# THE CURRICULAR INTEGRATION OF INFORMATION TECHNOLOGY IN THE SECONDARY SCHOOL SYSTEM



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# The Curricular Integration of Information Technology in the Secondary School System

by

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# Abstract

The purpose of the internship, conducted through the Memorial University of Newfoundland Harlow campus, was to study the British Education System and its approach to integration of Information Technology (IT) in and across the curriculum. The intention was to furnish insights that may have some application to the curricular integration of IT in Newfoundland and Labrador schools.

Chapter One of the internship report briefly examines the present condition and role of IT in the Provincial curriculum and offers some background to the place of IT in British education and curriculum. It also outlines the objectives for the internship and the activities undertaken.

Chapter Two consists of a critical and reflective journal of information gathered and insights gained during the internship placement and the research process.

Chapter Three contains a summary of the research component of the internship. It examines two approaches taken to the curricular integration of Information Technology in British schools (particularly in the two schools studied): a **subject-integrated** or totally cross-curricular approach and a **discrete subject** approach.

Interviews were conducted with department heads and lead teachers in the integration of IT at two schools of the Essex County Education Authority. A standardized list of interview questions was used. Data collection was triangulated using sources such as classroom observation, and document collection. Though there was less focus on classroom observation, the collection of documents was fairly extensive. Relevant and useful information was gathered from documents published by one of Britain's leading organizations in the field of educational technology, the National Council for Educational Technology, accessed through Internet searches.

Though further research is required to quantify the results, this investigation contends that a combination of these approaches would offer the most effective method for the teaching and application of IT skills within the curriculum.

# Acknowledgements

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# Chapter 1

## Overview of Internship Report

### *Background to the Internship*

With the wide-spread use of computer technology in the world today and its proliferation in industry particularly, one can understand the importance placed on technological skills. Most educators have come to recognize both the value of computer skills for their students and the potential that this technology has for delivering and extending the curriculum and their professional practice.

The need for curricular integration of technology in the Newfoundland Education system has been documented over the years, achieving prominence in the present milieu of educational reform. In 1979, Crocker and Riggs called attention to the need for Technology Education as a component of curriculum:

> Each child should understand the function of technology in modern society .... Each child should acquire a basic knowledge of the major areas of technology and their impact on his or her life ... nothing in the existing curriculum deals with the technology .... A new curriculum approach is therefore needed ....
>
> (Crocker & Riggs, 1979)

In 1992, Change and Challenge, a provincial government document, called for the following actions:

> Review and update course curricula at all levels ... to ensure that courses continue to be relevant to the changing needs of society and the economy by introducing new programs which focus on technology-based education ... by expanding the provision and use of computers and computer-based

> technologies within the school system and developing a comprehensive information technology plan for the Department of Education and the school system ...
>
> (Government of Newfoundland and Labrador, 1992).

The government document, Adjusting the Course: Part II, provided a rationale for the needed educational changes that will foster essential technical skills:

> Much of this change is being driven by technological advancement. One only has to think of the impact of the microcomputer, and the advances in communications technology and automation to illustrate the pace of change over the past decade or so. There is every indication that this pace is increasing. ...Today's generation of workers has had to absorb the impact of the microcomputer, and the fundamental restructuring of the labour force due to automation and global competition. The changes in store for the next generation are no less profound and unpredictable.
>
> (Department of Education and Training, 1994a)

Finally, the TILE document, *Technology in Learning Environments - Enabling Tomorrow's Learners Today* (Department of Education and Training, 1994b) provided a vision for technological change. This document was the product of a comprehensive and strategic planning process and called for "integration of technology into and across the curriculum" (p.iii). Focusing on the major areas of curriculum development, curriculum implementation/delivery and learning resource management, TILE sought to provide a "clear statement of direction for the appropriate use of technology" in the school system and a "detailed series of projects, evaluations and pilots" for the integration of technology. It was

a philosophical and systemic shift in thinking and approach to technology in education.

Using a strategic planning process, the TILE initiative delivered an analysis and summary of where the education system might evolve with regard to the integration of technology in the curriculum. It described the current levels of integration and mapped out the direction for future integration, curriculum development and professional development. It proposed a series of development strategies which broke down the overall goal of technology integration into seven areas: Policy Changes, Educational Support, Professional Development, Enabling Technologies, Technology Integration, Curriculum Management, and Curriculum Technology Infrastructure. It was believed that these areas would facilitate an environment that could foster essential technological literacy while connecting students in a network of learning. In short, it was a view that projected an education system that could prepare its students with the skills necessary to contribute meaningfully to society and to engage in lifelong learning.

The commitment to furthering the technological skills of our students is evidenced by the Canada/Newfoundland Cooperation Agreement on Human Resource Development (HRD). This joint federal / provincial initiative promoted innovative and creative activities in the human resource development field. Signed in January 1993, the HRD Agreement was developed to build "on the principle that economic development depends upon building excellence in people" (Johnson & Johnson, 1994). This five year, $42.9 million federal-provincial agreement has been a catalyst for long-term change in Newfoundland. It

sought collaboration with and strives to foster cooperative links between school boards, community colleges, business, labour and community organizations to initiate improvements.

