going to get left behind if I refused to use it, because I worked out I just refused to be interested in it or have anything to do with it. So then I decided I had to have some skills. And so I went to college to get them [those skills]. I found programming very difficult. Turbo Pascal, I

found very difficult. And also I wanted to prove that I could do it as well, and that I wasn't stupid. And so that's another reason why I went ahead to do it. And it has been very useful for teaching. Particularly from creating worksheets and handouts, that sort of things. But I haven't used the more difficult bits of it. Desktop publishing and that sort of things, I haven't used

[Teacher A]

Our main fear for a practitioner is that the hesitancy of..'oh, it's a machine and I..I need to deal with people'. But [to] actually translate that teaching from extremely interactive via physical communications as well as deliver the same quality of programme via machines runs against the grain for a person who have been doing this for a certain number of years. But we know, that's where it's going

[Teacher B]

Very often our students know more about certain aspects of IT than we do ourselves. Because there is sort of generation difference possibly or at least some years difference, and they've had more IT training in their normal education than we ever had. So there is probably a feeling amongst teachers that we are struggling in some ways to keep up, both with our own awareness and training needs and also skills

[Teacher C]

Several methods of delivery were made available for members of staff to acquire, update or extend their ICT skills. This includes the provision for a one-to-one support or 'instant helps' in the Flexible IT Centre; or people could work on their own at their own pace through training packages, which may or may not enable them to gain IT qualifications. An example of the qualification that staff may gain was the *European Driver's Licence Certificate* (EDLC).

The common approach for ICT training was in a large group. Teachers also suggested that the ICT training they were encouraged to attend should be geared towards the requirements of the subject they taught and that it was relevant:

> I did a course here, a couple of years ago on spreadsheets and database. They didn't show me how I could use it in my subject; I thought that might be more useful to me. I wasn't clear how I would use it in my subject [History]. ... I was hoping to know more how I might use it in lessons and so on, but I didn't come out with that. So I don't think I would go again, unless it was specifically for History. I haven't used it either
>
> **[Teacher A]**

Several interviewees indicated that staff largely acquired their skills through 'self taught' or 'learning from their peers' as evident from the following quotes:

> Most of us are self-taught. The packages that I've got the one that I use for my teaching here and the computer that I have at home has the Internet, word, design.. But they only require basic skills - that basically through trial and error, you have a go and learn as you go along
>
> **[Teacher B]**

> I've had word-processing training...a long time ago I had some training in using much earlier version of *Word*. *Word* itself, for example *Office 97*, I taught myself. I've undertaken training on my own to do with Internet. So my own development and use of IT comes about through simply using it at work and asking colleagues, and just through my own personal development at home
>
> **[Teacher C]**

> I think you'll find when you talk to our staff and the managers like myself, we are largely self-taught in IT. And one of the drawbacks of that is that you often learn bad habits and don't know the shortcuts. So for example, when I work on *Excel*, it's quite a laborious process. When I see my colleague in accounts do it, they do it much more quickly
>
> **[Manager A]**

Staff development and training for staff had been part of an on-going activity in the college, although it appears that it might not be strategically focussed:

> There are lots of staff that enrol in out flexible IT centre to pick up an IT qualification on a flexible basis. I think most people have basic IT skills and they have got enough [IT skills] to do their job. So they can manage to do their job such as producing teaching notes and that sort of things. But with the development in the college such as the intranet system and email, I think it will keep pushing people to think, 'I need some training here, I need some training in IT so that I can do all these things here that everybody else can do, and I want to be able to use the email system effectively and I want to be able to use the staff intranet'. People will just want to get on board with that
>
> **[Manager E]**

According to the Personnel and Training Manager, the college has a generous budget for staff development. Regular and periodic training programmes were being offered. Teaching and support staff were informed of what training was to be made available through the publication of newsletters, brochures and leaflets. Often members of staff were encouraged to take up the IT training at no cost:

> We are not saying every staff must get the IT training. At the moment we are

making it available. So all staff may join any IT or they can join any course they want in the college for no charge. So there's the incentive to do it, so most managers will find time for their staff to go and attend.

[Manager A]

we've got lots of courses available at the lower end of IT, sort of introductory IT course and actually they [the courses] do become quite advance, and [staff] can study them on a flexible basis. So they can put in around other commitment they might have. If they need more advanced training then often they either go external for it or get somebody within the team that has got more advanced knowledge to cascade to everybody that wants to know about say a select package.

[Manager E]

All these might be triggered by the need to bring staff up to speed with appropriate ICT skills:

From my dealing so far with teachers is that...our main problem is enabling the staff to use the new system through training. Because there is a big gap between what we expect them to achieve through IT and what they are able to achieve at the moment. Because we still got many staff who are, particularly in the administrative area, who are still DOS-based...using say Word Perfect for DOS.. These people need to be more up to date to deal with the technology

[Support Staff A]

At the moment, we are aware of our longer-term vision that we need to have people who are fully conversant on all sorts of packages that are within the systems that we have. We are aware of the fact that they are not in that position at the moment. But we are also aware of the fact that we have to be able to give them the hardware to be able to do these things

[Manager D]

I think across the college, many staff has still got lots of development to do.. and also it's only this year that PC has started to appear and be useful in staffrooms because they might have been in staffrooms before but they were all old kids and were not really very much of use except for basics..

[Manager E]

It is clear from the interviews that the many of them perceived that the lack of physical ICT facilities resources was one of the barriers to change towards ICT. Another resource that seemed to be lacking is time:

When they [the teachers] are in the classrooms for...twenty-five hours a week, where do you find the extra bit? They still got to do their marking, their preparations,...actually need to free them, find them some space to do that to actually get them up to speed.

[Manager C]

The above argument was supported by the teachers interviewed:

we do have staff development but it's very difficult to go because [the SD programme runs] usually when we are teaching...I really want to go...that's how I feel ...but because we are committed, we don't want to leave our students...So, the fact is..I rarely do any of the staff training... because it's usually when I am teaching

[Teacher A]

In the staff development programme, there are [ICT-related training] courses you can go...however because our student [number] is so big, sometimes the time is restricting; because all the members of staff have two separate jobs - professionals in the theatre as well as as educators here, their time outside the college is short. In fact we've been chasing after the IT-training for the past eighteen months, and when it has been arranged, we [often] had

something to cover in the department, we had to do that [as priority] and so it's just never matched. So I think, yes, the colleges has provided these two courses, but for myself and my department I work with those courses have not been compatible to our time-table structure or time outside

[Teacher B]

Often if a course is appropriate - is made available, you often don't have enough time to respond. You know, if you got teaching commitment, you can't just drop everything and go. So it's partly managing the time-table for training which I think is inadequate. It's partly the amount of training that's made available. I don't think there's enough of it. So there's not enough of it made available with enough warning and there's not enough time...when people are very very very very very very busy, training tends to take a backseat. So it's not that staff are begging for training, we're all undoubtedly need it, but we are too busy thinking about the day-to-day and then what's provided isn't adequate in any case, I don't think.

[Teacher C]

The issue highlighted above is the availability of time set aside for training in the college which does not seem to be enough as teachers are already been overloaded with other professional duties and the paperwork. Another barrier to change was the lack of skill among certain teachers which resulted from the probable lack of opportunity to practise the skills which might be because of the lack of time or other resources as exemplified by the following interviewee:

I've only begun to use email recently here, in this college. I've had email training about a fortnight ago and so now I started looking at my emails. But again, I get very little time to do it. So I am not using it efficiently at the

moment. I am just looking to see what messages are on there and deleting them, at the moment. I am not sending anything, so it hasn't helped me so far. But I think, I've just had the training and I am not efficient in using it yet.

[Teacher A]

Perceptions about Teachers' Attitudes towards Change

There was a perception that it is easier to encourage people who already have some basic IT knowledge and skills to go and gain further training than to do so with non-IT people. However, there might be hidden reasons that motivate them to learn and gain further IT skills – for example, the need to remain employable within the IT sector/world:

And they [IT people] are delighted because it [an introduced training programme] is a very expensive course and that they are getting trained for nothing [since the course is brought in and paid by the college], and they are doing it in their own time, in the evenings, and they are happy because they know that they are getting trained up. And they want to do it because they are IT people - IT people want to know more; with non-IT people...I have slight problem - they are a bit picky...It's not the same for people who think like, "Well I teach 'English' or 'History' or 'something else'; and they've been brought reluctantly in to the world of IT. I think IT people have different requirements from non-IT people. And I don't have any problems for getting them to want to know how to do it.

[Manager B]

One manager saw the spirit of team work that shares the same vision as the necessary element for successful change as well as being essential in a culture that values IT:

I think I am really lucky because my team consists of a good bunch of people

really. And we work really well as a team. I mean they share things and they help each other and it really works which makes my job a lot easier as well. And I suppose because of being in IT - if you are in the IT team, you've got no choice but to be involved in IT, which might be alien to other people in other curriculum areas...also in IT, because you have to be used to change because it is always changing.... You cannot let that be a barrier, you just have to get on with it and people in IT do - just get on with it. It's the way that IT people tend to be I think

[Manager E]

The following manager believes that changing the mindset of people is possible if the benefit it brings to them is understood by people – for example by planting or attaching values to it:

What I am focussing on at the moment is to introduce people to *PowerPoint*, to show them that it's good fun to use, that it can produce some decent overheads...and then from there they can actually go in and develop their own skills as far as they think it is going to be useful for them at the moment... I think what we need to do is to get people to understand where the future is going to be. They need to know what we are working on, this is the vision that we see. And then get that sort of message across to particularly academic staff so that they've got a better understanding of where they have to pick their skills for the future.

[Manager D]

The process of innovation and change does take time and often requires patience on the part of the innovator and involves risk-taking during the change process, as perceived in the following quote:

I mean we are making mistakes all the time, but I think we are learning from it,

and I think there is a definite desire to do something seriously about IT. And it's new, it takes a while to realise that there is a need but it has been recognised and once a need is recognised then you have to find a way to be in there

[Manager B]

Teachers need to get on board with continuous professional development (CPD) on top of being willing to try, experimenting to increase confidence even though it takes time in the development of skills acquired through self-learning. People need to be empowered to change through CPD so that eventually the change becomes theirs and in them, i.e. they own it. As one manager said:

I am a great believer in continuing professional development. People need to be prepared for change...and I do believe that you can't just say to someone, 'as of next week, you're gonna do it this way'. You can't do that. You gotta get them on board through making them feel comfortable with it

[Manager D]

5.4 Discussion and Utilisation of the Pilot Study

The main objective of the pilot study carried out in the three FE colleges in the UK was to inform the case study approach research design. In particular, the study was conducted with a view to framing and formulating the interview questions for the Brunei case study. In the pilot study, the results of which were presented in the previous section (5.5), the concepts of staff development and training had been used primarily as the main vehicle to explore the process of ICT innovations and changes in the three colleges – Western, Southern and Northern. The concept of *staff development* is important in terms of changing the way the teachers perceive the demand put on their job and in preparing them for change in their future role in the ever-changing work environment. In this regard, the concept of staff development is used as the key component for effective management of change. There is then a need to consider how staff development can make change a constructive process.

The findings of the small-scale pilot study presented in this chapter revealed a number of events driving the need for change. The main one is perhaps the innovation of curriculum in the FE sector. With the introduction of *Curriculum 2000*, as highlighted by managers in the three colleges, most 16+ students in the FE colleges would have to study ***IT*** as one of the main key skill areas (there were three key skills area areas – *communications* and *numeracy* were the other two). As a result, that implied a massive increase in the amount of ICT-related activities that needs to be delivered to not only the students but also to the FE teachers. This, in turn had meant more ICT skills training for the staff.

Another main driver for change that emerged from the study is the pressure for teachers to engage in, support and/or promote the new styles or approaches to learning and teaching. This was triggered from the rapid development of on-line and the competition generated from the increasing use of CD-ROMs and/or on-line (i.e. the Internet) materials. The pressure for change was increased in terms of the need to urgently have more and more FE teachers to be competent and proficient in the use of ICT – again intensifying the need for strategic approaches to staff development and ICT skills training. There was also the need to re-think the way in which course programmes were being delivered. This, in turn had brought out a number of issues related to the pedagogy of delivery – the pedagogy of student-centred on-line learning/delivery is different from the traditional teacher-centred approach – although at the time of the pilot study, this was not been a major issue.

A third change driver that emerged from the study was the expectation from the various client groups – the FE college business partners, the employers, and the students, whose priorities and needs are ever-changing all the time. The current scenario seemed to favour an environment where more and more people prefer the flexibility of accessing learning in the comfort of their own homes or workplaces or just about anywhere (e.g. public library) at anytime. This triggers the need for the FE colleges (as learning organisations) to be responsive and adaptive to the environment in which they operate. One approach that the three colleges took in response to the demands was intensifying the robustness of their ICT infrastructure in order to provide better access to learning for the various client groups.

A number of inter-related issues emerged as barriers to the process of innovation and change; some of them were unique to each college. However, some of common ones are as follows:

- not all teachers were IT literate
- people were expected to do more with less resources (including time)
- access to resources were very often limited or they were not enough
- teachers were often too busy to take up ICT training and staff development activities, this is despite the many training opportunities made available for them
- time for training and staff development was often not allocated for them
- ICT was viewed as a threat rather than an opportunity, and
- resistance to change was especially among the 'older' teachers.

One key finding of the pilot study was that all three colleges were actively engaged in developing their ICT strategies. They all recognised that having a clear college vision for ICT is an essential component of the ICT strategy. The vision statements spelled out the needs of both the college and its client groups – the community, the local employers, and the staff and the students. One question that arose from the finding – was such a vision for ICT shared by all stakeholders?

There were implications for more effective management of the college through the effective use of college networks and Intranets. In terms of the organisational structure, the three FE colleges involved in the pilot study acknowledged the importance of teamwork, partnership between different groups and effective collaboration in their approaches to managing the

colleges. The college managers recognised the advantages of having a 'flatter' organisational structure. Beneficial factors such as 'improved communications', 'increased effectiveness' and 'adaptive and learning culture' also emerged from the study findings. How the college structure was organised would have an impact on how it responded or adapted to changes and how authority and power to change were exercised.

The need for staff development was evident. Findings from the pilot study revealed that FE teachers needed both ICT skills for their own learning, teaching, as well as for their administrative duties. Various approaches to staff development and training were adopted ranging from a very unstructured (as in the drop-in 'instant help') to very structured (as in the compulsory training in basic IT skills). All three colleges were in agreement with the need for all staff to gain sufficient level of proficiency and competence in ICT skills – although often only to a superficial level. The results also revealed that teachers needed a lot of support and encouragement in terms of changing their negative perceptions of ICT. In this respect, implementing progressive cultural change (gradual progressive encouraging participative and persuasive rather than coercive or dictatorial) were perceived to be effective, an example of which was through strategically focussed staff development programmes as implemented in Western College. The difference was perhaps in the way in which these activities were co-ordinated and different colleges adopted different approaches to staff development. Two of the colleges (Western and Northern) saw the benefits of supporting identified ICT champions (or 'IT advisors' as Northern College put it) to take up further relevant training. In Western college, teachers were encouraged to have

ownership of their development needs. This is the case where professional maturity of staff is demonstrated. Some colleges may expect staff to take most or all of the responsibility for their own professional development, sometimes it is co-ordinated within departments, and others may provide central facilities to co-ordinate the activities. All three colleges had set up staff development 'units' with closely integrated centralised ICT resources. The organisational benefit was demonstrated when the knowledge and skills acquired by staff are shared with others. The training needs of the teachers were assessed during the annual performance appraisal exercise and the process was seen as a useful tool in terms of analysing the training needs of staff.

It was evident from the findings of the pilot case study of the three FE colleges that a number of factors determine the success (or failure) of the ICT innovation:

- *Clarity of vision.* The extent to which a vision is shared and understood by the members of staff at all level has a direct bearing on their motivation to change.
- *Deliberation and Implementation of strategy.* This includes the means of translating the vision into practical, yet sensitive strategic plans, which recognise the problems of those who make strategies work.
- *Relations between various interest groups.* For example, the inter-relation between library (learning centre), teaching staff, support staff and students. The boundaries between groups become 'blurred' as interdependence increases. There need to be a high degree of collaboration between groups.

- *Staff training and development.* Teaching staff need assurance and confidence that they receive initial and continual help and support to enable them to adapt more comfortably to change.
- *Management structures.* The one that seems more effective is the adoption of teamwork approaches.
- *Management of change.* This is important in terms of planning and providing training provision for staff development and ensuring that resentment and bewilderment among staff are avoided through good communication

The level of support that an institution gives to its teachers, in particular in terms of the provision of physical resources, will affect the extent of the educational impact of ICT. Teachers who are already keen or have interest in ICT would want to use it and they would expect to receive continuous support and help in their professional development. In this respect, there is a need to address and identify the needs of the teachers who are already keen and committed to ICT. This has implication in terms of determining the structure and content of the training provision.

Based on the issues and themes that emerged from the pilot study, the research questions for the subsequent Brunei case studies were refined. The findings from the pilot study were also used to frame the questions for the interviews with teachers and managers in Brunei's VTE institutions. It is important to note here that there are cultural differences between the two case studies and the stage of development of ICT in the educational sectors in the two countries are not the same.

THE MAIN STUDY

The case of VTE Institutions in Brunei Darussalam

Chapter Six
Data Presentation and Key Findings from the Interviews (Summer 2000)

6.1 Introduction

The aim of this chapter is to present the data from the semi-structured interviews based on the fieldwork carried out at three Vocational and Technical Education (VTE) institutions in Brunei Darussalam between the periods May - August 2000. The perceptions of 22 interviewees from the three VTE colleges were analysed to provide insights in relation to the issues of change brought about by the innovation of Information and Communications Technology (ICT) in these colleges. The samples consist of 'teachers' and 'managers'. In addition to the college principals who managed the whole college, 'managers' also include those teachers who had been given managerial responsibilities on top of their teaching duties. They include senior managers (e.g. registrar); coordinators (e.g. group coordinators, programme coordinators, subject coordinator or course coordinator); tutors (e.g. group tutors, semester tutors, year tutors, and students' tutor) and heads of department or sections and their assistants. The results from the analysis might be used to explore the professional development needs of the VTE teachers in Brunei Darussalam. Relevant quotes from the interview transcripts will be used to support the narrative descriptions of the findings. In many cases these quotes have been edited, made clearer and corrected where there were mistakes in language. However, in some cases, in order to preserve the accuracy and the integrity of the views given, some of the quotes

from the translated transcripts were not amended. Those selected are representative of the balance of views expressed across the whole sample.

Presentation will be organised around the following major themes:

- Development of ICT
- The current utilisation of ICT
- Staff development and training
- The Organisational Culture
- Analysis of change and the process of innovation
- Barriers to change and the process of innovation

6.2 Development of ICT

6.2.1 Where were they?

Although there were obvious differences in the progress of development in each of the three VTE colleges, there were several commonalities in their cultural characteristics and attitudes towards change. Being under the umbrella of the Department of Technical Education (DTE), they all shared and faced similar challenges and dilemmas. The response from the managers of the three colleges clearly shows that at that time there was yet to be a driving policy to address change and strategies for development in the area of ICT. Here are some of their typical responses:

> I don't see any development in ICT at the moment. There is not yet any drive from either the college or DTE. I suppose there is none at the moment. My personal feeling is that – there is none. I don't know – you might find otherwise from other people, but as far as I know nothing particularly on ICT.
>
> **(Manager A College C)**

> In terms of ICT implementation specifically, there is none at the moment. We don't have any plans for example, to use ICT in the delivery of lessons and so on; so I say, there is none at the moment.
>
> **(Manager B College C)**

> At this moment, officially there is no one here looking into the implementation of IT. In the Technical and Vocational area, at this moment personally I think, there are no changes as yet. Through Brunei Darussalam Economic Council, they've now approved, I don't know - how many millions to supply primary and secondary schools with

computers. But only primary and secondary schools were mentioned. But I really don't know much about this.

(Manager A College A)

When the college was first established, we were given twelve computers. Unfortunately they are old and we cannot use them. Think about *professional write* [a word-processing package] installed on those computers. Who or where else can we find people still using *professional write* when you now have *windows 2000* and maybe *windows 2002* is coming soon, who knows? So we try to improve things here.

(Manager A College B)

Similar views were echoed by the teachers in all the three colleges:

But we are not really aware up to what extent they've achieved the things, what is the latest, you know, there is no update. At least, I am not aware what we will achieve once we do this thing. What benefits we will get out of it, how it is going to upgrade us, I am not fully aware because no one has mentioned it.

(Teacher A College A)

There are no signs of progress in ICT. Frankly, we are still having problems...we are waiting for supplies. And then there is no [access link to the Internet] here. All these severely impact on our need to introduce innovation in our teaching or whatever. Do you get what I mean? There is no improvement at all. We only have nine machines for the whole college! I knew the principal has proposed and requested for one hundred-twenty PCs. But they were questioned, "why hundred-twenty?" And then it was reduced to forty, and even forty... well... it's better for me not to add further. I heard we are still chasing up, requesting

for the machines. But I honestly don't know how the progress is. Maybe, people have underestimated this college. I mean those top people who refused to provide us PCs. Maybe they said that there's no need.

(Teacher A College B)

According to two participants, the development might be more evident at the individual level:

I think the change is happening slowly. It's just that at the workplace, the change is probably not so obvious. But at home, for example, most of the teachers have access to the Internet.

(Manager C College B)

Well, I would say that, if there's been any development in ICT, it's been individual staff members, but that has nothing to do with the college. Teachers self-update themselves in ICT; my colleagues have told me that too.

(Teacher B College C)

The above perceptions imply that the there is no policy framework in principle, nor any funding strategy. It also implies there is no 'sponsorship' by the government – so that may inhibit the principals from doing anything at the next level down. The process of innovation might be observed more clearly at the individual level rather than the institutional level.

----- ----- -----

The following participant gave the impression that no one has monitored the development of ICT, let alone evaluated the progress:

As far as my department is concerned, I don't know. I am not very sure,

> whether the staff really know where the direction is. But they know we have a vision and mission in this college, so most of us are aware of that. We know our mission and our vision. But I don't think there is any vision for ICT specifically.
>
> **(Teacher A College C)**

Interviewed participants tended to tie their perceptions of ICT *development* with the *provision for ICT resources* in their college, of which, according to them, there had been very little improvement, if there had been any. Few linkages were made about the vision of ICT to bring about effective changes to learning and teaching. These perceptions suggest that the lack of ICT resources might be one of the barriers to the process of innovation. A more detailed view on this issue will be explored in a later section in this chapter (see sections 6.3.5 and 6.3.6).

The dilemmas of the interviewed participants can be felt from the phrases and the words they used to describe the development of ICT. '*Slow progress of development*', '*no budget*', '*no clear vision*', '*lack of resources and facilities*', '*lack of support*', '*lack of expertise*', and '*lack of knowledge and skills*'.

6.2.2 Where were they heading?

As noted in section 6.2.1, all interview participants tended to link their views on development with the improvement of ICT facilities, in particular the need for a local-area network (LAN):

> There is a plan to link up all these buildings with a local-area network. There will be two stages; stage one will be to LAN the admin block, and then the other stage will be the rest of the college. The latter

will be more expensive. I have one staff who is working on the planning of this at the moment.

(Manager A College A)

As part of the college plan, I think they are trying to have some sort of networking and all that. And their plan is still under some goal that each department will have two terminals and should be centrally-linked.

(Teacher A College A)

We know the importance of the Internet and so on. So our plan was to inter-link this campus by local-area network, but now I think it's not going to happen. I don't think we'll be able to achieve it. We've only managed to LAN this administrative site only. That is completed. But for the whole [college], it's not going to happen. Because, I think it will be more costly to try to link up all these departments.

(Manager B College C)

In college B, the priority was placed on increasing the number of personal computers (PCs) for the computer laboratory. LAN had a lower priority:

> Initially when my colleague, who has now been transferred to another college, first thought of it [how to improve ICT for college B], there was a plan for networking to connect the administration, the library, and all sections. But...there was no budget for LAN. So they suggested, just concentrate on priority. If possible, just concentrate on the lab, because the lab is under-resourced in terms of the number of personal computers. Since college-wide implementation is impossible, as there was no budget, so why not concentrate on the lab first...and when I moved in here [from another college], I think it's good to have the lab to be adequately resourced first. So that's why we concentrated on the

lab. But even then, initially we wanted about one hundred and twenty PCs. But the people there [at the Department of Technical Education] don't see why this college needs that much. So they advised us to reduce the number.

(Teacher A College B)

----- ----- -----

Two contrasting views regarding the priority placed on ICT were received from college B managers – one put ICT as top priority while the other gave it a lower priority. However the issue of lack of budget was implied in both cases:

The way we deal with ICT at the moment is in accordance to priority. ICT is probably lower priority in comparison to other equipment for our labs, for teaching the speciality courses that we are doing, like books and so on. But definitely, even if we have the budget, if we were given say thirty percent of those that we requested, we will be okay and build up on that.

(Manager A College B)

ICT is one of the identified needs and it is our top priority actually, since we want to bring the college up to the diploma level, so it is on our very top priority to explore further about this ICT, especially in the use of computers or the special application such as *PowerPoint* in teaching. We would like to introduce that. But because of the shortcomings, such as, 'not easy to get those materials from our ministry', we have some problems. But ICT is in our top agenda, to establish teaching using the computer.

(Manager B College B)

The data show that the issue of budget or '*lack of funds*' was brought

up quite frequently during the interview sessions bearing on the repeated use of the terms such as '*high cost*', '*no budget*' or '*lack of money*' and so on.

Through my own observation, from my visits to the colleges' ICT facilities in summer 2000, none of the three colleges had fully-developed local area networks. It was not easy to assess what the colleges' plans for ICT were for the immediate future. They were not clear – neither from the interviewees nor from the documents obtained during the field-work. However, there were expectations that things might change in the near future:

> I think 'ICT' is something, which has just cropped up. I think very soon it will be tackled because, I am sure you have heard about the *'national ICT plan*' right? – which is done by a section within the Ministry of Education [MOE] So very often when that come, I think, we'll have to do something about it also. But then we're still waiting for that to happen.
>
> **(Manager A College C)**

> I was involved in the MOE national ICT plan. They called me for 'brainstorming' they called it. A few of us were called for this brainstorming trying to develop this master plan for ICT in Education. There are many issues being raised....they have this project with the primary schools. I think their target was, by the end of this year, one hundred primary schools will be involved in the pilot project; they first thought of fifty primary schools. So they are introducing computers in these one hundred primary schools. They have their objectives and so on. But the way I see it, there are still many things that need to be done. For instance – machines. I think it's only like one lab for the whole school. We are involved in training some of the primary school teachers who are doing this computer project. But they don't have any support

> from anywhere. They should be more transparent at informing others... on the development of ICT in schools and so on, so that people will know where to go if they need assistance and so on. Because if you just set up something in the Ministry and nobody knows about it, it is going to be very difficult.
>
> **(Manager B College C)**

From the above interview quotes, it appears that the planning and preliminary works on the implementation of ICT in Education at the national level had just begun. However, the seeds had only been dispersed and planted in the *pilot* primary schools. For VTE, things had yet to happen; there was no clear vision for ICT as yet. The views from the participants also projected a '*wait and see*' attitude – for example, they were hopeful that the fever of ICT would spread to the secondary schools and then later might diffuse to VTE. As an example of how VTE colleges might respond should this happen, one visionary participant shared the way staff in his college had started to make preparation for the new changes:

> In our recent WEB-team meeting, one of the points discussed was the possibility of instructors posting tutorial questions on the web. So it's a matter of having a student password to access it. I think the plan is there....
>
> **(Manager A College A)**

If the above plan to develop ICT bears fruit, it would surely bring up a number of issues such as the need for institutional support in terms of training and staff development and so on. Issues related to ICT skills training and staff development will be presented in section 6.4 of this chapter.

6.3 Utilisation of ICT

6.3.1 Perceptions of Low Level Use

It is evident from the picture that emerged from the interview data that the level of use of ICT in the three VTE colleges was low – mainly limited to the use of productivity tools such as word processors and the use of spreadsheets. The following are typical responses of the interviewees when asked on this issue:

> But unfortunately, maybe because of so many constraints, the college's use of ICT is very limited – it is mostly word processing.
>
> **(Manager A College B)**

> For their [teachers'] work, I've seen most of their handouts. I think they make use of word-processing like *Word* and things like that for the handouts for their students.
>
> **(Manager B College C)**

> I think most if not all teachers know how to use *Word* and maybe *Excel*. All and everyone know how to word-process... but in terms of using other learning packages, I don't think so. I am talking about the use of multimedia and all those.
>
> **(Manager A College A)**

> I can tell you of one expatriate staff, he is very good exceptionally. But the others, I think they don't really need much, I feel. They just need like application programs, for them to use for teaching preparation and all that.
>
> **(Teacher A College B)**

The use of computers is mostly for the administration purposes.

(Teacher B College C)

As far as computers are concerned, it is only for the preparation of teaching materials.

(Teacher A College C)

I only used it for typing, to type my lecture, not for networking.

(Teacher B College B)

So for me, to prepare my exercise, I have to go home and use [my own] computer.

(Teacher B College A)

The last two quotes once again point to the issue of the lack of ICT resources in the college. It is clear that for most of them, their use of ICT is limited to the word processing tool for the preparation of teaching material and for administrative purposes. According to the managers in the three colleges, the use of a spreadsheet package like *Excel*, for example, in the compilation of examination results was a necessity. However, as one interviewee revealed, teachers still need training to use spreadsheet more effectively:

I can share with you my experience. Like BDTVEC [the local Examination Council] they want the results in standard forms, but I found, people are still not utilising the *Excel* properly. [*Why?*] You see, you can find lots of errors, they don't put formula, if they are to add they use calculators, still it's no use of that using *Excel*. They enter manually, they use calculator, and then they enter again into those columns, which I feel very sorry...

> Because, when they gave it to us, I checked I could find lots of mistakes, whereas if you put the formulas, I don't think there will be mistakes. Then when you talk to them, you'll find they don't know. They are in real trouble, when the exams come when they have to compile the results, they are in real trouble.
>
> **(Teacher A College C)**

The lack of skills and need for training are implied in the above quote. More elaborate issues on this will be explored in section 6.4. In that section, I shall explain how one college attempted to implement an in-house training session on the use of the spreadsheet package *Excel*, and how it raised a number of other issues such as *lack of time*, *cost* and *expertise* or human resources.

----- ----- -----

The perception of low-level use might apply to the students in the college as well. As one manager said,

> Even though all our students are doing one unit of computer application or appreciation, they only do it as a subject. They really don't use it to as a learning tool. They use Word and they use Excel for spreadsheets. They really don't use it for others. That's what I found. So it's really low and very minimal use of ICT.
>
> **(Manager B College C)**

----- ----- -----

According to the participants, very few VTE teachers made use of other ICT resources such as CD-ROMs, the Internet and Email in their work. The participants that responded 'yes' to my inquiries, said they used them at home

or used their own resources and their own machines (e.g. laptops) in the college:

> I know of few teachers and instructors who use CD-ROMs.
>
> **(Teacher A College C)**

> With the Internet, I used it at home. We don't have it here, that's the thing.
>
> **(Teacher D College C)**

> I use the Internet a lot, but at home only. Here in this college, it is not available.
>
> **(Teacher C College B)**

Out of the thirteen teachers interviewed, only one teacher shared how she used the Internet as a resource for preparing her teaching material:

> I only start looking a day or two [at home] before the actual teaching. It's okay, it's quite efficient in that sense, but I have to sit down and select which area is relevant.
>
> **(Teacher D College C)**

Only one other teacher admitted using ICT for teaching purposes:

> Yes, I have used computer for teaching in the classroom. I brought my own notebook [laptop] into the classroom for demonstration... I use computer a lot, so I use software like *Authorware, AutoCad, VideoMax, Adobe Photoshop, Adobe Premier*, all these software, so you can see that I use the computer a lot.
>
> **(Teacher B College C)**

From the above, it is evident that innovation of ICT and change is by individuals, acting alone and it can be deduced that the use of ICT is, in

general, at low level - mostly limited to word-processing and to some extent the use of spreadsheets software packages.

6.3.2 Curriculum Support

According to the participants, the teaching of ICT to students was primarily focused on providing them with the basic ICT skills in handling basic productivity tools such as word processor, spreadsheets and database. All VTE students in all three VTE colleges received basic ICT skills instructions through any one of the following subjects – *Applied Computing*, *Practical Computing*, *Computer Appreciation* or *Computer Applications*. The teaching of these subjects was carried out by IT teachers in the Computing Department or Computer Section in each college, of whom there were not many. Six of them were my interview participants. In most cases practical-based teaching was conducted in a limited number of IT laboratories. Because of the shortage of IT teachers and IT laboratories, these IT teachers felt that they were overburdened with too many teaching hours. Here are some typical responses from the participants:

> So what happened is that, the computer department apart from running their own courses, they have to service those other departments.
>
> **(Manager A College A)**

> So most of the time, if they want any help, they look to the computer department. They don't look for other departments.
>
> **(Teacher A College B)**

> At the moment, everything related to IT is shouldered by the computing department. Let's say for example, we have the convocation programme

> books and to produce handbooks for other important functions. The programme book is often a burden to us. All the small small bits, scanning, typing all the small things become the responsibilities of the computer department. Sometimes we could not cope.
>
> **(Teacher E College C)**

From these quotes, it appears that the responsibility for innovation is given to a specialist service unit, which in turn gives everybody else an excuse not to change.

The participants from colleges A and B confirmed that the teaching of ICT skills and their subsequent use did not go beyond the basics. One participant said,

> we haven't come to that stage where students use computers for ...learning, we haven't come to that stage yet. Simply because we don't have the supply and the facilities.
>
> **(Teacher A College B)**

However, the use of other software applications to support the teaching of a number of curriculum areas was noted in college C:

> The only things that I know that we really use ICT for specific areas are *Interior Architecture* - they need to use *AutoCAD*, because one of the units is the use of *AutoCAD for design*, - that yes. They really use software to teach the students *AutoCAD*...and also like *Land Surveying*, they have to use special software or computers....and also *Electrical-Electronic* they use *workbench* – a simulation software. They are using software packages.
>
> **(Manager B College C)**

> There are some courses that they need extra IT lab. Let's say for example, they wanted to teach their own package, like business for example *MYOB* [mind your own business, a business package], and *AutoCAD*, *Electrical Engineering*, and *Mechanical Engineering*, they really wanted to teach all these themselves. But the only thing is there are not enough labs.
>
> **(Teacher E College C)**

As in Colleges A and B, the issue of lack of facilities was implied in the above quote, and this time it is to do with 'not enough IT laboratories'.

6.3.3 Why ICT?

When the participants were asked why and how they might use ICT in their work, the interview data revealed that both teachers and managers alike put a high value on the usefulness of ICT. For example, they recognised computers as being an effective time-saving tool:

> One good thing about computer is that it saves you time. For example, in teaching...some of the diagrams it's very difficult to draw...especially on the white board. But if you print it and then scan it and then prepare it using your own computer and then print it and give it to the students, it will help to reduce the time you spend on drawing the diagrams only. So you can spend more time on explaining. I can see my students appreciate; it can help...really help. So more time could be spent on teaching.
>
> **(Teacher B College A)**

> Like myself, now I write down my own memos, because you really need the time, rather than you write it down, you can type it straight away
>
> **(Manager A College A)**

For teachers, the advantage of updating teaching material and being able to monitor the progress of development of their work brings enormous benefits. They also recognised that such a method of improving their teaching material is convenient and therefore useful for them in terms of organising their work more effectively:

> And it's also nice to see sometimes, after one year, when I teach the same level again, maybe I have new ideas and gain new information from the new groups. So we can keep updating using computers. That's the thing I saw.
>
> **(Teacher B College A)**

> But actually years ago, I have to prepare my teaching materials using the typewriter, but then nowadays I use the computer. Just either I have to keep on the hard-disk or floppy. It's very convenient. You can organise it and use it effectively. Mostly all the teaching materials, I prepared and save on the disk of my own.
>
> **(Teacher C College C)**

They also believed that the production of quality computer outputs such as printed notes or material could be used to motivate students and thereby help to encourage them in their learning:

> The quality of teachers' work has improved. A lot has improved, I think. The materials that we use today are of very good standard, because I can see it is progressing. Our materials are now progressing, even though the ways they prepare the materials are not that sophisticated, it's more attractive to look at it and get motivated, rather than simple typewriter's typesetting.
>
> **(Teacher D College B)**

Because if you use computers to prepare notes and exercises, you can see the students appreciate, rather than you copy everything on the board.

(Teacher B College A)

In the projects that students have to do, it's very helpful to see it, in three-dimensional object, for carpentry especially, for verifying some terms or something that is difficult to express in drawing by freehand on blackboard. With computer, it's much easier. I have done the drawing already in 3D on *AutoCAD*, as that's my specialty, and it's much easier to just show the students the true 3D representation and of course they enjoy it much more too. It's much more 'hi-tech' and the students like that.

(Teacher B College C)

Therefore based on these quotes from teachers, there seems to be a drive for change in terms of improving the quality of teaching and increasing student motivation. Another driver was the expectation of having to equip VTE students with skills that would be necessary in their future career:

> Because to me using IT in education includes teaching students how to access information... and also so that they can get information from outside through the net and all that .. in order to develop their skills.

(Manager A College B)

In general, both teachers and managers place a high and positive value on ICT and they recognise the potential benefits that ICT might bring to them and to their students. It remains to be seen though, how these strongly held

beliefs could sustain their motivation to change despite the lack of resources in their colleges.

6.3.4 If ICT is implemented then what is needed?

There might be a need to develop teachers' interests and attitudes towards integration of ICT into learning and teaching. As one manager puts it, the interest and understanding might be developed from the knowledge of basic ICT skills:

> I think it is very important to understand – ICT is to be used as what? Is it to be as a tool or to be used for studying as a subject? Teachers have to know. For example, teachers might want to show students how to use electronic referencing. Teaching staff, therefore, must have basic IT skills....
>
> **(Manager B College C)**

Another manager gave a view of how progression through level of development in ICT skills a teacher might pursue:

> In terms of teachers' development needs, firstly whatever they do, probably in terms of presentation and so on and then whether relevant or applicable. And then, I think what is really important, what these teachers should know, is of course, word-processing is one, for the preparation of their notes. Then *Excel*, then *PowerPoint* for presentation and then...multimedia. That's how it should be. That opportunity to gain the skills and knowledge should be given to all teachers.
>
> **(Manager A College B)**

6.3.5 Barriers to Effective Use

Clearly, the main contributor to the ineffective use of ICT in the three colleges was the lack of access to the essential ICT facilities such as personal computers (PCs) and local area networks (LAN). This can be linked to the constraint in the colleges' budget for capital expenditure at that time. All of the interview participants raised their strong views on this issue. Here are just some of them:

> the problem is we don't have the supply of computers. If we do have enough of them, probably we could also use computers for teaching ...to the students. So that is our constraint... We only have two computer labs, mind you and we are serving the whole college with over a thousand students and prepare teaching materials for all of them. So that's our constraint. So we cannot use it for teaching the students. So occasionally the teacher makes some arrangement with the students and brings his or her own computer.
>
> **(Teacher A College C)**

> There are only a limited number of PCs up there. There is one computer classroom in this college with only about twenty or so machines, I am not so sure. But they are mainly for student use. Staff can only enter the computer room when the class is not in use. That's why I didn't feel convenient. ... last time during my course overseas, I used a lot of CD-ROMs to find out the information by the help of our librarian from our institution. But unfortunately, in this college, they don't have any CD-ROMs yet, which I think is also very important. A lot of things we can do and much help can be obtained from the CD-ROMs.
>
> **(Teacher C College A)**

Take the language unit for instance. Until recently, they've had only one computer for all of the staff members and in the language unit, you really need to have computers these days. There are too many people there. At least now they share two computers or maybe three, but still not enough.

(Teacher B College B)

I think one of the reasons why the needs [to develop themselves in ICT] never arose among staff is because they don't have the facilities. Probably if the facilities are there, probably they will change how they think about ICT.

(Teacher A College B)

In terms of the facilities, I am frustrated myself...[laugh]....maybe it's just... I don't know...I just have to mention the honest thing. But if teachers are really keen, they would bring their own computer. Most of us bring our own computer. But I haven't got a laptop. We use the Internet as well, our own account with BruNet, of course. But in future maybe something could be done about it.

(Teacher E College C)

Basically first thing is that facility we don't really have it here, unfortunately. We have difficulty in getting the resources as well. The best thing is to go to the computer department. All we have is this only one computer, which has recently been updated, Windows has just been installed. Apart from that, these two are old computers, so that's why I am still worried about this thing; IT has not yet really taken up in this college.

(Manager A College A)

> The constraint is also on our staff. Without IT, our staff is slow in deploying their duties. You cannot get away, for example, from them using typewriters. Typewriters have limitations, even using word-processor. What can you do with word-processor on typewriters?
>
> **(Manager A College B)**

> In our annual report, all departments always identify one of the issues is that there's shortage of computers in their departments. They complained there's no computer to do their work and things like that. That's what they said. But they haven't specifically said that what this is for exactly. Administration work or teaching work or things like that? But in most of the reports, normally they indicated, 'inadequate', 'not enough'.
>
> **(Manager B College C)**

Other issues arose because of the shortage of ICT resources. In college A, one teacher shared an issue where many teachers wanted to use just two available PCs. This was especially so during the examination period when they needed to compile students' results – all VTE teachers were required to prepare the results of their students on a standard *Excel* (Spreadsheet) document for submissions to the council (BDTVEC) for the purpose of standardisation:

> In terms of hardware, we have three PCs actually - one is not in the working condition - one of the drives is faulty ...It's always difficult especially during exam time....we have to fill the AF-1 forms to record all the marks and...so during these times, it's difficult to get computers. Because it's not enough...two computers to be shared among thirteen staff.
>
> **(Teacher B College A)**

Another example – In College B, two teachers raised their concerns regarding the issue of the increasing number of students when there were not enough machines for them to use for teaching basic ICT skills to students. The issue was not only inadequate supplies of the essential ICT resources for teaching but also having to make do with old and dated machines. Here's from one of them:

> Our students have increased, yet we have not changed our technique of teaching, we still use traditional method; mainly teacher-centred. And the conditions of our computer labs are appalling. We should have, like in the UK, computer assisted-learning, self-directed student-centred learning, rather than guided by books and one straight lecture like in the lecture hall here
>
> **(Teacher C College B)**

The other teacher after giving me a tour around the college's ICT facilities said:

> Okay, what we have seen in the lab just now, we only have eight available PCs and those are not up-to-date machines. We still have *486* machines. And we have about one hundred over students for year one.... Each year we receive about one hundred and fifty students per new intake...So during the computing lessons, the students have to share...so five of them at least have to share one computer.... And [because of that] most of the students prefer to do their work at home rather than here, because they have better machines. They prefer to use their own machines that they purchased using the student loan scheme.
>
> **(Teacher A College B)**

It did not come as a surprise to me then when she said that students preferred to 'use their own machines'. This assertion was also confirmed by a manager of this college:

> Would you like to know how our students get around this? They bought their own machines. This is good in a way. Just because you don't have enough of it, doesn't mean to say we shouldn't conduct *Computer Studies*. So our students, through schemes like [bank loans to purchase computers], their allowance are deducted every month, and they are able to buy more powerful computers.
>
> **(Manager A College B)**

----- ----- -----

Another issue that arose from the lack of resources was linked to the issue of staff development. ICT shelf life is short, so there has to be immediate use of training and embedding skills quickly for that reason. For example, if the staff were given training and they were not able to make use of that training because of the non-availability of machines then it might cause frustration, as these interviewees implied:

> Everybody recognises the need for staff development, including the principal. But it's a question of resources and budget, we don't have a computer, the college does not give this one to us [pointing to a PC which was obtained through donation]
>
> **(Teacher B College A)**

> If for example, we have enough machines, definitely, we could develop our staff. We have two computer instructors for IT; we'll cater for our staff also definitely. I would like that. Yes. And maybe do workshop on some

of this like multimedia. And even on improving teaching presentation using *PowerPoint.*

(Manager C College B)

But so far, we haven't had the opportunity to attend any IT training. But they cannot be blamed also, because we have inadequate resources. They conducted a few things - IT short-courses and so on and encouraged teachers to attend but there are a few who resist.

(Teacher E College C)

6.3.6 Coping with the Problem of Inadequate Resources

According to one manager, the problem of not getting adequate supplies of college resources is an issue faced by many government departments and ministries in the country – a common problem which has existed for many years:

The problem of 'lack of resources' is a common issue, not only in this college. It's a common issue in Brunei Darussalam, especially in the government sector. Even in the department... from where I come before [another government department], phooh, it takes a long time. I have to push and push, and eventually I got two computers... I managed to get those equipment by early nineties. And you see that I have to push and push, and tell them about the needs, especially curriculum....I explained to them how my teaching material has to be documented and saved on the diskettes and to be reviewed and it means a lot of work if it has to be done manually or by the typewriter. So that's it.... And I remember asking for an LCD [Liquid Crystal Display], for example, I fought for it. I gave my rationale and at last I got it. But then still I am not happy, because due to

> the number of teachers at that time, I only got one. But that's good enough anyway, so everybody has to fight for it, when it comes to they want to use it.
>
> **(Manager B College B)**

So how did the three colleges tackle the problem of the lack of ICT resources? According to the participants, apart from doing their preparatory work (for teaching) at home, many teachers especially those keen ones, brought their own laptops and/or desktop PCs to the college. Some of them even brought accessories such as modems, scanners and printers. In that way, they did not have to rely solely on the resources provided by the colleges:

> Actually, I prepare my work most of the time at home, using the desktop. I seldom used in the college because they did not provide; we have to prepare our own. Of course it's not really convenient for me. So I did all my preparation at home, most of the time including printing. Photocopy in the office. Printing? I do my own at home.
>
> **(Teacher C College A)**

> For preparing their lesson materials, teachers find it difficult due to the lack of ICT resources. But most of them bring their own PCs. They do their own printing. The college printers are not reliable.
>
> **(Teacher A College B)**

> I have spent a lot of money buying original software like *Workbench.* I don't want that if I conduct a course and I don't have a licence for that, but I spent from my own pocket money.
>
> **(Teacher A College A)**

> Just one computer for all the staff (in the department of 13 teachers)? I wouldn't get my work done. So, I purchased my own notebook [laptop]. And I very seldom use this one PC, because all my records are in my notebook. My wife [who works in another department of the same college] has her own laptop. The college has a very limited budget. The budget is just isn't there, you know, not just for computers, but for everything.
>
> **(Teacher B College C)**

For the less bothered ones, they continue to get along with what are available in the college which include old and outdated machines received through donations from private organisations – I know this because this was mentioned during the interviews:

> Now the college didn't provide this computer. We had to go out to [a private organisation] that is willing to sponsor us, and ask for a donation, and they kindly donated this computer to us.
>
> **(Teacher E College C)**

> We have only one or two *Pentium 75*, the rest are *486*. Most of the *486* machines are handed down to us through donation by Brunei Shell.
>
> **(Teacher A College B)**

One of the colleges organised fund-raising sports events. The money generated from the sponsored events was used to purchase machines (PCs and computer accessories) for the teaching staff:

> You will appreciate that they try to generate their own funds to buy resources. Like for example, they held bicyclethon and other activities to

raise money. And then from that they purchased computers for teachers

(Teacher A College C)

> We tried to provide each department with one computer each from our bicyclethon event these past two years in a row. So now teachers in each department have got their own computer.
>
> **(Manager A College C)**

When the 'bicyclethon' event was repeated the following year because of its success the previous year, some of the money raised was used to buy computers for the ICT resource room specifically for teachers:

> When we organised our bicyclethon last year, we've [raised] over twenty thousands. So we decided to buy more PCs. I asked the computer department to set one resource room and then have that room for the PCs. We bought about ten PCs and had all of them networked.
>
> **(Manager B College C)**

I had the opportunity to view the facilities available in the newly-built ICT resource room for teachers in College C. According to the following participants, many teaching staff have yet to gain understanding of its usefulness – how they might gain from using such facilities:

> We've dedicated this one ICT resource room for staff to use only, not students. And I already received complaints like "it's too far", "why must it be in the computer department", "we have to walk there". It's mainly that attitude thing - but it's only a minority who complained.
>
> **(Manager A College C)**

> Probably it's too far for them. But as far as I am concerned, let's put it this

way. Suppose I am HOD of this department, and I want that people should be fully aware of this IT resource room and all those things, then I will create a situation, where they will be forced to learn. And that's the only way, you know.

(Teacher A College C)

Thus, the lack of access to the essential ICT facilities was a major barrier to effective use by VTE teachers and managers. The finding also reflects how the staff development activities were handled in each of the colleges. For example, what will become evident later in section 6.4.4 is that an initiative such as in-house training was only available in College C but not in the other two colleges.

6.4 Staff Development and ICT Training

6.4.1 Was there a staff development programme for teachers?

When I asked the participants their knowledge of their college's staff development, the views received were somewhat fragmented. Some simply said they didn't know, others said, "not properly handled"; still others said it was something which was not often discussed among teaching staff. Here are typical examples of the extreme views:

> Yes, I heard there are plans to develop staff, although we are not fully aware of it. But what I understood was that, at the moment, they are planning a strategy for staff development.
>
> **(Teacher C College C)**

> You see, I can tell you, with respect to the department where I am working, which is one of the largest – if you like, in terms of the number of staff, it's quite a big department because basically it comprises of three sections. But I don't see – I mean honestly, there is anything taking place for the staff development.
>
> **(Teacher A College A)**

Even if there were programmes for staff development, it appeared that it was not something that the participants perceived as a common practice. As implied by the following interview quotes, some of them suggested that teachers were left to monitor their own development needs:

> From my own feeling, I think staff have got to look at their own development needs. Very often, you'll find that there are those who tend to keep a low profile. So obviously, very often you'll find that the keen

ones will be the ones who'll get the training, and those who are not keen won't get it. That means they don't want anyway.

(Manager A College C)

What we are right now is all depends on the individuals, right? how much he or she is motivated, how much time he can spare, and then we just depend on the individuals, so some of the teachers, you'll find that they are delivering the thing...the output is quite effective, you can see [they learn] also...but for others, they don't put in any effort

(Teacher A College A)

In terms of staff development, new teachers are [usually] required to undergo the teacher training. After that, if you are lucky you'll be sent to do attachment, outside. But so far it always depends on the approval from above and they only give like one month or three months, and you go out like two days in a week, but it is not rotation [*meaning* – not everyone has equal chance to participate]. There is no continuity.

(Manager B College B)

Very often I feel, it was for my own self-development. When I need certain training is there is a suitable course or workshop, I will go on my own using my own money - I didn't ask for college's support. Maybe because I understand the problem with the budget.

(Teacher B College A)

----- ----- ----- -----

I asked the participants of their understanding of the concept "*staff development*". What emerged from the interview data was a diverse range of meanings. One manager looked at staff development as a means of providing continuing professional development at the management level:

> My colleague and I attended a management course at the *Institut Perkhidmatan Awam* (IPA), as instructed by the principal. That is how she thinks about the importance of staff development, especially the very senior people here. She sends us to IPA to attend a management course, just to improve further or to refresh our knowledge. That was her intention.
>
> **(Manager B College B)**

Another viewed it as the regular college activities catered for the teachers in the college:

> As far as staff development is concerned, in term of seminar or workshop, we are very active, very active! In this college, we always have a calendar, almost every month we have something going on, if not every month, every two months or three months. Yes, that is happening here.
>
> **(Manager A College C)**

A few viewed it as preparation for future career path:

> ...for staff development, the plan is to send me for this Master's degree course. And then I will, one day, replace the deputy principal, *Inshallah* [Allah willing]. I know I've been groomed to go in that direction. That's why I need to do my Master's
>
> **(Teacher B College B)**

However, from the rest of them, the views carry the connotation of what staff might expect to benefit at the personal level. For example, a majority of the teacher participants voiced their opinion that staff development was an opportunity for teachers to further their studies, for the purpose of upgrading and updating their present qualifications. This was the most common view:

> Our main priorities for staff upgrading in this college are those staff that

haven't got any HND. They are our main priorities. So we upgrade them to do HND courses overseas. Most probably after that there will be more career development for them.

(Manager A College A)

6.4.2 How about staff development in ICT for teachers?

I wanted to find out if there was any staff development programmes related to ICT in the three VTE colleges:

I don't know. As far as ICT is concerned, I don't think it [staff development programmes] exists. In others, like seminars and conferences, we have been asked to go and attend, and that yes, it is happening. Especially in SEAMEO-VOCTECH, there are seminars, there are experts giving talks and seminars.

(Teacher A College C)

Staff development in the area of ICT; there is none at the moment. But there is few staff that would like us to organise something. For example, they asked, "why don't you give us a course on this application program for a few weeks?"

(Teacher A College B)

There was not so much on ICT, I think. At this moment the focus of staff development is to refresh their ability to teach. So the goal is have a refresher course, like teacher training. How to prepare lesson plans, how to ask questions, how to use teaching aids, that's our target at this moment.

(Manager A College A)

So here, IT related staff development is very minimal. We have plenty in other fields. In fact, we have a calendar for it. We are very active. Take this coming July for instance, we have two workshops on two different days for the teaching staff, something to do with curriculum review, assessing the outcomes and the other on the impact of training on the organisation. I personally set up the topic. I want our teachers to know a bit on management.

(Manager B College B)

Yes, in terms of IT, that's right, yes. It is not a priority here. Yes, although everyone is aware that it is very important. I see it as being very important. But there is no money. I don't know much about the budget. But I think there is no budget for staff development in IT. There is no such thing as budget for staff development in IT.

(Teacher B College B)

These responses imply that the staff development activities related to ICT might not be a priority in the three colleges. The reasons given were the lack of budget and lack of ICT resources and facilities for training. However, this might also imply the reluctance to take imaginative steps to initiate change which often is due to lack of knowledge or skills to handle the situation. Other excuses such as 'lack of resources' and 'lack of budget' might then be used as obstruction to progress. Although ICT might not be seen as part of the college planned staff development, training in ICT was made available for staff in college C through short courses and in-house training, as we shall see in section 6.4.4. The participants in college C might not have seen that as part of a development plan for staff.

6.4.3 Teachers' Knowledge and Skills

The participants' perceptions of teachers' knowledge and skills of ICT was generally positive. There was a common expectation, especially among the managers, that most teachers have some knowledge and skills of ICT that they acquired from former education or previous employment and that they could use them as a foundation and further develop or share their knowledge and skills of ICT with their peer colleagues.

> Most of them [teachers], I think they have to update themselves. We've got few new instructors [younger teachers] here who have done some ICT experiences in their former education. For example, I know of one of them has come with a degree in computing and hopefully he's been exposed to some of these new software applications. And then again most of the recent graduates who have come back from overseas studies must have done IT. I know this because they've been asking me to buy software for them; software which is being used elsewhere but which is not yet popular here....Unfortunately, at the moment there is no proper organization and planning for staff development in IT.
>
> **(Manager A College A)**

> It's the more experienced, the older ones I am more concerned. They are the ones that lack IT skills...I mean, they used to, may be three years ago. But at the moment, I think, Alhamdulilah [*thanks be to Allah*] all of them can use the computer now. I think I am even quite happy to tell you, I think almost one hundred percent. It's true. Without IT, they cannot survive, they cannot survive without computers.
>
> **(Manager A College B)**

However the views of the teacher participants were contrary to the above. In spite of the confidence expressed by their managers, there are reasons to believe that teachers need support for their on-going learning of ICT and for their professional development:

> They can do just a little, maybe it's only the easy bits like *Windows*, and everyone knows how to handle that. But even so, you know we have the AF1 forms where we enter all the examination marks and results, many people are having difficulty in doing and using it. It is based on the ordinary basic *Excel*. Because the forms need to be submitted to the principal at the end of each semester once students have finished their exams and all that. We have to enter it by using the so-called AF forms, and these forms are saved to a diskette and submitted to the principal. Even that, they don't know how to do. I am talking about the older generation. They are quite illiterate. But I cannot really blame them. They simply don't know how to use it.
>
> **(Teacher A College B)**

The desire to learn is great, but it is not widespread. The pressure to change is not there because of resource constraints and limited facilities and this leads to pragmatic acceptance of little change:

> The individual instructors are not still well equipped. They are not capable of handling even the fairly basic Microsoft office tools. A computer literate must know this thing.
>
> **(Teacher A College A)**

> Many people want to update themselves even more for them to explore other IT skills too, that desire is there. But, as I said, there are

limitations. The limitations are there because they can't see the scope. There's no scope; that is the problem.

(Teacher A College C)

From what I see, students are more advanced; they know a lot more than their teachers. So it's sometimes quite embarrassing. Sometimes the students use terms we don't really know of. Unless those of us who are really keen, I think. Or those of us who are in the computer area. So it is in our interest to learn more of ICT.

(Teacher D College C)

I know how to use email basics. But the thing is I feel that, it's a waste of time if I didn't know beyond that basic skill. I should know how to handle 'short cuts', for example. That's why I attended this course [on participant's own initiative] for ten hours on Internet and email. It's useful. At least now I know how to use it appropriately.

(Teacher B College B)

Look at myself; I am just about to learn. I am now forty-four years old, you see. I am not that very literate in terms of the use of computer personally. But I have to keep abreast of these changes and realising the importance of this IT as a manager in this college. So I have to learn anyway. And I have to learn from my children....they are very good at it.

(Manager B College B)

The interview data also revealed that certain staff in the three colleges pursued their own development needs through their own self-initiative by attending ICT courses at private organisations outside their college. They also learned from others including their peers in the college or from their

children at home:

> Because teachers might want to use ICT during their teaching, they feel very threatened if they don't have the skill and I think because of that many of them took up the initiatives to do computer literacy upgrading themselves.
>
> **(Manager A College B)**

> Actually like me, some of the things I don't know, I ask my colleague, who has twenty years of experience. So I could ask them. Because they still can help me like clarifying my doubts. Unless, of course, they cannot do it, then maybe then I will turn to the Internet.
>
> **(Teacher B College A)**

> For example, things like the use of email, we learn on our own. What I mean is I spent a hundred and fifty dollars per week to learn about the Internet, email and so on. I did that on my own initiative outside the college in my own time. I speak for myself but for other staff, I don't really know.
>
> **(Teacher B College B)**

> Yes, that's true, skills in *Excel* and so on; we learn either through our own self-initiative or get tutorial from private tuition or learning from children at home or simply self-exploratory learning using trial and error.
>
> **(Teacher B College C)**

> And then even my son, he used to teach me how to monitor, how to search using the Internet, how to look for things that I need. Sometimes things like that help me with my teaching preparation, for example.
>
> **(Teacher D College B)**

> For me, maybe I'll go to the evening classes or short courses organized

by this college. I mean I also have intention to go to for IT training outside like Focus Computer School, but we have to pay ourselves.

(Teacher D College C)

The data presented above clearly indicates that there was a strong motivation to know and to learn more about ICT. Both teachers and managers alike wanted to know more than just the basic knowledge and explore other more advanced skills.

6.4.4 Availability of Training Opportunities

Two teachers expressed their frustrations concerning the problem of limited training opportunities for teachers. They did not seem to know where to obtain information or from whom to seek advice in matters related to ICT training:

If we have the support and resources and if we know from where to get counsel (about staff development and training), we want to. Like me, I want to learn all these things. But from whom? From where? That's the problem.

(Teacher B College A)

Things are moving faster outside, but in this college it is very slow. I mean, like myself and the rest of us, we want to learn, but the question is 'how?' How do we learn this and that? Well, one thing...ICT, for example, use of Internet, maybe use it for presentation. Apart from the Internet, what else is there for us to learn?

(Teacher C College B)

The above statements imply that information about 'learning opportunities'

appeared to be unavailable in the colleges. Frustration such as this is a stumbling block to their learning needs.

As it seemed interesting, I wanted to explore this issue further. So I asked the managers if there was any kind of training available at all for ICT skills development for teachers in their colleges. Here are some of their responses:

> We have a few staff who are very good in ICT. Probably we can use their expertise and run in-house training. But make sure that after the training, they straight away practise what they have learnt. So which means that the knowledge and skills of ICT or whatever it is, and resources should already be there. There shouldn't be any gap after training and then after that they don't hands-on, then they tend to forget.
>
> **(Manager B College A)**

> We will shift our focus; probably next year when we establish another action plan, probably we have to look into staff development in ICT. Probably, to upgrade those teaching staff now more on the use of computers. Or even on training some of the software they use.
>
> **(Manager A College A)**

> In this college, our primary concern is with educating our students to prepare them for their professional career. So definitely, emphasis is on the students. Training in ICT for teachers is usually catered outside, like SEAMEO-VOCTECH. Yea, we send our staff to go there....to specifically conduct courses in-house at the moment is not possible. Because you have to acknowledge that our resources are inadequate, even for the students.
>
> **(Manager A College B)**

Actually the college does provide ICT training for our staff. Even like things like using *Excel*, they are encouraged to attend. The Computing Department actually co-ordinate –every now and then the Department organises some courses for our staff. And very often the head of department will send a memo to all the other departments through us here.

(Manager A College C)

We encouraged our staff to attend the short courses run by the Computing Department. It's fee-paying, but for instructors they only have to pay about thirty percent of the actual course. So we don't give them free...some instructors do take the offer. So they are doing it in the evening, because I know a few instructors who are really keen to upgrade themselves. They will come in the evening and have to pay thirty percent and then do their own learning.

(Manager B College C)

The above interview quotes reveal that in-house ICT training for teachers was available only in college C. However, managers in College A indicated their strong desire to run IT training programmes to develop their teachers' skills. The lack of human and physical resources had not permitted this desire to materialise. A similar issue confronted college B. The only option for them, from what they said during the interviews, was to send 'relevant' teachers for the limited number of ICT training programmes organised by local public training organisations such as the *SEAMEO-VOCTECH* and *Institut Perkhidmatan Awam* (IPA):

There are several places that our staff can go for IT training – like IPA, for

example. But IPA I feel was very limited too, I don't really know much about what they are doing there, so I cannot say much. But at one time they advertised on *computer basics*, *how to use emails* and so on; that's in IPA. And then there is our regional centre, the SEAMEO-VOCTECH. At one time, they ran a workshop on *multi-media*. A few of our staff have gone to do that workshop. But I think it is at a more advanced level. Unfortunately their course will not be applicable to everybody. And also may not be appropriate and relevant. And so I cannot just send everybody to just do multimedia. And take three weeks of their time and I have to be selective as to who get to go.

(Manager A College B)

I think the Institut Perkhidmatan Awam has run the IT courses in Brunei Darussalam. It's up to the college to send its officers. That is the cheapest means anywhere.

(Manager B College A)

The only thing is we have limited number of training opportunities. So far, I think, we can only attend those provided by SEAMEO-VOCTECH.

(Teacher E College C)

When we received all those courses being offered by like institutions in Singapore or SEAMEO-VOCTECH, they are more often on management, It's very seldom on ICT, although some, like the courses being offered by the Singapore government, they are more on IT-based.

(Manager A College A)

As evident from the above quotes, one of the factors that limit the access to training through the outside organisation was that courses on

offer were seldom related to ICT. Two other related factors were lack of budget and hence lack of support from the above authorities:

> We've been told by DTE that if you want to send people for training now, either for short course and training or conferences, there is no budget. We've been told that there is no budget. So basically there will be no support [in terms of funding] for training opportunities for staff in the short-term planning. Unless of course it's sponsored by some outside or private organisation or if staff are willing to pay for themselves.
>
> **(Manager A College C)**

> With regards to the system as a whole, I don't think there's any direct support. Now there is none from the DTE. There is not much encouragement from anywhere. It's not like years ago. The obvious reason is 'budget'. They simply won't support because there's no budget. But in terms of support from here (this college), I mean, if they are relevant, very often the principal will say ' ya.' One or two day short courses like for instance - I don't know, it could be on ICT or any other course. If the staff insist that they want to attend and they are willing to pay for themselves, very often they are allowed to go, as long as arrangements are made to cover their classes and so on. Support from the college, I think, no problem... we do support... Our only problem is the budget.
>
> **(Manager B College B)**

Another issue highlighted by many of the teachers was that priority for ICT training was given to the people at the managerial position such as the heads of departments:

> I think my HOD had attended a course related to IT the other day. It was

held in Singapore. He and [another manager] attended that course. I think it was to do with *data-* or some *information-handling*...sorry, I don't know much of the detail; you can ask him later because he had attended the course. Apart from that I don't think there is anyone.

(Teacher B College B)

I asked the managers to confirm whether this was so and if so, why this might be the case. Here are their responses:

At first, we tend to open up the offers for *outside* training for HOD. But it seems that we don't have enough response. So what we did was we pin-point people. Our normal practice is that *priority* goes to the HOD first.

(Manager A College A)

I don't know whether I had sent the right people. But I wanted to give opportunity to them (the heads of department). So whenever there are offers, I would send them. But so far there is none, apart from those offered by SEAMEO-VOCTECH, who organised the workshop on multimedia, which is good. So I wish IPA would offer more.

(Manager A College B)

The only people that I get in contact with very often are the HODs. They are, if you like, my immediate concern. But I think, indirectly we are aware of the training needs of other staff too...in most cases when the training opportunities arise like...outside industrial training or short courses, very often the people you will send are the HODs. I think, the principal is also aware of the need for these HODs to have more knowledge gained through outside training. But then again it still boils down to budget.

(Manager B College C)

6.4.5 Issues of In-house Training in College C

In the previous section, the interview data revealed that in-house training was made available only in college C. As evident in section 6.3.6, this college has more resources than the other two colleges and therefore was able to organise short courses in ICT. These courses were usually conducted in the evenings, i.e. outside normal college working hours. The interview data from the participants implied that the response from teachers toward these training facilities was not very encouraging – it appears that only a few of them took up the in-house training provided by the college. Typical responses – one from a teacher and one from a manager:

> The short courses we offer require certain amount of fees but for college staff, we give them discount. It's run at 5.30 pm in the evening; so that they don't have to be committed to the teaching time during the college hours.....The response to this is not bad. There are a *few* staff who attend... maybe about ten that really wanted to take up the courses.
>
> **(Teacher E College C)**

> *Some* instructors do take the offer. So they are doing it in the evening, because I know a few instructors who are really keen to upgrade themselves. They will come in the evening and only have to pay thirty percent.
>
> **(Manager B College C)**

Several reasons can be inferred from interview participants in college C why only 'a few' or 'some' of them took up the short courses:

- cost – teachers were put off because of the incurred charge – although they only had to pay 30% of the actual fee

- time – evenings were not suitable for them

- to some teachers, the courses on offer were not relevant – maybe because the courses offered did not meet their professional development needs or expectation for learning and teaching

- some might not have the motivation and initiative to go for college-based courses – perhaps they are not relevant to their background, abilities, needs and experience.

However, if cost was the obstacle, there were two other ICT-related training opportunities made available for free to all staff in the college – training in *Excel* and a 'computer-awareness course' for teachers. There were good reasons why this college offered these two courses for teachers:

> The objective is for all staff to be aware of *Excel*...because for most of the staff here, and every course tutor, they are required to fill the AF forms. The forms are where they enter the final marks for report to the council. So everybody should know how to do it rather than they send to the secretary [in the administration].
>
> **(Manager A College C)**

> Our focus is on the non-IT-keen staff whose basic skill is not enough... the old generations, those who were not adequately exposed to IT. They were not scared...but it has become their habit, they could survive without IT....our principal really emphasises on this needs...he even remarked, "some staff teaching notes were really old, yellowish and they never changed". So these are the people that we really focus on.
>
> **(Teacher E College C)**

However, according to one interview participant, not all teachers were clear of the intention of the college:

> I think it's the duty of the administration to inform us why we must go to a short course. Not that we run this course only once, each time at mid-year I mean, if there was a term break or holidays, the staff should be encouraged to attend. ...and I think our computer department, they should come forward and offer more of this type of courses. So to tell you from that point of view, really how much effort are we making towards ICT? The desire is there, for example, they want the results to be standardised. And that they have achieved. But what actually is happening, the process is not very smooth, in the sense that the individual instructors are not still well versed with *Excel*. They are not capable of handling even those Microsoft office tools, which is nowadays considered to be very basic. A computer literate must know these things...Now there is no statement in black and white to say that staff should be ICT literate. But I attended a lot of meetings with the principal...at one time he asked us to use *Microsoft Project*, and then you could see that some of us were feeling uncomfortable.
>
> **(Teacher A College C)**

Another participant perceived that there might be another reason for the college's desire to put in place IT training for the teaching staff. Both teachers and managers in this college perceived that the teachers in the Department of Computing were overburdened with many ICT related activities on top of their teaching responsibilities. However, a participant from this department felt that kind of perception had begun to change:

> For example help from other departments has become apparent, so we

just have to facilitate. They are the ones who do the jobs. Let's say for example the Business Department, they now conduct 'the computer appreciation' part of their programme and also the teaching of MYOB (mind your own business) package. Now they are able to do it themselves without relying so much on us. So in that way, we don't have to be stressed up to serve other departments. Even with the teaching of the package AutoCAD, now the construction department prefers to do it themselves. So things like that we could transfer the responsibility to them.

(Teacher E College C)

6.5 The Organisational Culture

6.5.1 The Learning Environment

It is evident from the interview data that both teachers and managers would like to have an environment that supports a learning culture that values progress, change and development. To them support from the top is crucial:

> The way I see it personally, based on my experience, unless the ministry invests on this concept and that they want to invest in ICT as an investment for future training of our students and they are willing to put the money in that investment, then that it will work. If it is to expect institutions to embrace ICT without the support from the ministry, no matter how strong will the institution is, I don't think it will work. Because there is no direction by the ministry that we have to invest in ICT.
>
> **(Manager B College C)**

Also support from the bottom – especially the teachers:

> This College is very lucky to have a head [the principal] who is a very dynamic man. His ideas are fantastic. But he doesn't always get support from people under him – not from everybody. And if I were to be at his place, I might have given up. But still he is fighting. And I admire him because he himself works a lot. And he expects all of us to do the same. And that is one big challenge that he has to overcome. I know this because I happen to talk to him so many times and it is clear that he wants changes.
>
> **(Teacher A College A)**

Teacher participants also recognised that the support of their principals and heads of department is a key factor in their professional

development. This, however, as observed by one participant, appears to be lacking and staff were often discouraged because of the lack of 'pat on the back' or appreciation from their superiors:

> You know, there is even some who say, 'money is not everything". But, sort of recognition, appreciation for your work, then you feel elevated and have job satisfaction. You feel 'professional' you are doing something. But that [praise] thing is still missing, very much missing.
>
> **(Teacher A College A)**

According to the following participants, teachers did not have enough time to exercise peer-support and learn with and from each other. There were not enough opportunities for interaction in the college as every one seemed to be busy:

> Very often when you are teaching, you don't have that much time to actually get involved. When you worry about doing your lesson plans, marking, teaching, sometimes it's very difficult, you know, finding time to actually think about all these.
>
> **(Manager B College C)**

We don't have the chance to interact much with other staff members, you know, we are quite busy. But we do discuss the need for ICT, everybody basically complains it's inadequate. There aren't enough computers to go around.

(Teacher B College A)

When I was working on this ....document, I don't really involve others. We don't meet with other staff to seek their views. So it's just the deputy principal and myself.

(Teacher A College B)

> The other things which I found out about our local staff, they are too much committed with their family affairs. Like in this country you have so many things to do. So I found that, I may be wrong, but I don't think they do self-study. They don't get time to do, and it demands a lot of discipline, especially when you are teaching. I mean, sometimes you have to study late at night, but I don't think that the commitments to that exist here, since the level is not very high. There is not much challenge, and there is not much competition. And then there is no fear that when they enter the class, the students might challenge them.
>
> **(Teacher A College A)**

At least three conclusions might be drawn from the above interview data in relation to the characteristics of the institutional culture in the three colleges. These might be:

- lack of commitment to the colleges' development initiatives
- lack of opportunities for staff to be involved in the colleges' progress and development
- lack of peer-support, for example, in terms of the sharing of knowledge

If the above issues were allowed to persist in the colleges then it could be detrimental to their needs for ICT and for the teachers' professional development.

6.5.2 The Colleges' Missions and Visions

The interview data revealed that two of the colleges have written statements about their visions and missions. However, concerns were raised regarding the effectiveness of their implementations. For example, in College B two participants voiced the need to address the mismatch between "what was written" and "actual practice":

> In terms of the forward movement of the college, we have a very clear vision. Our mission and objectives and even the rules and responsibilities, they are all very clearly defined – written on paper. But I am a bit sceptical how transparent are these things amongst those below us. From my deputies and down - how much do they really understand those statements? What I am trying to say is I am a bit worried also, how far have these been manifested - do they practise it? Theoretically, yes, they understood what it is. But when it comes to practice, I don't know.
>
> **(Manager B College B)**

> ...I can see the vision is they want to achieve the target number of graduates. To have enough supply of manpower in this specialised area by 2003. That is what the vision is. But I am afraid we cannot produce quality graduates by that time even though they can achieve the target in terms of the number of graduates.
>
> **(Teacher C College B)**

I wanted to find out if there was any linkage to their vision for ICT. I asked each of the participants what their visions for ICT in their colleges were. Their views on this subject were diverse, varied and lacked coherence:

> From our college vision for 2002, we expect them [the teachers] to be computer literate. Somehow rather by the year 2002, I expect my staff to

be comfortable with ICT. And we are on our way....In this vision there are so many goals and they are all inter-related. What cannot be covered in one goal, can be covered in another goals.... But in terms of IT, I think you really can't get away from it. They should know about it, I think.

(Manager A College A)

If proper use of ICT exists in this college, some of these learning experiences can be transferred to the classroom here, but actually we are far from that although it is something I would like to see happen in Brunei, and in fact that is in our plan. The other thing is our library. I want our library to be transformed into a real learning resource centre. So that through IT, we can access information, network to the outside world, and also people from the outside can get information about Brunei, which they may not have in their country. So it's a two-way process which means we are also learning about their culture. And of course, in this world of accelerating change, we cannot afford to be left behind. Actually, if it was up to me, we would be well ahead already.

(Manager A College B)

I think we're lacking in the vision for ICT. I don't even know what is the Ministry's [Ministry of Education] vision for ICT in Education. I suppose what we really need is a [common or shared] one. That's why we as a college, we created our own vision. But then again we need to ask, are we linking our vision to this field [ICT]? As far as I'm concerned so far there's none [no link between college vision and its vision for ICT].

(Manager B College C)

I can tell you, I don't think there is any vision for ICT specifically. As far as this college is concerned, I don't think so. Yes, of course, teachers are

aware of the college's mission and vision. But as I said, there is no scope there to further their knowledge, to enhance their skills, whereby they could experiment all these new technologies and maybe introduce new styles of learning.

(Teacher A College C)

Vision for ICT? Sorry, I don't know whether we have one or not. Even if there was one [an ICT vision], I don't think people know about it. And all these planning and vision-making are just a waste of time if you didn't have the resources. You can say, you want to have this and that with ICT, but if you didn't have the resources and you did not have the money to buy computers, what's the use? That's the thing. Once we have all the resources, then we can start talking about ICT vision and other things.

(Teacher B College A)

The department has its own IT vision. We intend to at least to deliver the IT knowledge to all staff. The main reason is...if they are not computer literate then everything to do with computer, the burden always comes to us.

(Teacher E College C)

The above data reveals that there was no coherent and shared vision for ICT in any of the colleges – even in College C.

One manager argued that sometimes visions that began at the personal level were not allowed to be born, nurtured and developed. Even when they exist, often they were not aligned with the institutional vision and hence resulting in the slow development:

I believe and I know that education is different [now]...they have a

> vision. I believe why the progress is slow...maybe there were many factors also. For example, no matter how motivated you were, how you tried to push things, there's always this force that is not aligned with your vision. This is why the progress is very slow
>
> **(Manager A College B)**

The views from the participants highlight the colleges' strong desire to opt for more effective use of ICT and for fulfilment of their professional development needs. However, according to them, the lack of direction from the higher authorities (e.g. the Ministry of Education) and the dependency relationship that exists had inhibited the leaders in their colleges to create a clear vision of their own. The problem was aggravated by other issues such as the lack of resources.

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The data also shows that all these ideas about 'vision for ICT' had always originated from the people at the top of the institution – that is the principal and very seldom from the people down below, as implied by the following interview quotes:

> But the staff and the teachers here do not bother about the college vision and mission so much. They just want to have like, being told what to do like – *this is what I am supposed to teach, so this is what I teach*. And they themselves do not make the initiatives to suggest or to propose changes.
>
> **(Manager A College C)**

> As far as the principal is concerned, I think he has some targets or some expectations that all teachers should have certain level of ICT skills. He is

in the right direction. I think he is in the right direction. He has a big vision, good vision for the college. And I am sure he is aware of all these things, and he is working towards it.

(Teacher A College C)

One of the college goals is to link up all these buildings with a local-area network. I think that is our principal's vision. Well, that's why, the principal's overall vision is spread among the six of us, those who are in-charge of these goals. Actually most of these goals have officers-in-charge.

(Manager A College A)

That's why we have to struggle in order to fulfil what the principal wants. [The principal has] got a vision that one day [the principal] would like to propose a degree course for the students in this college. And we were so scared about that, you know. When we look at the facilities, because I just wonder how we are going to cope.

(Teacher C College B)

Actually I myself feel ashamed with all these things, I feel ashamed when my friends start asking me about our college mission and vision. Actually we are not fully equipped down here. But maybe the vision is there. But the only thing is our principal cannot work alone. But as you know, traditionally, we in Brunei, we are good followers, not good leaders.

(Teacher C College C)

6.5.3 Views about the locals – Bruneian Teachers?

The belief that 'Bruneians like to follow what their leaders say' interests me. So I asked a number of participants to elaborate on this to find out if I could obtain a clearer picture.

> Our culture is like that. Most of us are good followers, not good leaders. Whatever our boss thinks is good, and then we also think it is good. Yet sometimes we haven't got a clear idea what is at the top of our boss's head, and yet we try our best to fulfil what our boss wants. That's our main problem.
>
> **(Teacher C College C)**

> Because of our upbringing, in our culture the young people are discouraged to carry conversation with the elders. That was last time, but not now. You see them these children can really communicate. So these are changes and these changes are also in the younger teachers. These teachers have also changed in terms of their attitudes towards IT.
>
> **(Manager A College B)**

Being 'shy' and 'not being open' are just two cultural characteristics of the local Bruneian teachers as described by some of the interview participants:

> But I feel at the moment, I am not brave enough to voice out our concerns. Maybe there will be time, when I can speak up. I think I need a bit more time to speak out in my own way. The feeling is there.
>
> **(Teacher C College B)**

> Because sometimes in the meeting our local people tend to be very quiet, are they not? They just think that everything is okay, even when things are not really okay. It depends on the head also; does he really bring up

the issues of our concerns to the people at the top - our suggestions and so on?

(Teacher D College C)

The above views imply that the local Bruneian teachers are careful when it comes to 'speaking their minds'. They are pessimistic that their voices might not be heard by people from the top or they fear that if they are heard and identified, they might be pursued. Perhaps that explains why the managers acknowledge that their teaching staff seldom come forth with new ideas, let alone share their personal vision and tended to rely on their superiors to make decisions for them. As one manager said,

> Some do [participate in decision-making] while some don't, like everywhere else at the end they would like to let you make the decision for them. Only a few actually try to make their own, which is good.

(Manager A College C)

However, there was one view contrary to the above. This might be a case of a leader with many good ideas within a local context:

> ...we have suggested things and activities to the principal and she listens, she's being open to us. She does make use of the ideas generated through meetings... There are so many ideas but seldom related to IT.

(Teacher B College B)

There were views that many staff were not conscious of the need for change. According to one manager, they took things for granted and always wanted everything done for them:

> Some are very co-operative and offer their feedback, many are simply not bothered. Very often it boils down to the integrity of the staff; their own

> initiatives and integrity. But most of them just care for their salary. They come here, do their minimal work, go home. Sometimes you don't see them; they come to the class and then disappear.
>
> **(Manager A College A)**

The perceptions of the participants in general, were that they were in favour of starting a learning culture that embraces change for ICT. The main challenge, as revealed from the interview data, was the lack of a [shared] vision for ICT. There was a tendency of relying on the leaders to take the initiatives and they lacked commitment to change. This was in part blamed on the negative perceptions and attitudes of the Bruneian teachers towards progress and development in their colleges. Some of the responses received implied the need for serious attitudinal change on the part of the local Bruneian teachers!

6.6 Analysis of Change and Innovation in ICT

6.6.1 Are there any pressures to change?

All participants agreed that their colleges need to invest in ICT either sooner or later. Two of them pointed out how slow the progress had been:

> Of course, there have been some changes, but the progress here is very slow, and you yourself have to be keen and interested in ICT. Otherwise you'll find that there's not much in it for you, if you are not interested then you are not doing it.
>
> **(Teacher D College A)**

> I think they are coming to really focus on ICT very soon. We are aware of the needs of these teachers but it takes time, you know. Like many of the college goals, the vision for ICT might take a long time to achieve. I know my colleague is trying to compile all these information of all sorts and also for our MIS. But we haven't reached that stage yet where we identify the ICT skills of staff.
>
> **(Manager C College C)**

There was a range of feelings mixed with fear generated by stimuli such as "sense of loss", "widening digital gap", "the need to catch up" and that "ICT is moving so fast". The interview data shows that this generates the awareness for the need for the VTE system to respond accordingly:

> You know, it feels like you are in another world moving very slowly. The real world is advancing rapidly, but you are still in isolation. We really lack in those innovative areas. Actually with ICT, we can get new ideas, new projects and things like that.
>
> **(Teacher C College B)**

I mean we are all left behind already. Things change so fast, we are quite behind actually. When I graduated in 92, at that time computer power was not that advanced. At that time we learnt about *Excel* and all the small things like chart. But now it feels like I don't really know much.

(Teacher D College C)

A lot of these changes are happening in Brunei now. IT is happening. Otherwise, you know, I keep saying, "we cannot survive without IT".

(Manager A College B)

So probably we have to react fast. Until now, we have reacted to some of the government initiatives, like ShuTT; we reacted by introducing new courses such as tourism. So now probably we have to react because of ICT by introducing more new courses like 'e-commerce'.

(Manager B College A)

Interview participants believed that every one in the college should play his/her part and recognise his/her role in the process of change. Some carried the cultural expectation that changes should be initiated from the people at the top and transmitted to the staff in the colleges through their principals:

> We must have leaders who have the energy, to really push it, really go through it, really committed to it. But often we find that one-year a leader operates full drive, next year he or she is transferred.

(Manager B College C)

> I can see that our Deputy Director has a strong interest in ICT. Even during the programme and development committee (PDEC) meeting, he

once said things like, '*we need to include ICT in the curriculum*' or '*we cannot ignore the national initiatives such as RAGAM21*' and that sort of thing. But it also depends on the administrator. If the administrators are IT-people then definitely they will change their attitude towards ICT. But so far, I imagine mostly are not.

(Teacher E College C)

I think, the college is aware of the need for ICT. I am not so sure what are their current limitations, but the college is aware and they know that IT has to come one way or the other. It's only a matter of time, perhaps. But as far as teachers are concerned, they are aware that ICT has a role to play. I mean they believe in the new technology and they are aware of it of what ICT can do. I guess and I do believe that the driving force is not only among teachers, it has to come from the principal and from the administration [DTE] as well.

(Teacher C College A)

As the above quote implies, there are political challenges to overcome when it comes to dealing with the leaders within the VTE system.

There seemed to be no thrust to initiate change from within the VTE institutions. If any, it was only from a small number of enthusiastic individuals. It was not surprising, therefore, that the perceptions and the views the interviewees were confined to the use of 'personal computers' – either the use of their own personal machines (e.g. laptops) or the limited number of PCs that were provided by the college. As what is evident in section 6.3 on the current utilisation of ICT, the use of simple application software and hardware in the college suggests that the lack of ICT facilities in

the three VTE colleges was cited as one of the main barriers to development, but there is a confluence of factors to create a situation receptive to a led-change.

The pressure to change might also come from the students. According to the following participant, teachers sometimes are left with no choice but to consider developing or equipping themselves with the necessary ICT skills because their students are perceived to have "better" skills or more knowledge of ICT:

> We teachers, sometimes as a human being, always carry the notion that "teacher knows it all". But in reality, that does not exist. Maybe they will not admit to you openly, but if you meet them in the corridor, they will admit like saying, "*I do not know how to do this and that, I feel quite embarrassed sometimes because students can do better than me*". That, I think, is a form of confession that if you do not have the ICT skills, you feel left out.
>
> **(Manager A College B)**

Another manager perceived that the younger teachers in the college were the main agents of change:

> by the look of the pattern, the change is initiated at the bottom and then generated to the top. Because, as I said, the young teachers are full of ideas, they want to change. They want to move on.
>
> **(Manager B College B)**

As noted earlier in section 6.3.2, there might be no immediate plan to fully integrate ICT into the curriculum. However, when I asked the participants

on the scope or possibility for curriculum change, seven participants provided their optimistic views. I have categorised them as follows:

Three said *'yes, it is possible'*:

> In my subject area, I think there are a lot of things where IT can enhance. For example, there is this package, I can't remember its name now - it enables you to show things like teaching aids. And there are others, for example in the building architecture area there are software for example, for building a house, you can show from bottom-up, and various other features. You can use that for teaching. What the sequence or procedure is, whether it's foundation first or... and then it enables you to put labels on the graphics and so on. IT helps to motivate the students and improvement in our teaching.
>
> **(Teacher D College C)**

> We probably have to look at our Business Management module. Probably as an 'add-on' we might include 'e-commerce' as one of the components.
>
> **(Manager B College A)**

> It could be just enhancing certain areas - maybe diagrams, graphics, and simulations and so on. That one hasn't been identified clearly. So teachers have to know, where this ICT will be able to enhance the students' learning. If you cannot identify that then it becomes simply that tool, no matter how good they are, it may not be effective.
>
> **(Manager B College C)**

While four seconded the need for change: *'yes, the curriculum should be changed'*:

And since you brought up the issue of the content of the computer studies in our curriculum, probably we can now review and go into some more specific areas. Yes, I personally feel, as I said I have only been here for three years, it must be changed because when I looked at the content, there should be a module on database, as far as computer is concerned. For example when we move higher up, I would have thought, on the third year, they should be able to handle spreadsheets and they should be very good at it and then things such as the management information system (MIS).

(Manager C College B)

With regards to the use of the Internet and emails, yes that is true. They are not yet included in the present unit. That's why I feel we need to review. Within the last two years, I think, ICT has been more aggressive

(Manager A College B)

Our national diploma computer studies, in my view, are very old and it's time for revamp. Because the computer studies syllabus is too general and outdated I would say. They have been doing the same thing over and over again for so many years. I think there will be some input on ICT into this curriculum next time. That's where it will go, I suppose.

(Manager A College C)

If they are to use ICT, there must be some changes in the curriculum that allows for ICT to be used. If there are no changes and you continue to use the old curriculum and try to, it would be difficult. Because the content of the new curriculum will be quite different.

(Teacher A College A)

6.6.2 Identifying ICT Champions as Agents of Change

The main agents of change identified in the three colleges were the younger Bruneian members of staff especially the new graduates who had joined the teaching profession. A majority of these new Bruneian graduates had their higher education and training in the United Kingdom and they have brought back their broad and wide experiences in the use of ICT in UK's higher education. Managers in the three colleges were hopeful that the skills and talents of these new and young teachers could be harnessed to set the momentum of change going:

> I can tell you, compare to previous staff members [older teachers who are mostly non-graduates], I mean, now we are getting graduates. And they also have the realisation that they have to deliver something to the country. So now they are making a lot of efforts.
>
> **(Teacher A College A)**

> I am very lucky to have such dynamic staff here. They are all very good, especially the still young ones, they are full of ideas, especially those that came back from the UK. From there we can actually create and develop ICT and see its practicality in the context of this college
>
> **(Manager C College B)**

> Our new teachers, they already acquired the skills, especially when they are abroad, studying in the UK or other places. So they have been exposed to the use of computer. And even maybe one of the modules is computer study or whatever, when they are abroad.
>
> **(Manager C College C)**

The UK case studies presented in Chapter 5 may therefore provide stimulus to change as examples of the achievable. To illustrate the point, the following quote came from a local (Bruneian) nursing teacher who shared her knowledge and experiences from her former training in the UK:

> The Ministry of Health should use IT in the area of patient-care. The use of ICT or the use of computer...not just blood results or whatever...that's one example that employs ICT. We could employ also ICT on patient-care. Most nurses work on paperwork, consequently lack of communications between nurse and patient. Yet whatever is done is paperwork and sometimes...clerical work...it is more effective if we use ICT. I mean, nurses in the UK...practise what I've just described.
>
> **(Teacher B College B)**

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Other identified agents are the foreign experts that came to Brunei Darussalam from abroad to work as teachers. The majority of these so-called expatriate teachers have had years of work experiences, possibly teaching in other countries. The general expectations were that they could share or impart their knowledge and skills to the local teachers. One manager observed that innovative ideas were often synergised from these 'experts':

> People come up with many different ideas. And then we get people from abroad [expatriate teachers], we have probably about twenty percent still they come up with their ideas. So I won't say we are short of innovative ideas in this college.
>
> **(Manager A College B)**

However, as one participant said, locals need to take extra initiative to rk hand in hand with the expatriate teachers:

> Locals have to be more active than expats. Because, ultimately they have to do the job, isn't it? So the earlier they do the job, the better it will be. Because over a period of time, you'll see that expats are being phased out, isn't it?
>
> **(Teacher D College C)**

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Other potential agents of change identified in the three college are the few T champions in each of the three colleges. The interview data revealed that ese 'experts' were often mandated by the principals to oversee the ICT eds (e.g. software and hardware requirements) for the college and were avily 'hired' not only by the staff in the college but also by the Department of chnical Education as well by servicing other organisations through their nsultancy work. Their positive attitudes towards ICT might be used to luence others strongly – in other words, leading the change. Here are the edentials of just three of these ICT champions put forth by the interview rticipants:

> We do have one IT expert here, [the person named]. He is our main reference person. But we also need to move on with ICT. We especially need more computers, then....
>
> **(Teacher B College B)**

> last time we were alone trying to encourage change. Now people are being moved around, and luckily we have one active person here, [the person named] so now we can do it [change initiative].
>
> **(Teacher D College A)**

[The person named] is now seconded part-time to DTE. He is doing the planning there, to look at DTE's needs for ICT. So I presume, the plan includes the institutions. But at the moment, I think, he is concentrating on the DTE MIS system.

(Manager B College C)

Now [the person named] is posted to DTE twice a week, trying to set-up the MIS, and now they have the Internet and everything. They are trying to do more ICT things over there. But it takes time because of lack of expertise. It's only him, plus a few people who are supposed to be IT-literate. But they've been there for so long doing routine work, so their thinking is not towards IT. So he faces this difficulty. So in actual fact, he is still alone. Plus [another person named], helping him analysing the system and implementing it bit by bit. There is yet to be a proper team, they don't have a team.

(Teacher E College C)

At this moment, he is doing all he can for DTE as well. I think he is alone. He is also a member of this computer procurement for our ministry. I think you should interview him because he is more knowledgeable in terms of ICT planning.

(Manager C College C)

In response to the above quote, I did try to chase after him many times and on several occasions. Unfortunately, due to his work commitment, I had not been able to interview him.

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Finally, the many computer-using teachers, especially those who use ICT at home and those who brought in their own computers and laptops might be able to exemplify their attitudes towards ICT and disseminate their knowledge and skills in the colleges and become role models to those who are not yet like them as advocated by the following participants:

> But mind you, most of the local staff that I know, they've got their own computers at home, they are all linked to the Internet, so these are potential change agents in this college
>
> **(Manager A College C)**

> In this college, the main agents of change are the individual IT enthusiasts themselves. For example, our principal is one of them. He is very good. He is very dynamic too.
>
> **(Teacher E College C)**

As the previous quote implies, the heads of the college, e.g. the principals, have a significant role to play in leading the change. Although the role-modelling technique might require a 'formal' process to facilitate changes, there is still a greater challenge which requires addressing – the local culture!

6.6.3 Identifying Strategies for Change

The focus of this section is on the strategies for change – what the teachers and managers might do in their colleges in order to introduce or encourage change in the system. For example, one strategy identified from the interview data might be access to powerful or key people within the system with the strong influence on the local culture. As one participant puts it, "it is not what you know but who you know that gets you to places":

> and especially in Brunei, the family structures are especially we are practising this what they call extended family. It happened say, oh my first cousin or second cousin or related to my wife, related to my brother-in-law, all these make a difference. That's my personal experience, it makes a difference.
>
> **(Manager C College C)**

> I think the top people; the people who are in the council have to raise the issues up. Because like in our department, our HOD always go for the department meeting, and then he only listened to us, this and that. But I don't know whether he brought it up to them and how much the other people notice it.
>
> **(Teacher D College A)**

> ...it also depends on you as a person, who you work with, and then your peers, these are all very important and of course you have to have the support also, political, whatever, the people above you within the organisation, I think it's very important. If they are not supportive, no matter how good your project is, because I have seen this, it didn't work.
>
> **(Manager B College B)**

Another strategy might be by creating an environment that is conducive to change. For example, one that promotes the sharing of knowledge and skills, as noted by the following participants:

> We always share the knowledge, whatever there is to learn today, the knowledge is shared although not formally, but it is done. Information is passed around and we discuss things. Some experts share their new ideas perhaps, and then we'd like to see if we could apply in our context or not and things like that. And yes we do discuss that. We do share our knowledge. And yes, that is going on as far as knowledge sharing is concerned.
>
> **(Teacher D College A)**

Creating a positive environment also implies improving the resource environment:

> I think, if there are no other resources like typewriters but computers everywhere, then they have no choice but to learn it, in order to survive, I think the people here will only embrace ICT if they are forced to change. Otherwise things will take time because people will just take it easy.
>
> **(Teacher E College C)**

Creating the environment also means allowing people access to training for updating new knowledge and skills. However, this also implies more money will be needed for resources and also for on-going professional development:

> Teachers need to keep up to date with what's going on and also enhance better performance in their work. Can you imagine them still writing on their transparency? It wouldn't reflect very well on their students, would

it? Because students asked for advice sometimes, that's why I said, teachers have no choice; they need to update. Imagine if students asked "I would like to install this and that" and teachers lack knowledge then teachers feel shy although they don't admit it, I mean this is human nature.

(Manager A College B)

I think you also have to master the skills; you need to learn it first. Once you got the skills then you go on to do the next stage, otherwise how do we improve things here? Because at the moment it appears to be stagnant.

(Teacher D College C)

There might be a need to address seriously the negative attitudes of the teachers. The interview data revealed that many VTE teachers were not conscious of the need for change or it might be that they were denying the need for it. In this respect, they might need to address changes in the way people think about ICT – all negativity and limiting factors about ICT need to be kept at a low level so that the staff can be motivated and challenged to move ahead with the process of innovation in ICT. The vision of one manager might generate some enlightenment:

Some people think that ICT takes you away. There are disadvantages, but I don't think so. Of course, the elements of control have to be there. Because I look at ICT this way. I know sometimes planners have a lot of limitations. So they tend to restrict their visions. I am never like that. I always look at the focal point, where I think we are going. Like at the moment, some people, even in this college, they say, "Brunei is very small". I don't think we are. Say in five years time, we already reach half

a million. Now from the half million, we talk about the college as a manpower development for the health service. I don't just look at Brunei, because I believe Brunei has a lot to offer. Not only to Asean, but also to the whole World. Maybe some of our contacts through the national writings, my readings also, through the literature, now I see some countries, like even the middle east are coming up. They are doing things differently from us. So I believe, if we focus our planning to just on the notion of 'we don't need that sort of technology, therefore...', it will be very limiting. That will be a terrible mistake. There will come a time later, when you reach that five years, you are totally unprepared. Although ICT is very capital-intensive but in the long-run, you gain. And your people gain. We want that. If you want to look at the best in people, I mean this is the place. If you don't have the technology, it's very time consuming and it's very expensive in terms of man-labour. Time is money. So these are our current constraints. I mean those are our limitations especially in terms of the resources.

(Manager A College B)

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6.7 Barriers to Change and the Process of Innovation

From the analysis of the findings presented above, several factors might be identified as inhibitors of the process of innovation in the three colleges. They will be summarised below together with more supporting evidence from the interview data.

6.7.1 Lack of guiding policy and clear vision of ICT

I came to this conclusion because when I asked the interview participants of the existence or of their awareness of any colleges' policy and/or vision for ICT, a range of negative responses were received:

> No, I don't think DTE have either a vision for ICT or a policy document of how ICT should be used in VTE institutions. I don't think there is any. Maybe there is a bit here and there.
>
> **(Teacher E College C)**

> With regards to policy in the use of ICT, I think there is no such thing. Maybe it is there somewhere, but it is not widely known to people or maybe they are trying to get somebody who would be prepared to propel this particular policy to be made available. But trying to implement such a policy, at the moment, I think, is not possible.
>
> **(Teacher C College A)**

> But so far we haven't got a college policy, for example on exactly how they should use the Internet.
>
> **(Manager A College C)**

> I am not aware of any written policy with regards to ICT. I don't remember. I don't know whether there is or not...but I don't remember

anything about ICT. Maybe the principal in the meeting does stress about this thing.

(Teacher B College A)

Policy statements? We don't know anything about policy related to IT statement. Well, of course, you do hear about these things that we better expose to learn IT but it will be okay if we all had computers.

(Teacher B College C)

I also know who these staff are in the department, who are fully aware of this ICT. But then again, there is no clear-cut policy to do something for development in this area. And, I personally think, one of the reasons is maybe the lack of resources.

(Teacher A College A)

But there's no policy to say that everybody must be IT literate. Maybe in the future, may be it is important, in the recruitment to say that 'you must be IT literate, you must know how to use *Word*' and so on, maybe that one we will support in the future.

(Manager B College C)

How can the teachers help the institutions focus on ICT? We don't have the correct vision to develop the ICT. Unless they are already experts.

(Manager A College B)

6.7.2 Lack of funds/budget

What I learned from the four managers of the three colleges was the process of getting the annual budget from the Government. The annual budget for the VTE colleges was handled by the Department of Technical

Education (DTE) and controlled by the Ministry of Education (MOE). According to them, the budget for the expenditure for the year 1999-2000 was severely reduced to less than 20% of what was received the previous year. As a result, there was limitation in the provision for resources – not only in terms of ICT facilities but also of human resources for teaching and technical support. The frustrations of the participants were clear from the way they expressed their views on this issue:

> Take *Construction Department* for instance. They are supposed to be learning *AutoCAD*. In fact, it's written in their curriculum. But there's nobody to teach it, and there are no computers for them to use! And that's been going on seven years since I've been here. They should be getting *AutoCAD*, and they are not getting it. Because the resources aren't there and there is no staff that can teach it.
>
> **(Teacher B College C)**

> ITB, I think, no problem. They've got all the computers. In UBD you have your own budget, but how about us? We have limited budget, what can we do? It's even worse. Easy for some to say do this and that. But when you do it without the resources actually it is difficult.
>
> **(Teacher B College A)**

> We've been trying to get a computer lab for our department...since they started the course two or three years ago. And we are getting nowhere. We've been asking for resources repeatedly...it's the same reply - "no budget".
>
> **(Teacher B College B)**

> Our plan was to inter-link this campus by local-area network, but now I

think it's not going to happen. I don't think we'll be able to achieve it. We've only managed to LAN this administrative site only. That is completed. But for the whole school, it's not going to happen. Because, I think it will be more costly to try to link up all these departments.

(Manager B College C)

6.7.3 Inadequate 'local' experts or skilled personnel

The lack of budget might also affect the operation and management of the VTE system. As the following interview data implies, the lack of technical and skilled human resource had generated other issues such as 'staff borrowing' and staff being moved around from one VTE institution to the other, albeit within the Department of Technical Education:

The other day a few of my staff attended a course on developing multimedia-learning resources for technical education at SEAMEO-VOCTECH. Three of my staff went for that training. Now they want to take them part-time at PDS [PDS = Programme Development Section at the Department of Technical Education] so that they can develop these learning resource materials for multimedia.

(Manager B College C)

In our section, we have one computer and it's for all staff. We've got let's say three staff, actually four but one of them has been transferred to another section, and they've got their own computer there.

(Teacher B College B)

6.7.4 Ineffective Staff Development and Training Programme

The main factors identified as barriers to effective training in ICT and for

staff development were the lack of physical and human resources and lack of support that arose from the lack of budget. However, teachers' attitudes and commitment towards training programme activities might also be contributing factors as implied by the following interview quotes that speak about their use of time:

> Of course, given the opportunity, I would like to do more of IT training. But at the moment, I am so busy. Actually, I would like to, I mean to go for further training in IT if I got the opportunity. But because of too much work, I simply cannot give time on that right now.
>
> **(Teacher C College B)**

> I think... how easy is it to get, one thing is resources...I mean how easy is it? If it is easy then, there might be a chance and secondly, time and commitment. If there is time, commitment and interest and time, if they are very keen, they have time to do this and that...
>
> **(Teacher D College A)**

> we give them training, but in most cases the training ends just like that. I can see that most view training as a one-off thing. They don't really use it. For example, if we ask them, "have you done publisher?" A possible answer might be, "yes, but I did it long time ago, I haven't really used it for so long". You see things like that happen. So the drive to follow-up to 'training' does not exist. One thing is maybe because of the lack of computers. Maybe if the computers are everywhere, then maybe they might use it.
>
> **(Teacher D College C)**

5.7.5 Teachers' Resistance to Change

Resistance to change especially among 'senior' or 'older' members of staff was perceived by the following interview participants:

> I think you need to know how to use the computer, to do reports, minutes and so on. But some staff still use typewriters. It's hard to believe, but I can tell you confidently there are one or two that I know here who are still using typewriters.
>
> **(Manager A College C)**

> Those old teachers...if they are using typewriters, I think we need to be very careful to not even make statement such as 'why are you not using computers?' It's an insult to them.
>
> **(Manager A College B)**

> With the older people, it's very difficult when it comes to change, as you know, even in the administration the older generations are still taking hold of their position. They won't accept the notion of the need for change. I mean some sort of like, their pride is still there. Who are you to speak about ICT? I mean, even the lower position, they simply think that as if that you are teaching them, and they don't like that.
>
> **(Manager A College A)**

> I said to them 'if possible, avoid producing notes that are handwritten. Everything must be word-processed and then you can give it to the students, and so on'. But in certain cases you can still people have their notes handwritten. ...they use the easier way out, the easier part for them is this - all you need to do is buy a transparency, write on them, then place it on the projector. If they have to use IT then they have to come

here, queue up to use the printer, sometimes have to deal with errors and mistakes, too many hassles. All these put certain people off.

(Teacher E College C)

The picture that emerged from the analysis of the interview data was that in general VTE teachers were competent with basic ICT skills such as the use of the word processor. However, the data also revealed that they were less competent with the more advanced use such as the Internet and that they were not motivated to take steps to change. As one teacher said,

> Most of the staff members you see the maximum they use the internet just to read the newspaper or send the email. That's the maximum. But they are not really making any extra effort to make use of this internet to get information or to write or develop resources and which I found this very straight forward and very easy…

(Teacher C College A)

One manager perceived that his members of staff have serious attitude problems and gave examples of their refusal to take steps to change:

> And very often if you ask them for feedback, you know, for example if you send out a questionnaire to them, you'll be lucky if you get half of them back, some just don't respond. They might fill in the other details, those simple ones. Anything they find difficult to answer, they just leave it blank, which is the response you might get next time when you give out your questionnaire. I find that kind of character very difficult to understand.

(Manager A College C)

6.7.6 Lack of Sharing of Knowledge and Skills

The interview data revealed that the present level of knowledge sharing is low and if there was any, it only happens informally at the individual level. One manager said,

> I could only say this based on my three year's experience here. With all due respect, the contribution of staff in terms of 'sharing of knowledge' is very very small. When I said 'very small', I am comparing it with my previous place where I work. So I can give you that as an example. In my previous organization, !f somebody has attended a course somewhere elsewhere, I made them share what they have gained from that course, so I organised a day or one hour or one hour and a half, short seminar. I'll be sitting there and all the teaching staff will be listening what they could share. This has not happened here at all. But I am in the process of introducing it. That is one area that needs changing.
>
> **(Manager B College B)**

Typical supporting view from a teacher:

> So I am telling you, the challenge is not there, as I mentioned before. Also, I mean automatically, nobody is going to work for change to happen. They need to be in an environment where they can be challenged. You'll find that in some people, the exceptions are always there, but others simply don't care. Committed people always look for high quality work. They do, but there are only very few of them here. And we want to achieve something, yet there is to be a follow-up, and there is no system. But until as you force people to do that, nobody will do it on their own.
>
> **(Teacher A College C)**

In one interview transcript, the notion of "*kau kau aku aku*" or "you do your own thing, while I'll do mine" was evident – another characteristic of the local culture. This is one of the many negative attitudes that need to be addressed. Further, lack of communication exists in some departments:

> In this department, the environment is quite okay. The people are quite friendly and they help each other. But when you go to other department, why I am saying this is because I have attended meetings and I found this problem of communication exists.
>
> **(Teacher A College A)**

6.8 Conclusion

From the analysis of the foregoing interview data presented in this chapter, several interim key findings might be drawn out in relation to the issues of change and ICT innovations in the three VTE colleges. These are summarised as follows. The study revealed that in summer 2000:

- There was yet to be a clear vision for ICT, let alone a strategy or any operational policy to realise the vision for ICT. ICT was yet to be placed on the agenda for change and hence its progress of development at the institutional level was not obvious.
- The priority for ICT development was focused on the supply of college resources and ICT facilities, in particular, the provisions for the colleges' local-area networks. Although the emphasis was on the development of the ICT infrastructure, the lack of budget had impeded the progress of development in this area. Supplying the college with ICT facilities appeared to have taken precedence over other needs such as teachers' need for skills and knowledge developments.
- The use of ICT among VTE teachers and managers was relatively low and was focused on a small range of ICT, predominantly productivity tools such as word-processing and spreadsheets. Beyond this, only a few teachers made use of other ICT resources such as CD-ROMs, Internet and Emails.
- With the exception of a small range of VTE courses in one college, the use of ICT for supporting the delivery of the VTE curriculum does not go beyond the preparation of teaching materials and the equipping of VTE students with basic ICT skills through practical teaching. The use

of ICT to deliver other curriculum areas, apart from computing subjects, was not available in two of the colleges.

- The lack of access to the essential ICT facilities is the main barrier to effective use by VTE teachers and managers. To alleviate the problem of lack of access, initiatives such as fund-raising activities had been put in place to help generate income to purchase computers for teachers.
- The lack of ICT resources exacerbates other issues such as having to cope with an increasing number of students, teachers' frustration and ineffective staff development and training for ICT.
- In spite of the lack of ICT facilities in their colleges, VTE teachers and managers in general, place a high and positive value on ICT and they all recognise the potential benefits that ICT might bring to them and to their students' learning.
- VTE teachers have limited access to training opportunities in ICT. In-house training in basic ICT skills was provided only in one of the three colleges. The main barrier to in-house training was the lack of resources – both human and ICT facilities. Access to training outside the colleges was even more severely restricted due to the lack of budget for staff development.
- There is a group of committed staff who use their own resources and are competent at a higher level and introduce innovation in their own classroom – i.e. they promote change within the bounds/limits of their authority/control.
- Most people look to others, higher up to promote change and to tell them what to do.

Chapter Seven
Data Presentation and Key Findings from the Questionnaire (Autumn 2001)

7.1 Introduction

In this chapter the data and key findings from the questionnaire will be presented. Data analysed was obtained from the questionnaire administered to teachers and managers in six Vocational and Technical Education (VTE) institutions in Brunei Darussalam in November 2001. Note that the data from one of the seven VTE colleges (College G) was not available because none of the questionnaires distributed in that college was returned. The results of the analysis will be presented in descriptive form as well as in numerical and tabular forms for the purpose of cross-checking and validating the findings of the interviews which were presented in the previous chapter. To facilitate the presentation of the key findings, all of the tabulated results associated with this chapter are compiled in appendix F.

For the purpose of comparing and giving possible explanation for any convergence or divergence of data, the presentation of the data and key findings will be organised around the following themes:

- Characteristics of the respondents
- Utilisation of ICT
- Staff development and training
- ICT strategy

7.2 Characteristics of the Respondents

7.2.1 Respondents from Colleges A, B and C

A total of 75 questionnaires were distributed to the three Colleges A, B and C. The detail of how the sample was selected has been explained in the chapter on methodology – see chapter 4 section 4.5.4. The overall rate of return was 60%. The actual number sent to each college and the corresponding return rate is shown in Table 7.1 in appendix F.

One questionnaire from College B was discarded from this group because of non-completion. Therefore, the actual number of questionnaires used for analysis was 44. This figure satisfied the original target of reaching about 20% of the total teaching population in the three colleges. 27 respondents (61%) were male and 17 (39%) were female. The gender balance does not reflect the total population from which the sample was drawn. This was because of the wide variation in the male/female population in each of the three colleges.

Table 7.2 (see appendix F) shows the frequency distribution of the respondents into different age groups. Only 11 respondents (25%) are below 36 years old. This age group is of interest because the respondents within it might have been introduced to ICT during their earlier years in colleges or higher education, either locally or overseas. Hence they are more likely to be users of ICT – see section 7.3.

Table 7.3 (see appendix F) shows the frequency distribution of the respondents' teaching position and titles they hold in their colleges. Education officers, lecturers and tutors were grouped together

because they are equivalent in terms of level of appointment and salary scale. Their differences only exist in names and titles given to them which vary in different colleges.

Table 7.4 shows the categorization in accordance to their managerial responsibilities:

- Heading a department or a section or assisting (e.g. HOD, HOS, AHOD, AHOS)
- Tutors (e.g. group tutor, semester tutor, year tutor, students tutor)
- Coordinators (e.g. group coordinator, programme coordinator, subject coordinator, course coordinator)
- senior management (e.g. registrar)

25 respondents (57%) are teachers who have in-college administrative or managerial responsibilities in addition to their teaching duties. Out of this, 13 (54%) respondents were coordinators, 5 were at senior management level, 4 heading a department or section and two were tutors.

Table 7.5 shows the number of years the respondents (including those teachers who have in-college administrative or managerial responsibilities) had been in the teaching profession. In the case of non-local teaching staff (or 'expatriate' teaching staff), the number of years might include at least five years of teaching outside Brunei Darussalam as that is one of the requirements prior to teaching in the country. The result shows that more than 95% of the respondents have at least three years of teaching experience. The two 'new' teachers were locals (Bruneians) who were still in their 3-year probationary period. Confirmation of terms of appointment for

locals normally takes place after three years in the teaching profession. The result also shows that more than half of the respondents have been in the teaching profession for at least 10 years.

Table 7.6 describes the respondents' educational and/or professional qualifications. It is evident from the figures in the entry that the respondents have indicated more than one qualification. In most cases, respondents only indicated their teaching qualifications in the entries to the questionnaire. However, those who have had no teaching qualifications had indicated their highest qualifications in lieu of teaching qualifications.

Table 7.6 also shows that at least 75% of the respondents have 'teaching' qualifications (e.g. CertEd, PGCE etc). With the exception of one or two recent graduates, all of the local (Bruneians) respondents have a teaching qualification. This is because it is now compulsory for all newly graduated VTE teachers from these three colleges to take up a teacher training qualification. The other 11 respondents (25%) have a degree with an 'education' component (e.g. BEd or MEd) that might be counted as a 'teaching' qualification.

10 (23%) of the respondents are expatriate teachers. This is evident from the places they had indicated where they had taught prior to taking up employment in Brunei Darussalam and the fact that none of the local teachers have taken up teaching employment outside Brunei Darussalam. The detail is shown in Table 7.7. Tables 7.8 and 7.9 describe the respondents' current level(s) of teaching. Table 7.8 gives an overall picture; Table 7.9 shows a cross-tabulation for the purpose of comparison between colleges. Note that,

depending on in which college one is serving, it is possible for a VTE teacher to teach more than one level or to teach more than one unit.

All 11 respondents in College B taught only one level – Diploma in Nursing. There were no pre-diploma or diploma courses in college A as it only deals with trade and craft level courses. However, a small number of trade level courses still exist in college C, but according to one of the managers during an interview in June 2000, these will soon be phased out and be transferred to the vocational schools (college A is one of the vocational schools).

7.2.2 Respondents from Colleges D, E and F

Table 7.10 shows the response rate of the questionnaires distributed to colleges D, E and F. Two of the questionnaires (one from college D; one from college E) were discarded due to non-completion, so the total number of questionnaires for the purpose of analysis was 42. Out of this 36 (86%) respondents were male and 6 (14%) respondents were female.

Table 7.11 shows the frequency of the various age groups of the respondents. 45% (19) of the respondents were under 36 years of age. The result also shows that there were more younger respondents in this group of colleges compared to the other group (Colleges A, B and C).

Table 7.12 shows the respondents' teaching position in their respective colleges. 25 respondents (60%) have in-college managerial responsibilities in addition to their teaching duties. Out of this, 10 were heads of departments or sections or assistants, and 9 were coordinators. The breakdown of the

various types of managerial responsibilities is shown in Table 7.13.

More than 73% of the respondents have had at least three years of teaching. This is lower compared to the other group (A, B and C). This can be explained in terms of the high percentage of younger respondents in this group (D, E and F). At least 45% of the respondents have teaching qualifications. This figure includes all of the respondents in colleges D and F. The rest of them (all except one in college E) entered the profession without having the need for a teaching qualification. Teachers in College E were employed as teachers by virtue of their academic qualifications – I know this from my experience as one of the teaching staff in that college. Hence it was not surprising to find that out of 16 respondents from college E; only one has a teaching qualification. This is also evident from Table 7.15 which shows the detail breakdown of the teaching and professional qualification of the teaching staff for each college.

More than half (56%) of the respondents in college E and all of the respondents from college D are locals (Bruneian teachers). Therefore only 9 (21%) of the respondents were expatriate teachers. See Table 7.16 for the places they had taught prior to their taking up employment in Brunei Darussalam. The widely varied number of expatriate teachers in each college can be explained in terms of the level of courses offered in each college as shown in Table 7.17. There are more expatriates teaching higher level courses in college E (HND and degree levels courses) compared to both colleges F and G, which deal only with craft and trade level courses.

7.3 Utilisation of ICT

7.3.1 Results from Colleges A, B and C

Respondents were asked if they used ICT for work. The overall response shows a high percentage of users (86%; 38 out of 44 respondents). However, the pattern varies in each of the colleges – see Table 7.18.

The percentage of ICT users is high in college C (96%) when compared to college A (70%) and college B (82%). This might be explained in terms of the availability of ICT resources and the level of access to these resources in each college. The findings from the earlier studies did point to the fact that college C was better in terms of access to hardware (see 6.3.5). College C had better facilities in terms of ICT resources; while college B was the least resourced by comparison. Even so, a high percentage of the respondents from colleges A and B (70% and 82% respectively) did use ICT for their work.

Table 7.19 shows the number of ICT users in relation to the different age groups. 11 respondents (25%) are below 36 years of age. This age group is of interest because the respondents within this age group might have been introduced to ICT during their earlier formative years while attending colleges or higher education, either locally or overseas, and therefore are more likely to be users of ICT.

Also the result shows that all but one (91%) respondent in the 25 – 35 age group are users of ICT. The pattern up to the age of 45 supports the assertion that the younger members of staff are more likely to be users of ICT. Further analysis revealed that all six respondents in the 46 – 50 age range

were managers which necessitated using ICT as an essential managerial tool.

Table 7.20 shows the summarised result to the question directed to the users of ICT – "*how would you describe your level of competence?*"

The result shows that 3 out of 38 users of ICT (8%) respondents described themselves as highly competent users, while another 3 considered themselves as not yet competent. 11 (29%) of them saw themselves as just having basic competence while the largest cluster (55%) i.e. 21 of them described themselves as competent users of ICT. All 24 respondents who saw themselves as either highly competent or competent were below 45, supporting the assertion made earlier regarding younger staff being more likely to be users of ICT.

Table 7.21 shows the frequency of use of a range of commonly available ICT resources while Table 7.22 shows the frequency of the place where the users normally use these ICT resources.

Use of Office Tools (e.g. Word-processors and Spreadsheets)

The result in Table 7.21 shows that there is a very high percentage (97%) in the use of productivity office tools such as word-processors and spreadsheets. 71% of users claimed using these tools on a daily basis. The use of these office tools is high in the staff's workplace or office (79%) and also at home (71%) (See Table 7.22). 41% of the respondents gave "*resources are not available*" as their main reason for lack of use while 34% gave their reason as "*resources are not accessible*" (see Table 7.23). Almost a quarter of the respondents (24%) make use of the Computer Labs to access

these office productivity tools. Therefore it is very likely that those who use these tools at home tend to use them in their workplace or office too. These figures also include those that brought their own laptops or machines.

Use of the Internet and Email

Table 7.21 shows that the use of these ICT resources is also relatively high among users (79% for the Internet and 80% for Email). 45% of these users used the Internet on a daily basis while 24% used it occasionally. The use is higher at home than in the colleges (See Table 7.22 – 74% and 71% respectively for home use Internet and email compared to 8% and 11% office use). Once again, this was because of the "*lack of access*" to these facilities in the work place.

Use of Educational CD-ROMs, Simulation/Modelling Software

66% of the users claimed using educational software on CD-ROMs (see Table 7.21). However, most of them claimed using these resources for personal use rather than for teaching or to support students' learning (29% office use and 42% home use for educational CD-Roms) and relatively low percentage use in the classrooms or computer labs (5% and 3%) – see Table 7.22. The result also shows that these facilities were only used by 53% occasional users.

The use of simulation and modelling software was also low and rare – that is, 37% of the users and out of this, 32% use them only occasionally; 63% never use simulation and modelling software. Once again the result points to the low level of use in the colleges and mostly for personal use – 16% office users and 24% home users.

The above results were consistent with the findings from the interviews that the level of use of ICT in the three VTE colleges was low (see chapter 6 section 6.3.1) in that the use was predominantly limited to the use of productivity tools such as word-processors and spreadsheets.

Table 7.23 shows the reasons given by the respondents for the lack of use in their work in the colleges. 18 respondents (41%) gave "*resources are not available*" as their main reason, followed by *"resources are not accessible"* (15 respondents; 34%). 25% of the respondents admitted that they lacked ICT skills which implied that 75% of them might have at least some basic skills.

Some of the *other* reasons given by three respondents also relate to the lack of access due to shortage of physical resources:

> There are only two computers available in our section. We have more than 13 staff in the department... ie we need more computers... because we all need them (ICT)... I use computer etc...to prepare teaching notes, lesson plan etc...
>
> resources not enough
>
> no line (internet email)

So it can be deduced that the 'non-availability of resources' which leads to the limited access was the main barrier to full use of ICT in the three colleges, although 'lack of skills' was also a major element. Another deterrent to use was the lack of technical support – (18% of the respondents). Once again, these results were consistent with the earlier findings of the interviews (see 6.3.4).

66% (29 out of 44) of the respondents said there was nothing that discouraged them from using ICT. Even so, out of this, four commented

primarily on the need to improve the ICT provision in the colleges. Eight (18%) of the respondents did describe things that discouraged them:

- One of them felt that the support from above (higher authorities such as the MOE and DTE) was not enough;
- Two pointed to the lack of access to facilities and ICT resources while one admitted having to use his/her own resources to buy a computer;
- One was discouraged and 'frustrated' because of the frequent computer breakdowns due to old and slow machines;
- Two felt 'lack of time for ICT' as a de-motivator
- Two felt lack of skills and knowledge of ICT discouraged them.

66% of the respondents gave their views on the factors that encourage their further use of ICT – out of which six different categories were identified, summarised in Table 7.24. Once again, access to and availability of resources topped the list followed by their need for training and staff development. Surprisingly, technical support in terms of technical expertise or helpdesk did not appear to be one of the factors.

In general the respondents had a positive attitude towards ICT. Although more than half of them (59%) believed that their colleges had a positive interest in ICT, 91% of the respondents however disagreed with the statement "*computers scare me*" and similarly 91% disagreed with "*I wish ICT had never been invented*". A majority of them (86%) believed that ICT would make their work easier and that ICT helped them to communicate with their colleagues (73%).

Many of them placed a high value on ICT – for example, 75% of them

agreed that ICT helped them to manage information more effectively. Although 41% agreed with the statement "*I don't know what I would do without ICT*", 34% disagreed with this statement indicating a moderate or healthy reliance but not being too obsessive in ICT. Other evidences which were consistent with this assertion came from the following results:

- 23% disagreed with the statement "*some students are way ahead of me*" while 41% of them agreed.
- 50% of them disagreed with the statement "*I feel lost in the in the information age*"; only 9% agreed.
- 50% of them disagreed with the statement "*I find using ICT time consuming*"; 23% of them agreed.
- 50% of them agreed with the statement "*ICT is all moving too fast for me*"; 20% of them disagreed.

68% of the respondents disagreed with the statement *"I use ICT, but not for work purposes"* which might imply that a majority of the respondents have the ability or perhaps the facility to use ICT at their workplace. However, 16% admitted that they used ICT but not for work purposes.

In terms of their professional development, their need for ICT skills and training was evident from the responses obtained. Although 52% disagreed with the statement "*I don't have the appropriate skills to use ICT effectively*" which came from those that considered themselves as competent (at least 55% of them see Table 7.3h), 25% of them agreed with this statement. Thus this confirmed the fact that about 25% of the respondents lack ICT skills to

use ICT effectively (see Table 7.3m). Also 43% of the respondents confirmed that they "*knew the basics of ICT but that is all*". Again, the 36% who disagreed with this statement were those that described themselves as competent. 41% agreed with the statement "*I receive enough support in my use of ICT*" which correlates well with those who agreed with "*I don't know what I would do without ICT*" (41%).

In terms of keeping themselves up to date with ICT, the sharing of information and knowledge of ICT with their colleagues topped the list (84%) followed by discussing with other people outside their colleges (63%) – see Table 7.25. The result ordered in Table 7.25 reflects the degree of access to these facilities. For example, there was limited access to published materials in the colleges and participation in staff development activities related to ICT (see section 7.4 later). The 61% who kept themselves up to date with ICT development through online materials were those that use their own machines either in the colleges or at home as access to these facilities in the college was also limited.

7.3.2 Results from Colleges D, E and F

The picture that emerged shows that the percentage of ICT user for this group was 93%. This is higher than the one obtained from the other group (86% for the overall respondents in colleges A, B and C). However, this figure is not consistent across the three colleges D, E and F because as Table 7.26 shows, college E has 100% ICT users. A more representative figure might be obtained when college E is isolated – i.e. about 87% of the VTE teachers use ICT for their work in the five VTE institutions, i.e. when college E is not

included in the analysis – see Table 7.27.

Table 7.28 shows the number of users in relation to the different age-groups. The result shows relatively high percentages in the different age groups. The assumption that younger members of the staff are more likely to be users of ICT is not supported by the data for this group. This is because of the distortion generated by the data obtained from College E which has 100% ICT users.

Table 7.29 shows the result of the users' assessment of their level of competence. The result shows that the percentages obtained for colleges D, E and F are almost similar to the result obtained for colleges A, B and C. For example, 22 out of 39 of them (56%) considered themselves as competent users – compared to 55% in the other group (i.e. respondents in colleges in A, B and C); 5 out 39 (13%) regarded themselves as highly competent – compared to 8% in A, B and C; and 12 of them (31%) described themselves as having basic competence – compared to 29% in A, B and C.

Table 7.30 shows how the percentages of users across the six colleges that described themselves as either competent or highly competent. There were higher percentages of 'competent' users for colleges C and E. The results reflect the level of access to available ICT resources for teachers in each of the colleges. The findings from the interviews did show that college C was better in terms of ICT resources than colleges A and B with college B being the least resourced. If the result supports the assertion that teachers who routinely expose themselves to ICT might see themselves as competent users then how well resourced were colleges D, E and F might be predicted

by the figures from Table 7.30. In terms of ICT facilities, college E was clearly very much better than the rest of the colleges. College E was the only VTE institution that had a well developed local area network. Therefore by comparison, the respondents from this group were better in terms of access to ICT facilities than the respondents in the rest of the colleges.

The percentages of ICT users that used common ICT resources and their frequency of use are shown graphically in Table 7.31; Table 7.32 shows the frequency of the place where the users normally use these ICT resources.

Use of Office Tools (e.g. Word-processors and Spreadsheets)

Like the results obtained from colleges A, B and C, there is a very high percentage (97%) active in the use of office tools and an even higher percentage of daily users (92%). 95% of the users had access to these tools in their workplace, a much higher figure compared to 79%, the figure for colleges A, B and C. In spite of this, 48% of the respondents from this group gave "*resources are not available*" as their reason for not using ICT in their work – See Table 7.34. 69% of them also use these tools at home. This majority were those that used their own laptops or machines. Also 13% of them made use of the computer labs to gain access to these resources.

Use of the Internet and Email

Table 7.34 also shows higher percentages of Internet and email users compared to 79% and 80% respectively for colleges A, B and C with corresponding high percentage of daily use – 72% and 64% respectively compared to 45% and 40% respectively for colleges A, B and C. Since 76% of the staff in College D claimed using the Internet normally in the office and

59% of them used Email in their office indicated that they too have better access to these facilities in their workplace – see Table 7.3r. However, as mentioned earlier, College E is the only VTE institution with a well-developed campus network. Therefore the staff in that college readily had access to Internet and email facilities whereas staff in College F had no access to either of these two facilities. The overall result is summarised in Table 7.33.

Use of Educational, CD-ROMs, Simulation and Modelling Software

The result shows 64% of the users made use of educational software on CD-ROMs. The results were quite similar to those obtained for colleges A, B and C in that most of them use these resources for their personal use rather than for curriculum support as evident from Table 7.32 – 41% office users and 49% home users compared to only 5% classroom users and 8% laboratory users.

Although there was a relatively higher percentage of simulation and modelling software users (49%), the level of use in the classrooms and laboratory was very low – 8% and 13% respectively. The fact that there were 28% office users and home users, the use of these resources was more likely to be for personal and professional use but not classroom learning and teaching. Once again, the results support the assertion made earlier that there was a low level of use of ICT in the colleges.

Table 7.4 shows the reasons given by the respondents for the lack of use in their colleges. The results were consistent to those obtained for colleges A, B and C. The main reason given was *"resources are not available"* (48%) followed by *"resources are not accessible"* (31% of the respondents). Note

that all respondents who ticked "*resources are not accessible*" also indicated "*resources are not available*". This then is followed by "*lack of skills*" but claimed by only 10% of the respondents. This strengthened the assumption made earlier that there were more respondents with better ICT skills in Colleges D, E and F. Hence the same conclusion may be drawn for colleges D, E and F – as for colleges A, B and C – that the '*non-availability of resources*' which is closely related to the '*lack of access'* was the main barrier to full use of ICT in the VTE colleges. Other barriers include the '*lack of skills*' and the '*lack of technical support*'. Once again, the results were consistent with the earlier findings from the interviews (see 6.3.4).

Like colleges A, B and C, a majority of them (74%; 31 out of 44) indicated there was nothing that discouraged them from using ICT. Only one of them gave comments on this issue – this respondent said:

> "I am not discouraged - because whenever there is a problem there is always someone at the institution who can help me"

10 (24%) respondents did describe various factors that discouraged them. These include:

- Lack of resources or lack of access to resources (this came from 5 respondents)
- Lack of technical support (this came from 3 respondents)
- Lack of time (this came from 1 respondent)
- Recurring problems related to machines breakdowns due to viral infection or old machines (this came from 1 respondent1)

Although 74% (31 out of 42) of the respondents said there was nothing

that discouraged them from using ICT, 26 of them (76%) gave their views on the factors that would encourage their further use of ICT. From these six categories that emerged, the top three factors matched to those obtained for colleges A, B and C. They were: *availability of and access to resources* (42%), followed by their *need for training and staff development* (35%) and their thirst for knowledge on the *usefulness of ICT* (31%). The result is summarised in Table 7.35. There is thus a signal for the need for staff development in ICT – a theme which will be covered in the next section (7.4).

In terms of their perceptions of ICT use, the responses from this group were not very different from those obtained for colleges A, B and C in that they too had a positive attitude towards ICT – perhaps in even greater magnitude. 83% of the respondents disagreed with the statement "*computers scare me*" (including 60% strongly disagreed) and similarly 83% disagreed with "*I wish ICT had never been invented*"; 67% of them disagreed strongly. Like the other group, a greater majority of them (88%) believed that ICT would make their work easier (including 67% strongly agreed) and that ICT helped them to communicate with their colleagues (86% agreed including 62% who strongly agreed). An even more positive attitude was the belief that their colleges had a positive interest in ICT – 86% of them agreed with the statement including 62% who strongly agreed).

The value placed on ICT was even higher for this group when compared to the other group. For example, 88% of them (including 62% agreed strongly) agreed that ICT helped them to manage information more effectively; none of them disagreed with the statement, thus showing their strong

support. Although half of the respondents (50%) agreed with the statement "*I don't know what I would do without ICT*", still some 29% of them disagreed with this statement – once again indicating a non-obsessive attitude towards ICT. Here are another three supporting findings:

- 24% disagreed with the statement "*some students are way ahead of me*" while 43% of them agreed.
- 59% of them disagreed with the statement "*I feel lost in the in the information age*"; only 12% them agreed.
- 60% of them agreed with the statement "*ICT is all moving too fast for me*"; 14 of them disagreed.

However, in contrast to the other group, 48% of them agreed with the statement "*I find using ICT time consuming*" – only 24% disagreed. This describes the proportion of those who spent time on emails or the Internet especially respondents from colleges D and E who have better access to these facilities (see Table 7.33).

While 12% agreed with the statement *"I use ICT, but not for work purposes*" – a majority of this came from college F, where facilities were poor, 67% nevertheless disagreed, which once again implied that there was a greater motivation to use ICT for work in the colleges. The result is comparable to the response obtained earlier from the group of Colleges A, B and C (i.e. 68% disagreed with the statement).

In spite of better facilities and ICT resources when compared to the other group, this group had a greater need for ICT skills and training, as evident from their responses. Although 57% disagreed with the statement "*I don't*

have the appropriate skills to use ICT effectively" –most of which came from those that described themselves as competent, 21% of them agreed with this statement. Again this matched the fact that about 24% of the respondents who confirmed their lack ICT skills to use ICT effectively (see Table 7.3q). Although 48% of the respondents disagreed with the statement "*I know the basics of ICT but that is all*", still 33% of them indicated the fact that they needed more support for skills development and training. Again, the 48% who disagreed with this statement were those that described themselves as having at least basic competence. While 57% of them agreed with the statement "*I receive enough support in my use of ICT*", 12% of them confirmed that 'lack of support' was a major deterrent to use.

Like the other group, in terms of keeping themselves up to date with ICT, the sharing of information and knowledge of ICT amongst their colleagues topped the list (90%). However, for this group, keeping up to date through online materials came second in the list – see Table 7.36. Formal events such as participation in staff development activities were ranked low – 31% for in-house and 15% for outside participation. As mentioned earlier, the order (from highest to lowest rank) as arranged in Table 7.36 reflected the degree of access to the ICT facilities. No doubt all of the respondents in college E had full access to the Internet and email facilities. However, there was little participation in staff development activities related to ICT. The result of the analysis for the theme "staff development and training" in relation to ICT will be presented in the next section (i.e. section 7.4).

7.4 Staff Development and Training

7.4.1 Are there any staff development programmes related to ICT?

7.4.1.1 Results from Colleges A, B and C

68% (30 out of 45) of the respondents were not aware of any staff development programmes related to ICT in their colleges, while the other 32% (14 respondents) claimed they were aware. These figures are not consistent for all colleges – See Table 7.37.

In the case of college B, almost all (91%) of them appeared to have no knowledge of staff development in relation to ICT. This has also been reflected in the earlier finding that there was an absence of staff development in relation to ICT in this college (see 6.4.2). While the figures are almost similar for colleges A and C, those who are 'aware' were in the minority (39% and 40% respectively).

The comments that came from the four respondents that said 'yes' from college A referred to 'outside college' participation, for example short courses organised by SEAMEO-VOCTECH, ITB and other courses outside Brunei Darussalam. The comments that came from college C pointed to the in-house training and short courses made available for staff as highlighted in the earlier qualitative interview findings (see 6.4.5).

Here are some of their limited number of short comments:

Short courses on application software

Evening classes

Training given by Computer Department

I once attended a short course to learn about the *Excel* lessons

HOD will inform staff if any courses are advertised regarding ICT

7.4.1.2 Results from Colleges D, E and F

Only about a quarter (24%; 10 out of 44) of the respondents claimed that they were aware of staff development programmes related to ICT in their colleges while the other 76% (32 respondents) claimed that they were not aware. Six of those that indicated they were aware were managers. Like the other group (colleges A, B and C), the figures too were not consistent for each of the colleges D, E and F – see Table 7.8. In college D, 3 out of 7 who said they were aware were managers. Based on the comments that they gave there was evidence of staff development related to ICT in that college:

There was a workshop on hands-on use of college on-line facilities only

The ICT staff development is open to all the suitable candidates, and this is circulated using the memos/minutes

Recently we conducted a workshop on online activities among college staff

In college E, despite being in a 'better' position in terms of ICT facilities and resources, 94% of the respondents said they did not know of any ICT staff development in their college. This surprising revelation of the absence of staff development in ICT in college E implied that only the resource provision for ICT strategy was achieved while the strategy for training in its use was not. Even the comment that came from the one who was aware suggested that the respondent could not remember where and when such staff development activity was conducted.

Both the respondents in College F who indicated that they were aware of

staff development related to ICT were managers. One of the comments points to the lack of access to the internet while the other refers to the staff development programme through participation in teacher training – that is the one offered locally in the Institute of Education, Universiti Brunei Darussalam:

> *Especially in our department, we don't have access to the Internet. As a result lack of resources for both instructors and students. Very limited knowledge and ideas.*

> *Staff recruitment in Technical Education, that is, teacher training which involves ICT subject in their curriculum*

7.4.2 Have the respondents received any training or short courses related to ICT?

7.4.2.1 Results from Colleges A, B and C

The result shows that about a third (i.e. 34%, 15 respondents) of them claimed that they had received training or short courses related to ICT. Cross-tabulating this result with the results in section 7.4.1.1 reveals that those who had received ICT-related training or short courses were unaware that such activities might be part of their staff development programme. For example, 5 out of 15 respondents who had received training or short courses were not aware of any ICT staff development in their colleges – see Table 7.39.

Those that had received training or short courses related to ICT were asked to provide details in terms of the nature, the place, duration and also the usefulness of the courses attended. The result is summarised in Table

7.40. What emerged from the responses of the participants of colleges A, B and C (see Table 7.4g) were only three types of training:

- training/short courses related to the use of application software
- training received through participation of teacher education programme
- training/short courses related linked to administrative management

The low level of participation in training or short courses related to ICT is quite evident. For example, only two out of 10 respondents in college A had attended training/short course related to the use of application software, organised by other training centres outside their college. One attended a one-day training, while the other attended for a few months. They did not indicate whether that training was useful or not.

In College B, out of the 11 respondents, only one respondent participated in the training of the same nature for a few weeks (less than a month) and found that it was useful. One other respondent from this college receive ICT-related training while participating in a teacher education programme for up to six months and found that it was useful for his/her present role. Another two respondents from college B attended an ICT-related 'administrative management' training/short course, which was organised by a training centre outside the college. One found that it was useful while the other found that it was not useful.

Out of the 23 respondents from college C, only 4 had attended the in-house application software related training/short course organised by the college, which ran for a few months. None of them indicated whether such a

programme was useful or not. Another 4 received training of the same nature at training organisations overseas. Two had training for a few days; one had it for a few weeks while the other attended for more than six months. 3 thought that the training was useful while the other indicated 'can't tell'.

Only 5 out of the 15 respondents were willing to give their personal comments on the usefulness or non-usefulness of the training or short courses that they received. 3 comments came from college B and 2 from college C; none from college A. Their frankness was quite revealing. And since there were not many of them, I include all of them below.

> very useful because the course introduced the use of scanner, digital camera which instructors/teachers can incorporate into making the OHP tranparencies and powerpoint program
>
> The above course could not be implemented due to unavailability of software and resources
>
> After completing this seminar, I am able to utilise it, in doing preparation of my teaching, especially in doing the compilation of the students' marks; test and examination results, etc.
>
> I had no chance but I update my knowledge somehow with the help of friends
>
> It is very useful because I use it almost every day in my training activities and admin work

The above revealed more about the paucity of staff development and training related to ICT in colleges A, B and C. The results thus strongly support the earlier qualitative findings (see 6.4.2, 6.4.4 and 6.4.5).

Table 7.41 shows the summary of the responses received from the 29

respondents (66%) indicating their reasons for not having received training or short courses related to ICT. The fact that nobody ticked the box "*ICT training/short courses are not of interest to me*" showed that all of the 29 respondents might have interest in developing themselves for ICT. More than half of them (55%) indicated that they have not been offered the right kind of training. This result is consistent in all of the three colleges – 5 out of 8 in college A; 3 out of 7 in college B and 8 out of 14 in college C. It might be that 'training/short courses have not been made available' since 28% of them made such claims: 2 out of 8 in college A; 1 out of 7 in college B and 5 out of 14 in college C.

13 respondents (45%) gave reasons, other than those listed in the questionnaire. Out of this, 11 gave their views: 6 came from college A; 4 from college B and only 1 from college C. Their comments reflected the relative differences in the availability of ICT training and staff development programme in each of the colleges – supporting and validating the earlier findings from the interview even further (see chapter 6, section 6.4.4). Here is a sample from each of the three colleges:

> Actually there was a short course being organised by the computer section in my institution a long time ago but now it's stopped. Before I never managed to enter due to limited enrolment. Therefore I think by beginning this type of short course I would agree a person like me would benefit much from this exposure. Even though I know bits and pieces of ICT, I would like to increase my knowledge on it and be more confident to handle ICT. **(college A)**

> Hardly, no time at all, since much of the time is being used for preparing lessons, guiding students assignment/dissertations and being involved in so many activities held by the institution. Work overloaded but would very much keen to learn if only there is a 'time' allocated or being sent 'off' for training. **(college B)**

I have never been offered any ICT training / short courses **(college C)**

Almost all of them (9 out of 11) pointed that they had not received any offers for ICT training/short courses. If this number was added to the number for "*I have not been offered the right kind of training*", it pushes the percentage from 55% to 93% - making this the main reason and barrier to staff development, thus adding evidence to those obtained in the earlier findings from the interview (see 6.7.3).

7.4.2.2 Results from Colleges D, E and F

For this group, whilst 74% confirmed that they had not received training or short courses related to ICT, the other 26% (11 out of 42 respondents) claimed that they had. This is even lower, compared to the other group. As shown in Table 7.42, 7 out of the 11 respondents that had received training or short courses might be aware that what they received was part of ICT staff development in their colleges, while the other 4 were clearly not aware of this.

Table 7.43 shows the summary of the responses provided by the participants in terms of the nature, place, and usefulness of the training and short courses that they received. In contrast to the other group (participants from colleges A, B and C), none of the colleges had any in-house training or short-courses (i.e. organised by their own colleges) made available for the teachers. The data shows that they could only participate in ICT-related training or short-courses organised by organisations outside their colleges – either locally or overseas – e.g. a neighbouring country like Singapore.

The result also shows that, only two respondents from college D attended

training on the use of application software, organised by an outside organisation. Both had it for a few months. Similarly only two respondents from college E received training on the use of application software, one of which was organised overseas. Two respondents from college D took up short courses in administrative management, which might or might not be related to ICT. One had it for a few weeks and could not tell whether it was useful or not and the other had it for a few months and indicated that it was not useful – see Table 7.43.

Comments on the non-/usefulness of the training or short courses were received from 6 out of the 11 respondents who had received training or short courses related to ICT. One came from college E, while the other five came from college D. Once again, since there were not many of them I have included all of them below.

> The short course is useful because it gives me the idea of using the teleconferences and giving questionnaire through our own website. The short course is basically for people doing the research and development for their respective organisations where they can use ICT as their research tools

> The course was for three weeks but only a short period of time was spent on ICT. I found the ICT taught was lower than my level so I do not benefit any [new] knowledge from the course. I was teaching the other participants instead. It was okay for some other participants like those coming from Laos, Vietnam, Indonesia and etc.

> I'm currently involved in creating multimedia instructional materials for computer related subjects. Also involved in designing prospectus of the college (softcopy) and the college website. The course gave me a good basic knowledge / training where I individual improved with the help of colleagues

> It involved not just activities on multimedia but also now to handle information systems as such

Circuit Maker is a software that can use to simulate electronic circuit. It is very useful for teaching digital subjects. Students can use this software to test the electronic circuit.

It helps in preparing lecture notes/lab class to the students

Although the above comments describe a range of different ICT related training and short courses that were made available for staff development, there were barriers causing the low participation. This was evident from the reasons given by those who had not had the chance to participate in training or short-courses related to ICT. Table 7.44 shows the summary of the responses received from 74% (31) of the respondents who said that they have not received any training or short course related to ICT.

What emerged from the result is consistent to the other group, in that all of them (31 respondents) showed interests in getting training or short courses related to ICT. 45% of them indicated that they had not been offered the right kind of training – again, similar to the result obtained for colleges A, B and C. And also there was consistency for all of these three colleges – 7 out of 14 in College D; 4 out of 7 in college E and 3 out of 6 in college F.

11 respondents (35%) gave their comments on other reasons different from those listed above: 3 from college D, 4 each from college E and college F. Among these were issues such as being in different 'category' of staff or had not received any offers for training nor short courses related to ICT – all of which support the assertion made earlier on the lack of training opportunities related to ICT. Here is a sample from each of the colleges:

Because there are other staff in the college who should be given this offer

especially those in the computer section so the offer was open to them only. **(college D)**

In fact I need to attend training courses in ICT, But as I am an expatriate officer, my college does not consider me for any training sponsored by them. **(college E)**

I would say if I were given a chance to attend any trainings/short course related to ICT, I should have attended it. As an instructor, I would like to attend a short course on how to use the multimedia projector for the purpose of my teachings. **(college F)**

The result reveals that the issue of limited training opportunities and staff development in relation to ICT, identified earlier in colleges A, B and C, is also identified in colleges D, E and F.

7.4.3 Perceptions of Staff Development and Training for ICT

7.4.3.1 Results from Colleges A, B and C

In general a majority of the respondents indicated that they needed ICT skills for their personal and professional development, as evident from the following results:

- Only one respondent agreed with the statement "I feel *ICT training isn't appropriate to my teaching*"; 84% of them disagreed (this includes 55% who strongly disagreed)

- 75% disagreed with the statement "*I don't think I need ICT skills to progress in my profession*" including 39% indicating strong disagreement; only 16% agreed with this statement

- 75% agreed with the statement "*I really want to know more about developing my skills in ICT*" including more than half (55%) who

strongly agreed and only two (4%) respondents disagreed with this statement

- 86% disagreed, including 48% showing strong disagreement with the statement "*I don't need to use ICT in my teaching*"; only 7% agreed somewhat

- 93% disagreed with the statement "*I don't see the need to learn about ICT*" including 46% indicating strong disagreement with only 1 respondent (2%) who strongly agreed.

From the above results, it can be deduced that there was a great need for staff development and training since a majority of them showed great interest to learn ICT.

A majority of the respondents placed a high value on short courses in ICT; 77% of them agreed (including 50% who strongly agreed) with the statement "*I find short courses in ICT useful*"; none of them disagreed.

25% of the respondents agreed that they could not find *time* to learn. Nevertheless, 46% of them did not agree with the statement "*I am interested but could not find time to learn*". Half of them (50%) felt that their ICT skills were inadequate and more than half (59%) saw ICT training as a priority. This implies that at least half of the respondents possessed a positive attitude to learning.

While 36% of the respondents did not agree with the statement "*I am interested but don't have access*", 32% of them felt that they didn't have

access to develop their skills – five of them strongly agreed that this was the case.

Half of them (50%) agreed that "*training doesn't seem to be available*". However 27% of the respondents did not agree with the statement. The former might be the case where courses were being offered or made available for staff and the respondents did not know about it.

Since more than half of them (55%) did not agree with the statement "*no-one else is bothering*" and only 3 respondents (7%) agreed with the statement, it means that more than half of the respondents support the view that staff development in ICT for teachers in the colleges is an area that needs to be addressed and deserved a better place or consideration than it had been.

The above perceptions reflect the views of the teachers and managers regarding the knowledge and skills development needs of the teachers in the three colleges. The results therefore validate the earlier findings and the beliefs that teachers need support for their on-going learning of ICT and for their professional development – see section 6.4.3.

7.4.3.2 Results from Colleges D, E and F

The perceptions of this group matched closely with the perceptions of the other group as evident from the following results:

- only 7% of the respondents agreed with the statement "*I feel ICT training isn't appropriate to my teaching*" and 81% disagreed

including 50% who strongly disagreed

- 88% disagreed with the statement "*I don't think I need ICT skills to progress in my profession*" including 52% indicating strong disagreement; only 5% agreed with this statement

- 83% agreed with the statement "*I really want to know more about developing my skills in ICT*" including 43% who strongly agreed; only two (5%) respondents disagreed with this statement

- 81% disagreed, including 50% showing strong disagreement with the statement "*I don't need to use ICT in my teaching*"; only 2% agreed somewhat
- 91% disagreed with the statement "*I don't see the need to learn about ICT*" including 55% indicating strong disagreement with only 1 respondent (2%) who strongly agreed.

Therefore, it can be confirmed that there is a great need for staff development and training for ICT in the VTE system and that a majority of the respondents from both groups of colleges showed that they needed support in their professional development.

Likewise for this group, a majority of the respondents placed a high value on short courses in ICT – 81% agreed (including 52% who strongly agreed) with the statement "*I find short courses in ICT useful*"; only 1 respondent disagreed.

43% of the respondents agreed that they could not find *time* to learn. This

figure is higher than the other group which implies that for this group, time could be a barrier. However 36% of them did not agree with the statement "*I am interested but could not find time to learn*" showing that 36% could find the time.

45% of the respondents felt that their ICT skills were inadequate. 31% of the respondents agreed with the statement "*I felt my skills and knowledge in ICT are adequate*". This confirmed that there were more people who were competent or skilled in ICT in this group compared to the other group (participants in College A, B and C). Even so, more than half (64%) still saw ICT training as a priority for them.

31% of the respondents did not agree with the statement "*I am interested but don't have access*". However 45% of them felt that they didn't have access to develop their skills – 8 out of 44 respondents strongly agreed that this might be the case since more than half of them (64%) confirmed that "*training doesn't seem to be available*". However, 17% of the respondents did not agree with the statement. Once again this hinted at the fact that there were courses being offered or made available for staff although there might not be many or the participation might be low or the information on this is poor.

Like the other group, a majority of the respondents (62%) did not agree with the statement "*no-one else is bothering*" and only 2 respondents (5%) agreed with the statement. The result shows that both teachers and managers in the colleges were in favour of having more effective staff development and training for ICT in the colleges.

7.5 ICT Strategy

7.5.1 Results from Colleges A, B and C

Respondents were asked whether they knew of the existence of a long-term plan (a strategy) for ICT in their college. Overall, the result shows that only 6 out of 44 (14%) of the respondents claimed that they were aware of the existence of such strategy for ICT – all came from college C – see Table 7.45. This result is not surprising since the finding from the interviews did show evidence of ICT development and training for staff being deployed in college C. The result summarised in Table 7.45 also shows that almost half (i.e. 20 out of 44) of the respondents were *not sure* of the existence of an ICT strategy. This is consistent with the earlier results from the interviews (see sections 6.2.1 and 6.7.1). The result also shows that 5 out of those 6 that said they were aware of the ICT long-term plan for the college were managers in college C. This shows that only managers had been involved with the long-term plan for ICT in that college – if there was one.

7.5.2 Results from Colleges D, E and F

Table 7.46 shows the corresponding result from colleges D, E and F to the question whether they were aware of the existence of the long-term plan for ICT. The table shows that more than half (53%) of the respondents in College D claimed they were aware of the college long-term plan for ICT. There were none in College F and only 1 responded 'yes' in college E, which was an exception considering there were 12 who responded 'no' and 3 'not sure' despite the fact that this college had successfully implemented its equipment strategy.

Table 7.47 shows the result when the managers and non-managers are segregated. The result shows that all except one of them that responded 'yes' were from college D. Hence there might be such a strategy for ICT – but only in college D.

The overall picture for the whole of colleges D, E and F is as shown in Table 7.48. The overall picture shows that about a quarter (16%) were aware of the long-term plan for ICT – almost all of them were in college D. Once again, a great majority of them (74%) either knew nothing of it or were not sure of the existence of such strategy. Thus with the exception of college D (perhaps), the result is consistent with the earlier finding that there is an absence of strategy to address the development of ICT in five VTE institutions (See section 6.2.1).

7.6 Conclusions to the chapter

From the data presented in this chapter, several key findings might be drawn from the results of the analysis of the questionnaire. The study shows that in autumn 2001 there had been not much improvement in terms of the development of ICT in the VTE system in Brunei Darussalam since the system was last visited in summer 2000.

In particular, there was no clear and coherent strategy to effectively address the needs for ICT in the three colleges studied earlier in summer 2000 (see section 7.5.1). The finding in this chapter further confirms the earlier finding that there is yet to be a strategy to realise the vision for ICT for VTE in Brunei Darussalam (see section 7.5.2). Although, as evident in one college (see section 7.5.2), there might be a move towards a more positive future.

Although there was a relatively high percentage (in the range of 87% - 90% - see Table 7.27) of ICT users among the respondents, the utilisation of ICT in the college was relatively low and was focussed on a limited range of ICT resources (see sections 7.3.1 and 7.3.2). The use of productivity office tools (word-processors and spreadsheets) dominates the common ICT resources used for work in the college such as the Internet, email, educational CD-Roms, simulation and modelling software packages, etc. The main barrier to use was the lack of ICT resources and the lack of access to essential ICT resources. Another barrier to use was the lack of skills – about a quarter of the respondents admitted that they lacked skills in ICT – see Tables 7.23 and 7.34. This is in spite of the fact that a majority of them (in the

range of 44% - 88% - see Table 7.30) saw themselves as basically competent in ICT.

A vast majority of them (in the range of 60% - 94% – see Tables 7.37 and 7.38) were not aware of the existence of staff development for ICT in their colleges – if there was any. In terms of staff development and training for ICT, the finding in this study confirms the earlier finding that VTE teachers have limited access to training opportunities (see sections 7.4.2.1 and 7.4.2.2). A great majority of the respondents believed that they need an on-going support in their professional development for ICT (see sections 7.4.3.1 and 7.4.3.2).

In general VTE teachers and managers in all six colleges who were involved in the study held high values in ICT and a great majority of them have positive attitudes towards ICT. This confirms and validates the findings obtained earlier in chapter 6.

Chapter Eight
Discussions and Conclusions

8.1 Introduction

This chapter is divided into four sections. Section 8.2 discusses the findings of the study related to the research questions outlined in section 1.3 (Chapter One). Section 8.3 summarises these key findings of the study and draws from them the implications for prcfessional development of VTE teachers. Section 8.4 presents the conclusions of the study highlighting its implications for theory, practice and further research.

8.2 Discussions of the Key Findings Related to the Research Questions

The following discussions of the key findings have been sectionalized into themes and the aims are to provide answers to the following questions raised in the research study:

- At the institutional level, where are the VTE colleges now in terms of their progress of development in ICT? How adequate is resource provision for effective implementation of ICT?

- Are there any pressures for change? Are there any plans strategically focused on ICT? What are the strategies currently employed by VTE institutions in bringing about change?

- At the individual level, what values are held by VTE teachers towards ICT? How competent/ready are they with ICT? What attitudes do VTE teachers' hold towards ICT?

- What are the factors and conditions that support (or fail to support) successful implementation of ICT in the VTE institutions?

- What implications are there for VTE teachers' professional development? What implications are there for policy development and further research?

8.2.1 The Present Scenario of ICT in the VTE System

It was evident from the findings of the study presented in the previous chapters that the VTE system in Brunei Darussalam was in its early stages of development in ICT. Although the current infrastructure was sufficient to support low-level use of ICT, teachers and managers, in general, were of the view that there was a lack of planning and policy to provide the impetus for change within their institutions. There was also absence of a strategy and/or operational policy to realise the vision of ICT; the dominant focus was on the provision of ICT facilities to support low level use of ICT. All these had made the professional development of VTE teachers in this area a low priority. The skills and competence of the teachers and managers in ICT were described as low-level. Most skills and knowledge were acquired from their earlier exposure to computers during their early education years, or experiences of computing picked up elsewhere, or were self-taught. As a result the level of use of ICT among VTE teachers and managers was low; mainly to support their administrative and paperwork and preparation of teaching material. Their use of ICT was focused on productivity tools such as word processors and spreadsheets, which enabled them to attain generic computing skills. It can be deduced that the Bruneian VTE teachers have not moved beyond stage I (entry or 'awareness' stage) of the professional development model espoused by Sandholdtz *et al.* (1997) (see chapter 3 page 65). In other words, they are still at the Cooper and Zmud's (1990) or Fullan's (1991) 'initiation' stage or Somekh's (1998) 'orientation' stage. There was little indication of attempts to move beyond the said stage (see chapter 3 section 3.4.1 on page 63).

8.2.2 Factors that Hamper Change and Innovation of ICT

8.2.2.1 Organisational Structure

The VTE institutions in Brunei Darussalam were organised on many levels, from the individual programmes under the management of programme co-ordinators, to groups of co-ordinators headed by heads of section or heads of department, to a whole institution structure under the guidance of a principal and his or her deputies. The leadership style of each institution varies across the institutions. The seven VTE institutions across the country were administered by the Department of Technical Education (DTE) which in turn was controlled by the Ministry of Education. Within each level in the above structure, there was a need to improve practices that arose from individual or from the departmental level or from the institutional level. For example, a VTE teacher may want to adopt a new teaching method or assessment procedure. A certain committee within the institution may want to institute a different and more effective service to their students. Or the institution may want to organise a better way of sharing expensive equipment and resources with other VTE institutions to address the problem of lack of budget and so on. These findings highlight the dominance of corporate and/or bureaucracy cultures (McNay, 1995) in the VTE institutions. The structures within which change has to happen are multi-layered and the literature shows that different means or strategies to implement these changes are available and the success (or failure) of each of the innovations depends very much on how the change is managed. McNay (2003) espouses the consideration of four alliterative elements which are essential in the management of change – strategy;

system support; staff support and structures (see chapter 3 section 3.4.3 on page 68).

The study has found that there were certain shortcomings in the VTE system in terms of the lack of role clarity of some VTE staff causing role overlaps and conflicts, affecting their morale and productivity. Many VTE teachers and administrators were also not familiar with the functions of the individual sections of the VTE system. And since there was ineffective management of change, let alone a plan for it, they were unclear of their responsibilities. This means that they were operating without a clear sense of direction and purpose, making their actions and efforts incompatible with the organisational goals. This problem was compounded by ineffective alignment of staff-organisation interests and improper administration of sanctions (or rewards) resulting in staff dissatisfaction and underperformance.

Another shortcoming associated with management structures relates to the managerial decision-making authority. The study revealed that many institutional decisions (such as financial matters, student and staff recruitment) had to be referred to the head office (DTE) where some decisions were overruled. It is therefore not surprising that certain decisions were carried out through directives from the head office rather than initiatives at the institutional level. The head-office officials were found to be involved in the operation of the delegated tasks, implying unnecessary interference and/or ambiguous authority of some officers at the sectional and institutional levels – a clear eminence of power culture (Handy,

1993). This situation makes delegation pointless and it also deflates the morale and productivity of the managers at the institutional level (the principals). It was also revealed that many planning decisions were made mostly without group 'consensus' and some decisions were pre-determined prior to actual discussion, which made some meetings pointless. These affect staff motivation and commitment for change.

It is evident from the study that co-ordination and co-operation between teachers and managers within the VTE system were not very effective. For example, the study revealed that the interactions among teaching staff and between teaching and administrative staff were minimal; that the flow of informal communication within each section was constrained. Furthermore, certain information was not effectively disseminated to all staff at all levels.

There are various explanations that can be offered for this ineffectiveness in inter-sectional and/or inter-institutional co-ordination in the VTE system. First, there was a wide gap in status, experience and educational orientation of sectional and/or institutional heads. This acts as a barrier to effective communication and collaboration. Part of the reason is perhaps cultural and the need to abide by the MIB 'way of doing things' – where a person in authority needs to be respected and therefore obeyed. The power-distance (Hofstede, 1994) between heads and subordinates is high. Second, there is no written policy on institutional co-operation to guide the actions of heads. Third, there were no planning and/or evaluation committees at departmental or institutional level. Hence, there were no

opportunities for bringing administrators, teachers and others together for planning or goal setting or evaluating performance. There was no proper strategic plan at the DTE level and the levels below it. Certain institutional planning for change appeared to be done in isolation with little or no participation by key people either within the organisation or from other institutions. This means that VTE institutions were left to their own devices with no tangible sense of direction to guide them towards achieving common goals for VTE. The underdeveloped information system and the unavailability of important and reliable planning information also contributed to planning ineffectiveness. As a result, many change initiatives were implemented without consideration of internal constraints, for example, staffing and equipment, thereby causing less desirable outcomes.

The study has found that the process of equipment procurement was slow and tedious. Likewise, the maintenance and back-up services for equipment and facilities were generally unsatisfactory. The financing of material and equipment acquisition was inflexible and highly centralised, interrupting the essential supply of learning and teaching resources. While the inflexibility of financial procedures was intended to discourage financial abuse, it hindered development to the extent that it probably costs the government more loss in terms of time, money and manpower. Furthermore, this might hamper the national effort towards achieving its HRD goals. It can be concluded that the management structures in the VTE system were not facilitative and participative enough to allow for greater participation of people in problem-solving and information-sharing activities.

8.2.2.2 Access and Equity

Access and equity were among the key issues highlighted by the managers and teachers. In this context, it is not only access to physical resources because 'access' can mean a variety of issues: for example, keeping laboratories open, having 'help-desk' available and placing equipment and manuals where teachers and students can get at them. Other issues include: limited or denied access to machines or the availability of software only in certain locations. The constraint of financial resources makes it difficult to buy enough equipment and/or to hire support staff at these facilities and has a direct effect on the issue of accessibility. Such a situation of 'so near yet so far' would defeat the purpose of using ICT as a way to enhance learning and teaching. Such was the experience of the colleges during the period of the study. They were under severe strains as a result of budget cuts during the year 1999-2000 following the economic downturn. (The country reassessed its financial status after the Asian financial crisis during the last five years of the last century). With colleges already facing the challenges of outdated machines, limited access, and other equity issues, the prospect of new machines and ICT facilities remains a dream for many.

The study has found that only three (out of seven) VTE institutions have in-campus local area networks, two of which were not well developed. Having computers, but not having them fully equipped or networked is a strong de-motivating factor in the adoption of ICT. More and more schools, colleges and universities elsewhere (US, UK, Australia, Japan, Hong Kong, Singapore, Malaysia, etc) are using the Internet as a rich source of information and

dialogue. VTE administrators and policy makers must therefore consider the importance of providing this vital link in their colleges if they want to reap the benefits of ICT in their practice of learning and teaching.

8.2.2.3 Physical Resources

The study data has clearly revealed that the VTE system suffers from inadequate physical resources such as buildings and their maintenance, shortage of classrooms/workshops/laboratories, libraries and learning resources, and equipment inhibiting expansion of training programmes. As a consequence, the staff morale and commitment were affected, influencing the quality of training, learning and teaching. Furthermore, vandalism of expensive and essential training equipment disrupted the smooth running of programmes because of the lack of security in some VTE institutions. The maintenance and backup services of the present equipment and ICT facilities in the VTE institutions and the budget for such services were inadequate. The outcry for much of the old equipment and many old PCs due for replacement or upgrading was very clear.

It is apparent that the inadequacy of physical resources in the VTE system was partly due to poor planning. Planning was largely incremental where physical resources such as ICT equipment were 'planned to meet the yearly needs' or 'the needs of the introduced programmes' rather than on the basis of long term projections (e.g. 5 or 10 year plans). As a result, equipment and facilities provided for the year were seen as sufficient but were never enough for the upcoming years in view of the expanding programmes and increasing number of students. The

inefficiency of financial procedures and the limited financial authority of DTE and the MOE were other reasons for the inadequacy of physical resources in the VTE system. These limitations dictated the manner in which physical resources were acquired and reinforced incremental rather than comprehensive strategic planning.

8.2.2.4 Shortage of Staff skilled and knowledgeable in ICT

The study revealed that the constraints on resources also pointed to the shortage of staff (human resource) with skills and knowledge of ICT (see Chapter 7). This was further exacerbated by the shortage of qualified staff in many sections of the VTE system, affecting many long-standing programmes by delays and under-performance. The findings from the interviews in particular revealed that the turnover of VTE staff and the frequency of change of posts among teaching and administrative staff was a norm of the system and there were delays in finding staff replacements.

Staffing shortages in the VTE system tend to occur for many reasons. One possible explanation is that the staff recruitment process is highly centralised and bureaucratic (with little or no authority for sectional heads of VTE). Another reason is the ineffective personnel policy for staff retention, such as lengthy confirmation period for newly recruited teachers and restriction on staff recruitment of locally available expertise based on racial and residential status. Other problems include inappropriate transfers within and to outside the VTE system, and difficulties in acquiring foreign staff because of the global shortage of people with ICT skills and

knowledge, and competition with the industry for these people as highlighted by one of the interview participants in the UK case studies. One serious issue is that there was no systematic human resource planning taking place in the Department of Technical Education projecting the types and number of staff required.

8.2.2.5 Staff Development and Training

In terms of staff development and training in the area of ICT, the study revealed that while there was a generous provision for local staff, the training programmes provided were not systematically and equitably distributed among the VTE staff. Thus some staff members receive training more frequently than others or more than necessary and some training programmes were not relevant in type and level (see Chapter 7). Most training programmes were in management and administrative areas rather than 'technical' or 'vocational' areas. Training programmes in the rapidly changing domain of ICT which are essential for teachers were not forthcoming, even when they greatly need to upgrade their knowledge and skills.

This ineffectiveness in staff training could be due to the failure to conduct a proper training needs analysis and an absence of a clear policy on staff development. Or if one has been done, it could be that it has failed. As other government departments controlled the training of VTE staff, recommendations for training were normally ignored because the selection criteria were, to some extent, not responding to the needs of VTE. Most training was provided in management areas rather than catering to the needs of technical or vocational education. It may

be the case that they (the other government departments) might have no mechanism for assessing training needs of this nature.

The study also revealed the ineffectiveness of the in-house training provided by the VTE colleges. This situation may be due to the lack of competent training staff or under-provision of training facilities; lack of appreciation and recognition; and poor incentives. The level of staff competencies would have an impact on the implementation of the training programmes. Some local teaching staff also lack teaching and managerial skills. Some managers in the college also lack managerial skills although many of them have gone through management training and/or possess higher degrees in educational management. While they are familiar with the current management concepts, as evident from their competence in responding to the interview questions, there was a discrepancy between their theoretical knowledge and actual practice, implying the ineffectiveness of the training received.

The results of the study clearly indicate that little effort has been directed at examining professional development needs of the VTE teachers, although staff development and training with respect to ICT is seen as needed and should form an integral part of the culture of change. Time, resources and access are the three interrelated issues viewed as critical in all of the VTE colleges. Several success factors in staff development activities that address the major issues can be identified from the results of the study. As identified in the literature review in chapter 3 section 3.5.5 on page 70, such activities should occur within an

environment that provides adequate time for and access to professional development opportunities; provides ongoing programs of support for teachers and trainers, and technology renewal/updating; ensures that the hardware, software and technology infrastructure is in place and is well supported.

The study has also found that the small number of people who had gone for training and short courses seldom share their knowledge and skills that they had acquired. This might be because of the inefficiencies in the system of staff development and the implementations of training programme. It might also be because of the ineffectiveness in the implementation of successive and 'staff grooming' plans. For example, the annual appraisal of teaching and administrative staff was not utilised to assess training needs, improve the effectiveness of the programme implementation nor to determine proper staff placement. Furthermore, there was no formal orientation programme for new recruits to improve organisational performance. Inefficient staffing processes affected the availability of personnel and quality of staffing in the VTE system and implementation of VTE programmes.

8.2.2.6 Use of ICT in Learning and Teaching

The study has found that most VTE teachers who use computers use them for personal and professional word processing but they neither teach with nor teach about IT in their classes. This finding is consistent with the findings in the UK Pilot Study Colleges as reported in Chapter Five. A critical issue related to staff competence in ICT was derived from those interviewed and this was how to use

ICT in the practice of learning and teaching. VTE teachers were found to have limited understanding on the relevance of using ICT in the process of learning and teaching. In one sense, to them ICT was just another tool. In another sense, they have failed to recognise how ICT have influenced how they do their work. Many have yet to come to appreciate the potential and prospect of ICT to change the role of the teacher. Some, especially the older ones might find it frightening. A number of interview participants had suggested a basic fear of incompetence in taking on something new might inhibit its adoption in their practice of teaching and learning. There are major issues around the values and objectives of using ICT in the colleges. Technologies have been a disappointment many times in the past and to convince teachers that ICT is different from other past technologies might be a challenge. There needs to be much more research on how to use ICT effectively. A critical issue for VTE teachers is whether ICT technology is a tool or the driving force for change for them or both.

Integrating ICT into the process and practice of learning and teaching is a complex process that involves personal, group, organizational, institutional, and even cultural change. Real, significant change is both difficult and rare; most have tended to settle for less and call it a '*success*'. In many cases, 'success' was declared when equipment was acquired and installed. Research in identifying the role of ICT in learning and teaching is on-going and we are yet to be convinced and informed what research actually says about how to best support improved learning using ICT or whether learning is improved by the use of ICT.

8.3 Conclusions of the Study

8.3.1 Recommendations for Change

From the discussions of the key findings in this chapter, it is possible to elicit several principles which may be adopted as recommendations for change. Although they are not meant to be prescriptive, sequential and conclusive, they describe the essential elements and provide the foundations for further exploration and research considerations. The principles are categorised as follows:

8.3.1.1 Shared vision for ICT

What will the VTE system be like in, say, five to ten years from now? There is a need to have a clear understanding about investing in the use of ICT in the VTE system and to prioritise the factors that concern us the most. It calls for a common and/or shared vision for ICT. This vision has to serve the primary purpose and goals and objectives of all of the VTE institutions. For example, VTE institutions must incorporate the provision of access to computing and ICT services for all staff to equip them with the necessary skills and knowledge required to exploit those services and to promote the widespread use of ICT in the educational process as part of a commitment towards providing a high-quality learning experience and to provide ICT based systems to underpin efficient and effective management and administration across the whole of the VTE institutions. As resources become available, the provision of computer facilities will be increased for learning and teaching and possibly research to a level comparable with those found elsewhere – such as the Universities and Colleges in the UK. Although the present level of

usage suggests there might not be any need for using ICT in the delivery of the VTE curriculum such as through distance learning, such a possibility must not be overlooked.

Decision-makers and education policy planners are continually under pressure to make major changes in the face of the inexorable advance of the knowledge and information age that is fuelled by rapid developments in ICT. The vision for ICT needs to take this factor into consideration. There is always the sense of pressure for change, for example, the determination not to be left behind in the rapid advance of ICT in this era of globalisation; the need to be at the cutting-edge of technological developments in order to retain competitive advantage in the fields of socio-economic and cultural developments. At the same time, there is also need to be aware of the prevailing national short-comings such as whether or not our current telecommunication infrastructure is able to support the VTE system's needs for ICT; the need to be sensitive to the social and moral development of the VTE students in particular and Bruneian citizens in general, in view of the danger of cultural invasion posed by the new technologies that do not recognise national boundaries.

8.3.1.2 Policy for ICT

Having dealt with a shared vision, VTE would need to formulate an ICT Policy. This policy specifically for ICT should propose standards in relation to a range of ICT facilities and associated activities throughout all of the VTE institutions. The policy must be designed in such a way that it is flexible, extensible

and renewable in line with the prevailing and rapid development of ICT and should take account of the implementation of other emerging Government projects and plans. In particular it should be aligned to the National ICT strategy, if any. In addition, the policy will need to inform future decisions in relation to upgrading and replacement of hardware and software; internal and external networks; the expectations and varying needs of VTE institutions and students in relation to ICT competencies; student and staff open access areas and so on.

Another central component of this policy is the integration and diffusion of ICT provision and services throughout all of the VTE institutions. The provision of ICT provision will need to be supported and serviced by a central unit which should be coordinated and managed by a management team. The unit would be used to provide a learning support service in conjunction with the other elements of that service such a library and/or other learning resources units.

Although the integration and diffusion of IT provision and services throughout VTE institutions will be a crucial and central component of this policy, the possibilities for divergence from this ideal are so great that, if tightly bounded and held, the unity of the VTE system can be undermined. There needs to be a structure to systematically oversee the implementation of the policy and approve colleges' ICT strategies (see next – section 8.3.1.3). The establishment of the Department of Technical Education's (DTE) ICT Advisory Committee in May 2000 is a step in the right direction. There is, however, a need to strengthen the capacity of this committee. In addition to overseeing the continuing realization of the policy

and its strategies as well as monitoring and having an advisory role and having powers of approval, DTE, through this committee, will have to regularly review and update the ICT policy to enable the inevitable rapid exploitation of new developments in ICT.

8.3.1.3 Strategy for ICT

Following the formulation of ICT Policy, every VTE college needs to develop its own ICT strategy. An ICT strategy is a document defining the way in which the college intends to exploit ICT to achieve its overall mission and top-level objectives. The strategy would then be used to support the overall College's Strategic Plan. In other words it needs to integrate seamlessly with other cross-college strategies and plans. Each college will have differing needs and plans and therefore the specific objectives would vary greatly from college to college. Adopting the model as implemented in the FE sector in the UK, the ICT strategy will typically address the following areas of needs: learning, teaching and assessment; management and administration; marketing and promotion; and collaboration and partnership.

In each of the above areas, the key consideration is that ICT is an enabler, a tool to help a college deliver its overall objectives rather than be an end in itself. The ICT strategy should be published so that all members of the college community understand its future strategic direction. The development of the strategy would be best approached in phases following the stages defined and agreed in the overall direction.

Another key factor to ensure success is that the ICT strategy must be championed at the top-level within the college and have the visible and full-hearted support of the senior management team. Effective strategies for development in the area of ICT are in part predicated on the ability of the institution to manage cultural change. Senior managers need to have a leadership responsibility for coordinating strategies that are germane to improving standards in learning and teaching and more importantly, integral for overseeing the effective integration of ICT and ICT skills within the learning organisations.

8.3.1.4 Strengthening Advisory and Support Structure

Once the above principles are addressed and the programmes of implementation are in place, VTE would need a support structure that incorporates technical advice, regular basic maintenance and response to faults and breakdowns on request and seeks to offset the effect of limited technical staff resources by providing training programmes to help departmental technical staff and individuals become more self-sufficient. Advice and support are two high priority areas in a networked ICT environment. There is a need to recognise that training in the use of ICT systems is an on-going priority and therefore must aim to ensure that all staff are competent in their use of generic ICT systems which are in general used throughout the VTE environment supported by the ICT services in the institutions. The support system must include support for the hardware systems as well as the acquisition and maintenance of an appropriate number of the computing platforms in general usage throughout the VTE institutions.

The acquisition of appropriate personal ICT skills by all VTE staff and students ought to be encouraged. In this respect, VTE will need to focus on a capital-intensive investment to increase the number of networked personal computers, printers and specialized input/output facilities which will be made available in open access areas to a level comparable with that in colleges and universities in the UK. In the University of Greenwich, for example, an NT network has been put in place and has been used to manage the University's Local-Area Network (LAN). The NT network was managed centrally by the computing services unit. Although, it might not exist anymore today, at one time, this unit was also responsible for providing training, technical advice and support for University hardware and software for the NT network.

The LAN is considered the most critical component for a successful computing environment, in that it provides the means of showing data and accessing a wide range of computing facilities. In the United Kingdom today almost all of the FE colleges can fully participate in the inter-university network groups such as JANET and the Internet. The beauty of the LAN is that it can eventually be extended to provide all departments with network access points in every part of the institution – staff rooms, teaching rooms, library, laboratories and workshops and so on.

Using the UK environment as a model, the support structure for Brunei's VTE environment should include the provision of computing services which utilise a LAN for every VTE institution, including the provision of a unified communication system. It will at the same time support the unique computing needs of each area.

All personal computers and workstations will have to be connected to the LAN so that a wide range of general purpose and specialized software and dataset packages can be offered.

In addition, a common electronic mail (E-mail) system must be maintained which can operate from PC work-stations and which can provide automatic routing to gateways such as BruNET and other E-mail facilities. In the UK, external mail is based on data communication protocols in common use in the academic community.

Special management roles need to be given to a "Computer Manager" or "Computer Services Manager" who will have to play a central role in seeking to optimize the benefits from ICT. Each VTE institution should have at least one "ICT Coordinator". Their role should include: consulting with staff about the need for site licenses, make them aware of the licenses currently held by the VTE institution; holding and securing original software and application packages, master copies of electronic data and resources and providing staff with installation instructions and information about the ordering of manuals for usage of packages. Very often, in general, site licenses are purchased for packages, which are widely used across the campus and/or where considerable cost savings can be made.

8.3.1.5 Staff development and Training Programmes

In every VTE institution, an on-going programme for staff development must be put in place to ensure that all staff, teaching and non-teaching, are encouraged or

required to acquire new and relevant skills and to keep up-to-date with the latest technological developments. In addition, training should be made available in the use of specific applications e.g. use of library facilities and administration computing services. At present such facilities are not present in all of the VTE colleges.

There is also a need to strengthen the provision of ICT content in the technical teacher training programmes in the Sultan Hassanal Bolkiah Institute of Education (SHBIE) at the Universiti Brunei Darussalam (UBD) and to ensure that all its graduates are competent in the application of relevant ICT skills. In particular, SHBIE will need to ensure that all VTE student teachers qualifying to teach are competent in their use of ICT. The present model of teacher development needs to be modified to achieve the results desired. The required outcomes are:

- Any staff development programme should be based on a needs assessment, has to address where the teachers are now in their own experience, and has to be related to their direct subject matter needs. Professional development should be an ongoing activity with opportunities for practice, reflection and feedback. Flexible learning opportunities must be offered, so that teachers have a variety of ways to assess their learning and skills development.

- Both practical and theoretical knowledge should be provided.

- The programme needs to incorporate opportunities for practice and

coaching. Peer learning using tutorials and case studies are desirable. Opportunities must be built in for sharing ideas and materials both during the sessions and afterwards.

- Teacher development programs should model the desired teaching behaviour using ICT to teach about ICT.

- Staff development activities should be evaluated for their effectiveness so that future activities can be designed to capitalize on such successes.

A useful mantra to achieve best practice is to "model the behaviour you are trying to develop" or to "practise what you preach": for example, adopt a mentor-based delivery method for teacher development if the goal is to encourage teachers to coach and mentor when using ICT. The mentors must have credibility and the presentation model must show respect for the teachers.

8.3.2 Implications for Professional Development of VTE Teachers

Although this study has focused on the professional development needs of VTE teachers in Brunei Darussalam – and therefore has limited generalisibility, it raises at least two important issues. First, lessons may be learned from this case study so that others might help avoid complacency within their context with respect to ICT provision. Second, the process of identifying the needs and the skills which match those needs cannot easily be overlooked by the relevant authorities and policy makers if the issue of embedding ICT skills is to be taken seriously. As

many writers and proponents have indicated as cited in the literature review, ICT has an important role in transforming the way people live, work and learn. In preparing the future citizens of Brunei Darussalam for skilled workforce as well as life-long learning, VTE needs to consider and respond to these wake-up calls. The imperative appears to be the need to review and re-align VTE's existing strategies used in instructional practices by putting more emphasis on developing and producing more self-directed and life-long learners. VTE teachers in the VTE system must have at the very least, a high level of competency in ICT knowledge and skill if not more. This also applies to the people in the institutions who train, support, advise, manage and evaluate their work.

There is, of course, a further dimension to this. VTE teachers also need to develop awareness of how ICT can be used as an integral part of the process and the management of teaching and learning. Other benefits of ICT include its potential to enhance and enrich education and add to its enjoyment; providing access to electronic information sources and interactive learning resources. ICT also has the power to encourage in learners the research based, flexible and effective forms of learning that will contribute to their growing capacity to learn and prepare them for the challenges in later life. Every VTE teacher must be seen as a potential leader and all of them are walking on the road to ICT leadership because the future of VTE and the successful integration of ICT in VTE institutions depend on them. The leaders and policy makers at DTE need to change their perceptions of VTE teachers.

The teacher's attitude towards ICT is important for successful implementation in the practice of learning and teaching. For example, in disciplines such as nursing, computer use is practically unavoidable and this could result in taking technology for granted. In the midst of this, the teacher faces the challenge of passing on to students an understanding of the role of 'intuitive feel', as in making a diagnosis, without relying entirely on machines. At the other extreme, if the teacher is nervous about using technology, this attitude will find its way to the students.

Too often, efforts to help teachers learn about educational uses of ICT begin, and end, with short demonstration sessions where the 'expert' puts the hardware and software through its paces while impressed (and sometimes intimidated) novices watch. When staff development for teachers does include hands on work, it is often during scheduled 'periods' right after a demonstration. While such practice may help teachers become familiar with the mechanics of using the hardware and software, it does little to help the teacher with the many professional issues that crop up when an innovation is introduced into the practice of teaching and learning.

It is crucial that the student sees teachers use ICT as a tool in his or her work, and not just as a teaching device. Utilizing ICT as a natural way to do one's work is the best example for encouraging students to use ICT appropriately. Working with students gives the teacher a direct experience of the benefits and perils of technology. It also enables students to see the teacher in a new light, as a learner,

a factor that goes a long way in facilitating a view of education as an ongoing process. Much of a teacher's expertise with students lies in what he or she has internalized over years of teaching.

In many colleges, VTE teachers often find themselves teaching in an environment where a significant proportion of the class has had some previous exposure to computing at home or in their previous schools/colleges, while others have had little or no experience. What in retrospect seems simple and straightforward often appears daunting to the novice, while it is boring for students with previous knowledge. The first encounters with the chosen technology should be structured and pruned in such a way that important strides in learning can be made by the student without feeling either lost in a sea of new information or feeling totally unchallenged.

Several critical success factors in staff development activities that address the major issues may be identified from the results of the study. Such activities should occur within an environment that provides adequate time for and access to professional development opportunities; provides ongoing programmes of support for teachers and trainers, and technology renewal/updating; ensures that the hardware, software and technology infrastructure are in place and are well supported. All of these support earlier research findings such as Oliver (1994), Becker (1994), Schoefield (1995), Bosner & Daugherty (1994) Yocam & Wilmore (1995), Wilburg (1997), Davis & Somekh (1997), Wolfson & Willinsky (1998), Russell *et al.* (2000) – (see Chapter 3 section 3.5.5. pp. 102-109).

This calls for on-going or continuous support for professional development of VTE teachers. The importance of training and staff development programmes has grown with a plethora of newer and more versatile tools becoming available. It is important for VTE teachers to be comfortable with and appreciative of the new and ever-changing features of ICT. There are few things as de-motivating as watching someone wrestle with technology when it is supposed to simplify a task or be enjoyable. While all teachers do not have to be experts, they should be familiar with what could go wrong, so that they are not completely at a loss as to what to do. It is no small task to learn new technologies, and to find ways to integrate them into the curriculum. Typically, the workload also tends to distance teachers from advancements in their field. Attending workshops and participating in discussion groups are found to be quite useful in acquiring basic skills and ideas. It is important to get a feel of the kinds of complexities involved in using ICT from others actually using it, before one works with one's students using the new technology. Knowledgeable and skilled members of staff need to share their expertise and offer appropriate courses for colleagues who may be interested in learning how to use ICT in learning and teaching effectively.

Another issue that needs addressing is the availability of funding for ICT and the slow rate at which this funding is being deployed. As a result, lack of access to the technology on a broad basis by students and teachers creates a problem. The resource issue is both financial and technical; both are needed to provide the vital hardware and software infrastructure, maintenance and system renewal. Technical support services need to be delivered in a just-in-time

fashion. Lack of time for staff development and for developing and integrating ICT in the classroom is a fundamental problem. Most staff development activities can't reach enough teachers fast enough. It was evident that the conduct of staff development activities made no assessment of needs about where teachers are in their knowledge and skill levels. A key issue in designing teacher development programmes is to make ICT relevant for teachers and must be contextualised. When time for professional development is seen as an "additive problem" and teachers have to make choices about priority, technology training can suffer. Teachers' number one concern is for their students and, according to one interviewee, teachers resist using technology-based curriculum support materials if they think that a wider variety of quality materials exists in more conventional formats. During the summer of 2000 field study, I came across cases of VTE teachers having to buy teaching materials and learning resources out of their own pockets because of the "lack of college budget". This problem is exacerbated in teaching environments where operational constraints to using technology, such as poor access or inadequate technical support, are issues.

The results of the case study indicate that little effort has been directed at examining professional development needs with regard to ICT for VTE teachers, although staff development and training with respect to ICT is seen as needed and should form an integral part of the culture of teaching. Time, resources and access are the three interrelated issues viewed as critical in all three VTE colleges. The literature of educational change cited in Chapter three calls for the development of individual and organisational learning capacities to provide coherence in a

constantly changing educational environment. A collaborative culture has been identified as the culture that is most facilitative of organisational learning and development. In the case of Brunei VTE system, the way in which teacher professionalism has evolved and systemic issues such as time allocation continue to mitigate against the development of such cultures. Any institutional development work needs to take account of this issue by having an implicit understanding of the specific institutional culture (see section 3.4.5 on page 77). The need for "new skills" (including survival skills - aligned to ICT) challenges VTE institutions to prepare themselves and individuals that they train to shift their mindsets - from those that see VTE institutions as merely having a primary function of 'dispenser' of information and 'one-stop' agents or training centres to ones which train, develop and produce 'knowledge workers' and 'life-long learners'. To achieve this goal in a meaningful way, VTE institutions need to re-align the framework of their organisation and restructure and reprocess them to form learning organisations (see section 3.4.4. on page 71).

8.3.3 Implication for Policy Development

The study showed that many VTE teachers and managers were not aware of the existence of VTE policies and they seemed to perform their duties with unclear understanding or reference to the purpose or goals to be achieved. Their actions and decisions were not always guided by HRD and VTE policy considerations, if any. This hampered effective and desired outcomes simply because of the absence of effective policies. The inadequate provision of physical resources had been shown to affect quality and the morale and commitment of VTE teachers. The system calls for facilitative and participative structures to be emplaced. The results of the study revealed that factors such as unclear roles and responsibilities, too centralised power, unsystematic planning and monitoring processes, ineffective information-sharing and problem-solving activities, ineffective co-ordination and collaborative mechanisms had all impeded the process of innovation and its implementation. The results of the study also suggest that there is room for improving the leadership potential of the VTE managers operating at various levels in terms of their qualities, abilities, confidence and commitment. The VTE system, therefore, demands the formulation of strong and effective policies to effect the process of change.

There is an urgent need for a comprehensive staff-development policy in the VTE system. There should be targeted professional development programmes based on the needs of the VTE system rather than staff willingness or inclination alone. Such a policy can be developed through the establishment of a unit, say a professional development committee, to assess staff training needs by accessing

the expertise of experienced expatriate staff in local (in-college) staff development and by utilising recently-trained staff to share their newly acquired knowledge and skills and experience with other staff members. These suggestions are consistent with the concepts of 'learning organisation' where people are engaged in life-long learning and continuous improvement for the betterment of the VTE system.

8.3.3 Implications for Further Research

The result of the study has demonstrated that certain aspects of human resources seriously hampered the process of innovation and change for ICT in the VTE institutions in Brunei Darussalam. These include the shortage of VTE teachers in specialised areas such as ICT, unsystematic professional and staff development programmes, lack of appropriate competencies, and variable staff attitudes, motivation and commitment. Aspects of physical resources such as classrooms, workshops, laboratories, equipment and facilities and learning resources were also unsatisfactory. These had affected the quality of the morale and commitment of the VTE teachers and students. In other words, the study has provided broad base-line information for VTE decision-makers and policy planners on the current state of affairs of the innovation of ICT and highlighted the necessity to address the professional development needs of the VTE teachers in the VTE system. More in-depth studies on these specific areas are thus recommended.

Chapter Nine
A Reflection: The Process of Writing a Case Study in Brunei Darussalam

"And now the end is near... and so I face the final curtain..."
Anka, P. (1968).

Readers of this thesis might be surprised as to why there was a sudden change of tone to the writing up of the case study in Brunei Darussalam. This would become evident when reading chapters 6, 7 and 8 on the reporting of the main study; data presentation chapters, analysis, discussion and the deduction & conclusion drawn from the study. Questions might be raised as to why the cases in the Brunei Darussalam's study were not presented case by case – individual institution one by one just like the ones I did for the three UK's FE colleges presented in chapter 5. Much of this was to do with the dilemma and the challenges faced when I first attempted to write the case study. On the one hand, I attempted to present a well-balanced account of the conditions and reality of the situation in the VTE sector during the period of the study (1999-2001) and at the same time strengthening the validity and reliability of the data as discussed in Chapter 4; on the other hand, I struggled with the need to be careful when it comes to revealing the identity of the individuals in the colleges involved. This short chapter is a reflection on the process of producing the case study report and to share my experiences on some of the issues that I grappled with and to discuss how I minimised and/or overcame these problems. The main aim of this chapter is to help future researchers who might face similar challenges of sensitivities in their own political and cultural contexts.

I mentioned in chapter 4 about the assurance that I gave to the participants in the first three VTE institutions (colleges A, B and C) that their identities will be concealed in the eventual case reporting. However, when I first attempted to write on the backgrounds of the individual colleges, I found that I was faced with the very problem that I wanted to avoid – the number of participants in the three colleges was small and as their names will be listed in the thesis (in Appendix G), people in Brunei (*where everybody seems to know everybody else*) would be able to easily identify who they are and where they are. And from the views and opinions that they gave, some of which were very explicit and/or can be regarded as going 'against' the MIB philosophy and/or the government policy, there might be a danger that they might be found out. I did not experience such feeling of dilemma or fear when I did the earlier work in the three UK FE colleges. The approach of contextualising the colleges one by one, therefore, was thought to be wrong and should be avoided.

One way of rectifying the problem, was to cluster all of the three colleges and to look at the group as just being one case. This is by way of treating the VTE system as the boundary of the case. I reckoned this approach should be valid considering the total number of students in the three colleges was about 1500, which was comparable to the total number students in a typical FE college in the UK. By employing this approach, I have not really departed from my main endeavour – *to investigate the use of ICT in the VTE system*. Hence the data collection, analysis and presentation of the data from the interviews were as presented in Chapter 6. However, having done

that, I was faced with another dilemma. There were (*then in 1999-2000*) seven VTE institutions under the umbrella of the Department of Technical Education, while I had only collected data from three! The validity and reliability of the data obtained were questionable – they might still not present the reality of the whole VTE system.

One of the main reasons why the questionnaire was included as a method of data collection was to offer remedy to the problem encountered above. The objective was to include all of the seven VTE colleges so as to give a better or more representative case. However, as mentioned in the beginning of Chapter 7, even though no data was received from College G, the results from the six other colleges were thought to be enough to present the case of the whole VTE system.

The decision of clustering the colleges into groups of three was deliberate. Grouping colleges A, B and C enabled me to analyse if anything has changed. But more than that, the data obtained from the questionnaires of this cluster (structured and larger sample) was also used to confirm and validate the data obtained from the interviews (semi-structured and smaller sample). Putting colleges D, E and F into a group did not raise a major comparability issue, as in each cluster there was a 'vocational school'; 'a technical college' and 'a higher institution'. Even though this was incidental, it was later found to be an advantage because it then enabled me to do the cross-checking and compare data between the two clusters – hence strengthening the validity and reliability of the results.

Finally, the process of writing up the concluding chapter 8 was not one linear straight journey. Amongst others, friends and colleagues in the VTE system was invited to read and re-read the chapter as the discussions and the conclusions drawn were based on the issues that arose from the results of the interviews and the questionnaires. This exercise was done so as to safeguard their interests and to heed the ethical issues that might arise from the research study.

This chapter began by quoting "My Way", a song once popularised by the late Frank Sintra, written by Paul Anka back in 1968. Although the message of the song was "I did it my way", I must admit that the research work was not completed the way I preconceived it initially.

APPENDICES

Appendix A

VTE institutions and Programme Areas

VTE Institutions	Programme areas
Institut Teknologi Brunei (www.itb.edu.bn)	Higher Technician Level Programmes Higher National Diploma (HND) in Business and Finance; Computer Studies; Electrical Power and Building Services Engineering; Civil Engineering; Mechanical Engineering, and Communication and Computer Systems Engineering.
Maktab Teknik Sultan Saiful Rijal (www.mtssr.edu.bn)	Technician Level Programmes National Diploma (ND) in Aircraft Engineering (Airframe/Engine); Aircraft Engineering (Avionics); Automotive Engineering; Business & Finance; Computer Studies; Construction; Electronic and Communication Engineering; Electrical & Electronic Engineering; Estate Management; Fabrication and Welding Engineering; Interior Architecture; Radio, TV & Electronic Technology; Science; Secretaryship; Surveying; Mechanical Engineering; Hotel and Catering Management; Travel and Tourism Services, and Vehicle Body Engineering. Pre-National Diploma (PND) in Engineering; Aircraft Engineering; Armament Engineering; Business & Finance; Computer Studies; Construction; Electrical & Electronic Engineering; Fabrication and Welding Engineering; Radio, TV & Electronic Technology; Science; Secretarial Studies, and Travel and Tourism Services. Craft Level Programmes Basic Cookery, Basic Food and Beverage Service; Carpentry & Joinery; Furniture & Cabinet Making; Accomodation; Motor vehicle Mechanic; Painting & Decorating; Plumbing & Pipefitting; Vehicle Body Engineering, and Advanced Cookery and Services.
Maktab Kejuruteraan Jefri Bolkiah (www.mkjb.edu.bn) Maktab Kejuruteraan Jefri Bolkiah	Technician Level Programmes ND in Automotive Engineering; Computer Studies; Electrical and Electronic Engineering; Marine Engineering; Manufacturing Engineering; Plant Engineering; Refrigeration & Air-conditioning Engineering; Welding & Fabrication Engineering,

(continued)	and Instrumentation and Control Engineering. PND in Engineering; Electrical and Electronic Engineering. Craft Level Programmes Electrical; Machining; Motor Vehicle Mechanic; Refrigeration and Air-conditioning, and Welding and Fabrication.
Maktab Jururawat Pengiran Anak Puteri Rashidah Saadatul Bolkiah (www.mjpaprsb.edu.bn)	Diploma/Higher Diploma Level Programmes National Diploma in Nursing; Conversion Course (Nursing); High Dependency Nursing; Community Health Nursing; Cranio-Mascillo Facial Surgery, and Midwifery.
Sekolah Vokasional Nakhoda Ragam (www.svnr.edu.bn)	Craft Level Programmes Bricklaying and Concreting; Carpentry and Joinery; Electrical; Electronics; Furniture and Cabinet Making; Painting and Decorating, Plumbing and Pipefitting.
Sekolah Vokasional Sultan Bolkiah (www.svsb.edu.bn)	Craft Level Programmes Clerical Studies (Accounts Clerk); Clerical Studies (Computer Clerk); Clerical Studies (General Office Clerk); Dressmaking and Tailoring; Machining; Motor Vehicle Mechanic; Refrigeration and Air-conditioning; Vehicle Body Engineering, and Welding and Fabrication.
Pusat Latihan Mekanik (www.plm.edu.bn)	Craft Level Programme Heavy Construction Machinery.

Appendix B

Interview Schedule

1. (Warm up chat and establish rapport)

    a. Gather personal information about interviewee (if not done already or use this session to clarify: Name, gender, age, number of years working in the college, number of years teaching (in the college or elsewhere), current job responsibilities.

    b. Explain the nature of the research study to the interviewee and what the current interview session entails.

    c. General questions about personal interest and use of ICT, and teacher's perception of its use in learning, teaching and administration.

        i. Do you use it? How do you use it?

        ii. What are its advantages/disadvantages?

        iii. How did you learn to use ICT? Self? Former education? From Friends/colleagues? College in-house training?

        iv. Is 'staff development' in ICT for teachers in place? How was staff development handled? Was it sufficient? What else need to be done – in terms of enhancing teacher's knowledge and skills in ICT?

        v. Is there any *programme of staff development*? In the college? DTE? MOE?

        vi. Does college adopt the notion of *continuous professional development*?

2. ICT innovation and change in the college:

    a. Perception of the college's goals in terms of ICT innovation

        i. Its beginning – if known – Who initiated the ICT implementation? Who or which department/section first embraced it?

        ii. Were there any resistance? Among teachers or administrators?

        iii. How were problems (related to ICT innovation – if any) tackled or handled?

        iv. What else – (other problems) that need to be overcome?

v. Is there any ICT strategy?

- If yes, who developed it? Individuals? Groups? How well is its implementation? Is it in place?
- If no, do you know what 'ICT strategy' is? Will it be appropriate for this college?

b. Perception of the impact of the use of ICT so far:

i. How effective are teachers with ICT?

ii. What are the most common uses? Do students gain the most/least from it?

iii. Is there any problems? Resources/ Technical Support/ Network provision?

iv. What is the general level of teacher ICT skills?

v. How do teachers gain access to ICT? Office? At home? Computer lab?

vi. How many teachers have access to computers in their office? At home? Use of laptops?

3. Your own reactions and attitudes towards ICT

a. How does it affect you?

i. What do you think would happen if all ICT resources were removed from this college?

ii. How does it influence your motivation for learning?

iii. How does it affect your quality of work?

b. Perception of the values that ICT bring you personally and to the college.

c. Were the ICT resources really needed or would it be better used on something else?

d. Perception of the problems that ICT has created, if any – e.g. Internet and/or email abuse, virus perhaps or theft of college ICT resources, etc.

4. Resource provision:

    a. Description or knowledge of college ICT resource provision to support learning, teaching and management of college – if known
        i. The management of resources – who manage it? Group or individuals?
        ii. How are new members of staff prepared for it? [relate this to the question on staff development earlier]
        iii. Is technical support provided – to keep things going? If yes, how adequate is this support?
        iv. Teachers instant support? e.g. do teachers get 'help' if they faced problems?

    b. Issues of maintenance of ICT resources – if known e.g. who finance the maintenance?

5. Conclusion

    a. How could ICT be used more effectively in this college?
    b. What would be needed to improve the current situation?
    c. Any plans for further development – future needs? E.g. plans for further training in ICT?

Consent Form

AN INVITATION TO PARTICIPATE IN A RESEARCH STUDY

Dear Colleagues,

I am conducting a research study into the use of ICT in VTE in Brunei Darussalam. Specifically, I am looking at the professional development needs of VTE teachers. As you probably know, the development of ICT in our VTE system has changed many aspects of our work – as teachers, administrators and managers of the VTE institutions. It is acknowledged that this continual change is going to affect us, not only in terms of the rapid development of ICT but also because of the socio-economic forces and other factors. We, at VTE, I suppose, need to respond to these change forces.

The purpose of this study is to gather information, using semi-structured interviews, from staff on the issues of change and innovation brought about by ICT. I would like to know your views on the current development of ICT in your college, people's attitudes, values and beliefs, people's experiences on how they have used ICT, what hinders them from using it effectively and your views on staff development and training in this area, etc. Your input will be invaluable for this research study.

Please indicate your agreement about participating by returning the following form of consent. Participation is of course, voluntarily, and any information gathered will be held in the strictest confidence.

Cut _____

FORM OF CONSENT

Dear Gilbert,

Yes, I would like to participate in your project. I am available for up to an hour one-to-one interview on the following date, time and place:

Date:_____

Time:_____

Place: _____

Name:_____

Telephone (Preferably mobile):_____

Appendix C

Questionnaire on the Use of Information and Communications Technology (ICT) in Vocational and Technical Education (VTE) in supporting the professional development needs of VTE teachers in Brunei Darussalam

Dear friends and colleagues,

The purpose of this questionnaire is to obtain views from the VTE Teachers on the use of ICT in their institutions and to find out the priorities placed for the development of skills and knowledge in this area.

I shall be grateful if you could help me by responding to this questionnaire.

The questionnaire consists of 28 items grouped under 5 major sections. Please respond to **all** sections in the manner prescribed. The questionnaire is not intended to take more than 20 minutes of your time. The confidentiality of information and your anonymity is guaranteed. Your responses will be used specifically for the purpose of this research study and will not be used for any other purpose.

Should you have any queries regarding this questionnaire, please do not hesitate to email me using one of the following email addresses:

g.c.w.fung@gre.ac.uk or gilbert@gfung.freeserve.co.uk or fg38@hotmail.com

Thank you for agreeing to participate and for sparing some of your valuable time in responding to this questionnaire.

Please return your completed questionnaire to the assigned contact person from whom you received this questionnaire by Friday November 30, 2001.

Yours truly,

Gilbert C W Fung
Research Scholar
PCET Research
The School of Education and Training
University of Greenwich

A. Your Background

1. Your gender

   Male ☐ Female ☐

2. To which age group do you belong

   Below 25 ☐
   25 – 35 ☐
   36 – 40 ☐
   41 – 45 ☐
   46 – 50 ☐
   above 50 ☐

3. Are you an/a

   Assistant Technical Instructor? ☐
   Technical Instructor? ☐
   Assistant Senior Technical Instructor? ☐
   Senior Technical Instructor? ☐
   Education Officer? ☐
   Senior Education Officer? ☐
   Lecturer? ☐
   Senior Lecturer? ☐
   Principal Lecturer? ☐
   Others? ☐
   Please specify:.....

4. Do you have any managerial responsibilities in addition to your teaching duties?

   Yes ☐ ☐

   If yes, please specify:.....

5. Number of years teaching

   Less than a year ☐
   1 – 3 ☐
   4 – 6 ☐
   7 – 9 ☐
   10 – 15 ☐
   More than 15 years ☐

6. Which educational / professional qualifications do you have? (please tick all that apply)

Cert Ed, CTE, Diploma in Teaching, Diploma in Education ☐

PGCE, PGCTE ☐

BEd, BA, BSc ☐

MEd, MA, MSc ☐

MPhil, PhD ☐

Others, please specify:..... ☐

7. Have you ever taught in any Vocational and Technical Education (VTE) institution *outside* Brunei Darussalam?

Yes ☐ No ☐

If yes, where:.....

8. What programme level(s) are you currently teaching? (please tick [✓] all that apply)

NVC	☐	PND	☐
NTC	☐	ND	☐
PNC	☐	HND	☐
NC	☐	Degree	☐

Others, please specify:..... ☐

B. Use of Information and Communications Technology (ICT)

9. Do you use ICT for work?

Yes ☐ **please go to Q. 10**

No ☐ **please go to Q. 13**

10. How would you describe your level of competence

Highly competent ☐ Competent ☐ Basic competence ☐ Not yet competent ☐

11. In the table below, please indicate by ticking [✓] as many as necessary,
    a) how often you use the ICT resources listed, and
    b) where would you normally use them.

	Frequency				Place				
	Every day	Once a week	Occasionally	Never	In the classroom	In the computer	In my office	At home	Elsewhere
Office tools e.g. Wordprocessors and Spreadsheets									
Desktop Publishing									
Internet									
E-mail									
Educational Software/CD-Roms									
AutoCAD / MYOB / Simulation software									
Others, please specify:									

12. Please indicate how you keep yourself up to date with ICT. Please tick all that apply:

- Talking about it with colleagues ☐
- Talking about it with other people (outside the institution) ☐
- Participating in staff development activities inside the in☐ution
- Participating in staff development activities outside the i☐itution
- Reading computing and professional journals ☐
- Online material (Internet and/or emails) ☐
- Others, please specify:..... ☐

Please go to Q. 14

13. Please indicate your reasons for *not* using ICT in your work as a teacher.

- Resources not available ☐
- Resources not accessible when needed ☐
- Resources available but do not know how to use ☐
- Lack of skills ☐
- I do not need it ☐
- Lack of technical support ☐
- No time ☐
- Other reason(s), please specify:.....☐....

14. If you do use ICT for your work, please indicate what prevents you (if any) from using it more fully:

- Resources not available ☐
- Resources not accessible when needed ☐
- Resources available but do not know how to use ☐
- Lack of skills ☐
- Lack of technical support ☐
- No time ☐
- Other reason(s), please specify:.....☐....

15. Whether or not you use ICT or computers, please indicate the extent to which you agree with each of the statements below by ticking [✓] the most appropriate box. There is space below for comments you might want to add.

	Strongly agree	Agree somewhat	Neither agree nor disagree	Disagree	Strongly disagree
Computers scare me					
I don't know what I would do without ICT					
Some students are way ahead of me in ICT					
I know the basics of ICT but that is all					

	Strongly agree	Agree somewhat	Neither agree nor disagree	Disagree	Strongly disagree
I manage information more effectively because of ICT					
I use ICT, but not for work purposes					
I wish ICT had never been invented					
ICT makes my teaching and/or related work much easier					
I find using ICT time consuming					
I receive enough support in my use of ICT					
ICT is all moving too fast for me					
ICT helps me communicate with colleagues					
My institution has a positive interest in ICT					
I feel lost in the information age					
I don't have the appropriate ICT skills to use it effectively					

Please use the space below to add comments (if you have any) to explain why you ticked the boxes above the way you did:

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16. What do you feel would encourage your (further) use of ICT? Please use the space below to respond:

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17. Is there anything that discourages you from using ICT?

Yes ☐ No ☐ Don't know ☐

Please give your comments below:

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C. Staff Development and Training

18. Are you aware of any ICT staff development in your institution?

Yes ☐ No ☐

If yes, please specify:

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.....

19. Have you ever received any training/short courses related to ICT?

Yes ☐ **please go to Q. 20**

No ☐ **please go to Q. 21**

20. Please give details of any training/short courses attended specifying the nature, place and duration. An example is given in *italics*. Also please indicate by ticking [✓] the appropriate boxes whether the training/short courses have been useful for your present role:

Nature	Place	Duration	Useful	Not	Can't
e.g. Interactive Multimedia	*SEAMEO-VOCTECH*	*3 weeks*			✓

21. Please use the space below to explain your reason(s) for ticking [✓] the box of the non-/usefulness of the training / short courses for your present role:

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Please go to Q. 23

22. Why have you *not* received any training/short courses related to ICT?

ICT training/short courses are not of interest to me ☐

ICT training/short courses have not been made available ☐

I have not been offered the *right* kind of ICT training/short courses ☐

Other reason(s), please specify below: ☐

.....
.....
.....
.....

23. Please indicate the extent to which you agree with the following statements:

	Strongly agree	Agree somewhat	Neither agree nor	Disagree	Strongly disagree
I feel ICT training isn't appropriate to my teaching					
I find short courses in ICT useful					
I don't think I need ICT skills to progress in my profession					
I'm interested but could not find the time to learn					
I'm interested but don't have access					
I'm interested but training doesn't seem to be available					
I don't see the need to learn about ICT					

I don't need to use ICT in my teaching					
I really want to know more about developing my skills in ICT					
No-one else is bothering					
I feel my skills and knowledge in ICT are adequate					
ICT training isn't a priority for me					

Please use the space below to add comments (if you have any) to explain why you ticked the boxes above the way you did:

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D. ICT Strategy

24. Are you aware of any long-term plan (strategy) for ICT that your institution is acting on at the moment?

Yes ☐ (please go to Q. 25)

No ☐ (please go to Q. 26)

Not sure ☐ (please go to Q. 26)

25. In the table below, please indicate how appropriate the institution's ICT strategy is in serving the needs of (a) the students (b) the staff (c) the department or section you are in (d) the institution (e) the department of Technical Education (f) the Ministry of Education and (g) the country. Please tick [✓] only one for each row.

	Very appropriate	Appropriate to some	Not appropriate	Too early to tell	Not Sure of details
(a) students' needs					
(b) staff's needs					
(c) Departmental/Sectional needs					
(d) Institutional needs					
(e) DTE's needs					
(f) MOE's needs					
(g) National needs					

26. Please use the space below to express your feeling (if you have any) about an ICT strategy:

.....
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27. Please indicate the extent to which you agree with the following statements:

In this institution…..	Strongly agree	Agree somewhat	Neither agree nor	Disagree	Strongly disagree
the strategy for ICT is well-documented and clearly-defined					
I am yet to see more people who are ICT-enthusiasts					
the talents of ICT-champions are fully-utilised					
when it comes to budgeting, ICT is not a priority					
ICT is seen as something separate from other management issues					
the link between the overall college vision and its vision for ICT is clear					
I feel that there is a lack of shared vision for ICT					
there are specific targets for ICT					
teachers' responses to change for ICT are lukewarm					
there is a lack of time to think about anything, let alone ICT					

Please use the space below to add comments (if you have any) to explain why you ticked the boxes above the way you did:

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E. Further Development – Your Views Count!

28. Please feel free to use the space below to give your additional comments. You might want to include your views on how or what you would like changed for the future. Or you might want to comment on how you would expect the policy in relation to ICT to develop in the near future; say in five years time.

-- END OF QUESTIONNAIRE --

Thank you for your time and participation.

I might want to follow up this questionnaire with possibly communications through emails. Should the need to do so is necessary, would you be prepared to take part in this on-line 'interview'?

If so, please tick the box below and provide your name, college/school, telephone and email address.

[ ] I am interested in taking part in the follow-up on-line interview

Name:.....

College/school:.....

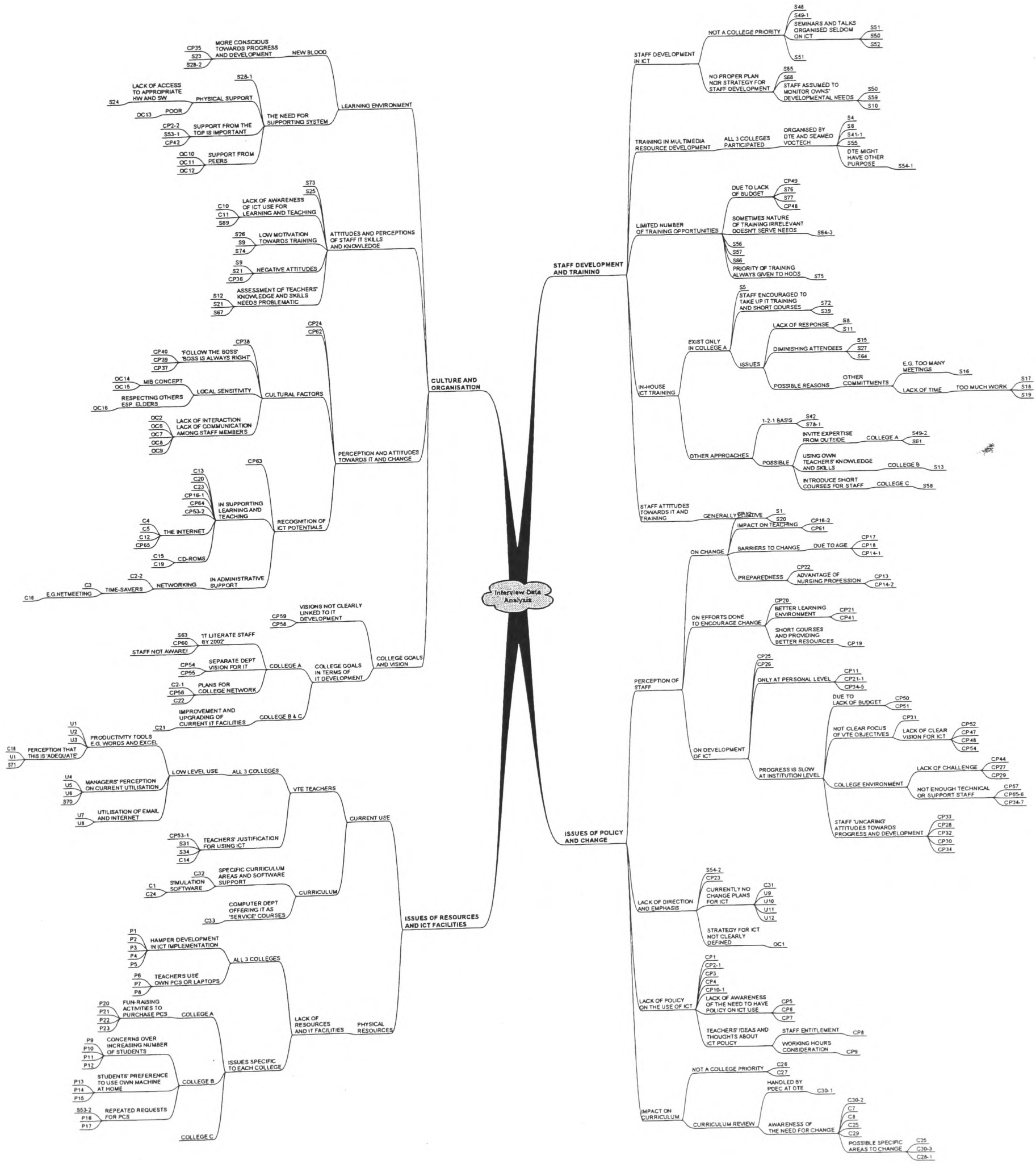
Email:.....

Day time telephone number: .....

Once again, thank you very much for your assistance.

Please remember to return your completed questionnaire to the assigned contact person from whom you received this questionnaire by **Friday November 30, 2001**.

Appendix D



Appendix D MindMaps of Interview Analysis.emm

Appendix F

Tabulated Results from the Questionnaires

Table 7.1 The number of questionnaires sent and returned [data from Colleges A, B and C]

College	Sent	Returned	%Return
A	15	10	67%
B	20	12	60%
C	40	23	58%
Total	75	45	60%

Table 7.2 the number of respondents in different age groups [data from Colleges A, B and C]

Age Range	Frequency	Percentage
25 -35	11	25%
36 – 40	11	25%
41 – 45	8	18%
46 – 50	6	14%
Above 50	8	18%
Total	44	100%

Table 7.3 Teaching position (titles) in the college [data from Colleges A, B and C]

Titles	Frequency	Percentage
Technical Instructor	3	7%
Assistant Senior Technical Instructor	9	21%
Senior Technical Instructor	16	36%
Education Officer/Lecturer/Tutors	13	30%
Senior Education Officer/Senior Lecturer	1	2%
Others	2	4%
Total	44	100%

Table 7.4 Managerial Responsibilities [data from Colleges A, B and C]

Managerial Responsibility	Frequency	Percentage
HOS, HOD, AHOS, AHOD	4	17%
Tutor (grp, semester, year, students)	2	8%
Coordinator (grp, prog, sub, course)	13	54%
Senior Manager (Registrar, etc)	5	21%

Table 7.5 Number of years teaching [data from Colleges A, B and C]

Number of years teaching	Frequency	Percentage
1 – 3	2	4%
4 – 6	10	23%
7 – 9	6	14%
10 – 15	12	27%
More than 15	14	32%

Table 7.6 Educational/Professional Qualifications of the respondents [data from Colleges A, B and C]

Educational/Professional Qualifications	Frequency	Percentage
CertEd, DipEd, CTE, DipTeaching	26	59%
PGCE, PGCTE, PGDip	7	16%
BSc, BEd, BA	3	7%
MSc, MEd, MA	6	14%
MPhil, PhD	2	4%

7.7 Places where the expatriate teachers were employed before Brunei [data from Colleges A, B and C]

Country	Frequency	Percentage
ASEAN (Malaysia, Singapore, Burma, Phillipines)	2	20%
United Kingdom or Europe	3	30%
Australasia (Australia, New Zealand)	3	30%
Middle East, India, Sri Lanka, Africa	2	20%

Table 7.8 Current level(s) of teaching [data from Colleges A, B and C]

Levels	Frequency	Percentage
Diploma in Nursing	11	25%
NTC	9	21%
NVC and NTC	4	9%
ND	7	16%
NTC and ND	2	4%
PND and ND	9	21%
NC, PND and ND	1	2%
NTC, PND and ND	1	2%

Legend: NTC – National trade certificate; NVC – National Vocational Certificate; PND – Pre-national Diploma; ND – National Diploma

Table 7.9 Current level(s) of teaching Vs Colleges [data from Colleges A, B and C]

College	Levels	Frequency	Percentage
A	NTC	6	60%
	NVC and NTC	4	40%
B	Diploma in Nursing	11	100%
C	NTC	3	13%
	ND	7	30%
	NTC and ND	2	9%
	PND and ND	9	39%
	NC, PND and ND	1	4%
	NTC, PND and ND	1	4%

Legend: NTC – National trade certificate; NVC – National Vocational Certificate; PND – Pre-national Diploma; ND – National Diploma

Table 7.10 The number of questionnaires sent and returned [data from Colleges D, E and F]

College	Sent	Returned	%Return
D	20	20	100%
E	20	17	85%
F	15	07	47%
Total	55	44	80%

Table 7.11 Age range [data from Colleges D, E and F]

Age Range	Frequency	Percentage
Below 25	1	2%
25 -35	18	43%
36 – 40	5	12%
41 – 45	7	17%
46 – 50	7	17%
Above 50	4	10%
Total	42	100%

Table 7.12 Teaching Position in the college [data from Colleges D, E and F]

Titles	Frequency	Percentage
Technical Instructor	4	10%
Assistant Senior Technical Instructor	10	24%
Senior Technical Instructor	3	7%
Education Officer/Lecturer/Tutors	11	26%
Senior Education Officer/Senior Lecturer	13	31%
Principal Lecturer	1	2%
Others	0	0%
Total	42	100%

Table 7.13 Managerial Responsibilities [data from Colleges D, E and F]

Managerial Responsibility	Frequency	Percentage
HOS, HOD, AHOS, AHOD	10	40%
Tutor (grp, semester, year, students)	1	4%
Coordinator (grp, prog, sub, course)	9	36%
Others (admin, ECA)	5	20%

Table 7.14 Number of years teaching [data from Colleges D, E and F]

Number of years teaching	Frequency	Percentage
Less than a year	2	5%
1 – 3	9	21%
4 – 6	9	21%
7 – 9	4	10%
10 – 15	6	14%
More than 15	12	29%

Table 7.15 Teaching and Professional Qualification Vs Colleges [data from Colleges D, E and F]

College	Qualification	Frequency	Percentage
D	CertEd, DipEd, CTE, DipTeaching	9	47%
	PGCE, PGCTE, PGDip	5	26%
	BSc, Bed, BA	4	21%
	Others	1	5%
E	CertEd, DipEd, CTE, DipTeaching	1	6%
	BSc, Bed, BA	1	6%
	MSc, Med, MA	10	62%
	MPhil, PhD	3	19%
	Others	1	6%
F	CertEd, DipEd, CTE, DipTeaching	4	57%
	BSc, Bed, BA	2	29%
	MSc, Med, MA	1	14%

7.16 Places where the expatriate teachers were employed before Brunei [data from Colleges D, E and F]

Country	Frequency	Percentage
ASEAN (Malaysia, Singapore, Burma, Phillipines)	7	78%
Middle East, India, Sri Lanka, Africa	2	22%

Table 7.17 Current level(s) of teaching Vs Colleges [data from Colleges D, E and F]

College	Levels	Frequency	Percentage
D	ND	5	26%
	NTC and PND	4	21%
	PND and ND	6	32%
	NTC, PND and ND	4	21%
E	HND	10	62%
	HND and Degree	6	38%
F	NTC and PND	2	29%
	PND and ND	2	29%
	NTC	3	43%

Legend: NTC – National trade certificate; PND – Pre-national Diploma; ND – National Diploma; HND – Higher National Diploma

Table 7.18: User of ICT vs. Colleges [data from Colleges A, B and C]

College	User of ICT	Frequency	Percentage
A	Yes	7	70%
	No	3	30%
B	Yes	9	82%
	No	2	18%
C	Yes	22	96%
	No	1	4%
Overall	Yes	38	86%
	No	6	14%

Table 7.19: Users of ICT vs. Age Groups [data from Colleges A, B and C]

	Respondents		Users of ICT	
Age Range	Frequency	Percentage	Frequency	Percentage
25 – 35	11	25%	10	91%
36 – 40	11	25%	9	82%
41 – 45	8	18%	6	75%
46 – 50	6	14%	6	100%
Above 50	8	18%	7	86%

Table 7.20: Level of Competence among Users (N=38) [data from Colleges A, B and C]

	Frequency	Percentage
Highly competent	3	8%
Competent	21	55%
Basic competence	11	29%
Not yet competent	3	8%

Table 7.21 Use of common ICT resources and their frequency of use [data from Colleges A, B and C]

ICT Resources	Percentage of user (N = 38)	Percentage of user who use them...			
		Daily	Weekly	Occasionally	Never
Office Tools (e.g. Word-processors and Spreadsheets)	97%	71%	3%	24%	3%
Desk Top Publishing	40%	8%	5%	26%	61%
Internet	79%	45%	10%	24%	21%
E-mail	80%	40%	8%	32%	21%
Educational Software/ CD-ROMs	66%	5%	8%	53%	34%
Simulation/Modelling Software	37%	3%	3%	32%	63%
Others (e.g. programming language)	0%	0%	0%	0%	0%

Table 7.22 Use of common ICT resources and the place they were normally used [data from Colleges A, B and C]

	Percentage of users who normally use them in these places:				
	Classroom	Computer Lab	Staff Office	Home	Elsewhere
Office Tools (e.g. Word-processors and Spreadsheets)	8%	24%	79%	71%	5%
Desk Top Publishing	3%	11%	21%	26%	0%
Internet	0%	8%	8%	74%	0%
E-mail	0%	5%	11%	71%	0%
Educational CD-ROMs	5%	5%	29%	42%	0%
Simulation and Modelling	3%	5%	16%	24%	3%
Others (e.g. programming language)	0%	0%	0%	0%	0%

Table 7.23 Reasons given by respondents for not using ICT in their work [data from Colleges A, B and C]

Not Using ICT for work because...	N = 44	Percentage
resources are not available	18	41%
resources are not accessible	15	34%
lack of skills	11	25%
lack of technical support	8	18%
no time	7	16%
don't know how to use	3	7%
None of the above (i.e. other reasons)	3	7%

Table 7.24 Factors that encourage further use of ICT [data from Colleges A, B and C]

Category	Number of respondents	Percentage (N=29)
Availability of and access to resources	20	69%
Support in terms of training and staff development	14	48%
Usefulness of ICT	4	14%
Interest	3	10%
Time	2	7%
Cost	1	3%

Table 7.25 *Keeping up to date with ICT (among users, N=38)* [data from Colleges A, B and C]

Keeping up to date with ICT (N=38)		
	n	n/N
Talking about it with colleagues	32	84%
Talking about it with other people outside college	24	63%
Online materials (Internet and/or emails)	23	61%
Computing and professional journals	15	40%
Participating in in-house staff development activities	14	37%
Participating in staff development activities outside	8	21%
None of the above	2	5%

Table 7.26: User of ICT vs. Colleges [data from Colleges D, E and F]

College		Frequency	Percentage
D	Yes	17	90%
	No	2	10%
E	Yes	16	100%
	No	0	0%
F	Yes	6	86%
	No	1	14%
Overall	Yes	39	93%
	No	3	7%

Table 7.27 Percentage of respondents who are users of ICT. [data from Colleges D, E and F]

Users of ICT...	Percentage
From colleges A, B and C	86%
From colleges D, E and F	93%
From Colleges D and F	89%
From all six colleges	90%
From five colleges (excluding E)	87%

Table 7.28 Users of ICT vs. Age Groups [data from Colleges D, E and F]

	Respondents		Users of ICT	
Age Range	Frequency	Percentage	Frequency	Percentage
Below 25	1	2%	0	0%
25 – 35	18	43%	17	94%
36 – 40	5	12%	5	100%
41 – 45	7	17%	5	71%
46 – 50	7	17%	7	100%
Above 50	4	9%	4	100%

Table 7.29 Level of Competence among Users (N=39) [data from Colleges D, E and F]

	Frequency	Percentage
Highly competent	5	13%
Competent	22	56%
Basic competence	12	31%
Not yet competent	0	0%

Table 7.30 User-defined level of competence across the six colleges [data from all six Colleges A, B, C D, E and F]

College	% of users who saw themselves as either competent or highly competent
A	57.2%
B	44.4%
C	72.7%
D	58.8%
E	87.5%
F	50.0%

Table 7.31 Use of common ICT resources and their frequency of use [data from Colleges D, E and F]

ICT Resources	Percentage of user (N = 39)	Percentage of user who use them,			
		Daily	Weekly	Occasionally	Never
Office Tools (e.g. Word-processors and Spreadsheets)	97%	92%	0%	5%	3%
Desk Top Publishing	41%	10%	5%	33%	51%
Internet	97%	72%	8%	13%	8%
E-mail	97%	64%	3%	28%	5%
Educational Software/ CD-ROMs	64%	10%	8%	46%	36%
Simulation/Modelling Software	49%	3%	5%	41%	51%
Others (e.g. programming language)	5%	3%	3%	0%	0%

Table 7.32 Use of common ICT resources and the place they were normally used [data from Colleges D, E and F]

	Percentage of users who normally use them in these places:				
	Classroom	Computer Lab	Staff Office	Home	Elsewhere
Office Tools (e.g. Word-processors and Spreadsheets)	5%	13%	95%	69%	0%
Desk Top Publishing	0%	0%	28%	23%	3%
Internet	0%	5%	72%	72%	3%
E-mail	3%	0%	64%	77%	3%
Educational CD-ROMs	5%	8%	41%	49%	3%
Simulation/Modelling	8%	13%	28%	28%	3%
Others (e.g. programming language)	5%	3%	3%	3%	5%

Table 7.33 Percentage of Users who normally use Internet and Email in their workplace [data from Colleges D, E and F]

College	Internet		Email	
	Frequency	Percentage	Frequency	Percentage
D (N =17)	13	76%	10	59%
E (N =16)	15	94%	15	94%
F (N = 6)	0	0%	0	0%

Table 7.4 Reasons given by respondents for not using ICT in their work [data from Colleges D, E and F]

Not Using ICT for work because...	N = 42	Percentage
resources are not available	20	48%
resources are not accessible	13	31%
lack of skills	10	24%
lack of technical support	10	24%
no time	9	21%
don't know how to use	8	19%
None of the above (i.e. other reasons)	2	5%

Table 7.35 Factors that encourage further use of ICT [data from Colleges D, E and F]

Category	Number of respondents	Percentage (N=26)
Availability of and access to resources	11	42%
Support in terms of training and staff development	9	35%
Usefulness of ICT	8	31%
Cost	2	7%
Time	1	4%
Interest	1	4%

Table 7.36 Keeping up to date with ICT (among users, N = 39) [data from Colleges D, E and F]

Keeping up to date with ICT (N=39)		
	n	n/N
Talking about it with colleagues	35	90%
Online materials (Internet and/or emails)	32	82%
Talking about it with other people	26	67%
Computing and professional journals	23	59%
Participating in in-house staff development activities	12	31%
Participating in staff development activities outside	6	15%
None of the above	4	10%

Table 7.37 Percentage of respondents who were aware of ICT staff development in their colleges [data from Colleges A, B and C]

College		Frequency	Percentage
A	No	6	60%
	Yes	4	40%
B	No	10	91%
	Yes	1	9%
C	No	14	61%
	Yes	9	39%

Table 7.38 Percentage of respondents who were aware of ICT staff development in their colleges [data from Colleges D, E and F]

College		Frequency	Percentage
D	No	12	63%
	Yes	7	37%
E	No	15	94%
	Yes	1	6%
F	No	5	71%
	Yes	2	27%

Table 7.39 Cross-tabulation Aware of staff Development / Received Training or short Courses related to ICT [data from Colleges D, E and F]

Aware of any ICT staff development in the College	Received training/ short courses Related to ICT	Frequency	Percentage
No	No	25	83%
	Yes	5	17%
Yes	No	4	29%
	Yes	10	71%

Table 7.40 Nature, Place and Usefulness of training or short-courses received [data from Colleges A, B and C]

Place	Nature	College	Usefulness	Participants
In-house (organised by own college)	Application Software (how to use..)	C	Can't tell	4
Organised by other training centres outside the college	Application Software (how to use..)	A	Can't tell	2
		B	Useful	1
	IT course within Teacher Education Programme	B	Useful	1
	Administrative Management	B	Useful	1
			Not useful	1
Training Organisation Overseas	Application Software (how to use..)	C	Useful	3
			Can't tell	2

Table 7.41 [data from Colleges A, B and C]

Have not received any training/short courses related to ICT (n = 29)		
ICT training/short courses are not of interest to me	0	0%
ICT training/short courses have not been made available	8	28%
I have not been offered the *right* kind of ICT training/short courses	16	55%
Other reasons (other than listed above)	13	45%

Table 7.42 Cross-tabulation Aware of staff Development / Received Training or short Courses related to ICT [data from Colleges A, B and C]

Aware of any ICT staff development in the College	Received training/ short courses Related to ICT	Frequency	Percentage
No	No	28	88%
	Yes	4	12%
Yes	No	3	30%
	Yes	7	70%

Table 7.43 Nature, Place and Usefulness of training or short-courses received [data from Colleges D, E and F]

Place	Nature	College	Usefulness	Participants
Organised by other training centres outside the college	Application Software (how to use..)	D	Useful	2
		E	Useful	1
	IT course within Teacher Education Programme	F	Useful	1
	Administrative Management	D	Can't tell	1
			Not useful	1
	Programming Database Management	E	Useful	1
	Simulation software	D	Useful	1
Training Organisation Overseas	Application Software (how to use..)	E	Useful	1
	Management of ICT		Can't tell	1

Table 7.44 [data from Colleges D, E and F]

Have not received any training/short courses related to ICT (n = 31)		
ICT training/short courses are not of interest to me	0	0%
ICT training/short courses have not been made available	9	29%
I have not been offered the *right* kind of ICT training/short courses	14	45%
Other reasons (other than listed above)	11	35%

Table 7.45: Awareness of ICT Strategy in their Colleges [data from Colleges A, B and C]

College		Frequency	Percentage
A	Yes	0	0%
	No	6	60%
	Not sure	4	40%
B	Yes	0	0%
	No	8	73%
	Not sure	3	27%
C	Yes	6	26%
	No	4	17%
	Not sure	13	57%

Table 7.46: Awareness of ICT Strategy in DEF vs. College [data from Colleges D, E and F]

College		Frequency	Percentage
D	Yes	10	53%
	No	5	26%
	Not sure	4	21%
E	Yes	1	6%
	No	12	75%
	Not sure	3	19%
F	Yes	0	0%
	No	2	29%
	Not sure	5	71%

Table 7.47: Awareness of ICT Strategy in DEF vs. Managers [data from Colleges D, E and F]

		Frequency	Percentage
Non-managers	Yes	5	29%
	No	8	47%
	Not sure	4	24%
Managers	Yes	6	24%
	No	11	44%
	Not sure	8	32%

Table 7.48 Awareness of ICT Strategy [data from Colleges D, E and F]

	Frequency	Percentage
Yes	11	26%
No	19	45%
Not Sure	12	29%
Total	44	100%

Appendix G

List of Local Interview Participants

Ang Leng An

Arihati Haji Sahmat

Denis Ho Mun Tai

Derik Hayes*

Hajah Fatimah binti Haji Ismail

Hajah Rahimah binti Zakaria

Haji Aftab bin Hassan*

Haji Azaman Haji Suleiman

Haji Ibrahim bin Haji Bagol

Haji Julaini bin Haji Othman

Haji Kamal Mustaffa*

Haji Mohd Daud bin Haji Mahmud

Mardiyah Haji Mahmud

Nor Nasriah binti Sidek

Noraminah binti Abdullah

Norzainab binti Haji Ladi

Pg Mas Salwa Pg Mohd Said

Pheh Soon Cheng*

Soraya Abdullah

Timothy Baker*

Vito S. De Raya*

Zaniton Haji Mohd Salleh

* = Expatriate

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