The HRD Agreement has set several goals. They were:

1. improvement of achievement and participation in science, technology, and mathematics;

2. improvement of written and verbal communication skills;

3. assistance for educational and training institutions in responding to the needs of small business, and

4. encouragement of a cooperative, working relationship between education, business and industry.

(Johnson & Johnson, 1994)

Four main programs were developed to further the economic and human resource development goals of the province. One of the focuses of the first program, *Learning and Enterprise Culture*, was to enhance school improvement efforts. Many improvement efforts today centre on the integration of technology in the school.

The benefits of the HRD agreement have been chronicled by *Prospects*, a publication funded by this government initiative. This is a journal that is:

> specifically designed to address issues in human resource development. This publication is a response to a need to inform individuals involved in education, business, labour and government of innovative initiatives taking place in the field of human resource development within this province.
>
> (Johnson & Johnson, 1994)

Since its first issue, *Prospects* has reported the many school improvement efforts made

possible by the HRD Agreement. The funding allocated under this agreement has enabled improvement initiatives that have focused on various areas of technology in education. These have promoted technological support, expansion and innovation in provincial schools.

Yet, in spite of the importance placed on technological literacy and government efforts to foster it, there are forces that constrain educators. More recently, down-sizing and restricted resources have resulted in a slowing down of the implementation of technology in education. With cuts to professional development programs, the majority of this province's teachers have not had access to the training necessary to teach with technology. Also, with a significant proportion of the teaching force approaching retirement age, there is questionable inclination among older teachers toward acquiring such training. As well, many of the new teachers emerging from pre-service teacher education programs do not have the necessary course work in the curricular uses of technology as such training has not been required for graduation. Together these forces act in opposition to a systemic integration of technology in schools.

### *Educational Technology in Britain*

Like Newfoundland, education in Britain today is at the forefront of media attention and political debate. The administration of its education system and the legal framework that

guides the system has recently seen many fundamental changes that continue to unfold. In this milieu, Information Technology (IT) has been developed as both an integrated and discrete subject area that has achieved a place of importance within the country's curriculum.

Information Technology has emerged from the integration of previously separate technologies. IT refers to areas such as advanced micro electronics, software technology, advanced information processing, office systems, data communications and computer aided manufacturing and computer aided education (University of Pretoria, South Africa, School for Information Technology, 1997). Research has shown the many benefits inherent in the curricular use of IT. Studies by Britain's National Council for Educational Technology (NCET, 1995) has indicated that IT can have many positive effects on teaching and learning. For pupils there are frequently gains in motivation, presentation, questioning skills, problem solving, information handling, and techniques of modelling. Teachers often find that (among many other gains) using IT can:

- lead to rethinking teaching and learning strategies;
- provide more opportunities for differentiation;
- foster greater expectations of their pupils;
- identify more opportunities for individual teaching and group work, and
- promote better understanding of their pupils' learning.

(NCET, 1995)

Given the educational opportunities offered by IT, it would be remiss of educators not to

explore the ways in which IT may be infused into the curriculum. The importance placed upon IT in Britain is indicated by the legal requirements that mandate its integration into each subject of the National Curriculum and by the ongoing research and analysis of implementation and delivery methods.

**Regulations and Rationale for the Internship**

Within the Master of Education program at Memorial University, candidates may choose an internship as a program elective after or near the completion of required course work. The internship consists of two components: a sequence of activities which are organized and supervised to provide the intern with the opportunity to exercise professional responsibilities associated with the professional role for which they are preparing; and a research report on some aspect of the area of study of the internship. The purpose of the internship is to facilitate the development of each intern's personal and professional competencies and his/her research and problem-solving skills while providing practical experiences that will elucidate the theoretical component of the program and offer opportunities for the evaluation of these competencies and skills (Memorial University of Newfoundland, 1996).

The internship in the Britain's Essex County School System met with the guidelines

and goals for this program elective. The experiences gained were rich and diverse and offered the opportunity to put theory into practice. At the same time, valuable research skills and experience was attained.

Conducted in Britain's educational environment of recent change and reform, this internship provided an opportunity to compare similarities that existed between two different systems of education. Using British government documents, interviews with teachers in the Essex County School System and observations of classroom and teacher-planning practice, a national picture of British education was acquired. It was a picture of an education system that sought to reform itself, a curriculum that struggled to define itself and the curricular area of IT that hoped to instill its students with the technological skills that were viewed as essential in the workplace - skills that would propel the nation's industry to a competitive international level.

**Objectives for the Internship**

The intern hoped to acquire an understanding of IT integration in the Essex County School System and, generally, of the British Education System. To this end, three main objectives for this internship were identified:

1. to observe various projects, strategies and plans in place to foster the

integration of information technology in and across the curriculum at St. John's Comprehensive School in Epping, Essex county;

2. to assess the systemic approach to IT integration taken by the Essex County School System and/or the British Government's Department for Education;

3. to utilize this knowledge of IT delivery so as to improve understanding of the most effective means of IT integration in Newfoundland schools.

The first objective was realized through interviews conducted with the IT Department Head and other Department Heads or individuals within the various departments who were considered lead teachers in the integration of IT. The second was achieved partly through the same method of data collection, but also through examination of literature from various sources, but chiefly from the British Government's Department for Education (ie. National Curriculum documents, etc.). It was also hoped that the experience in Britain could provoke a renewed look at the efforts for technological integration in Newfoundland and Labrador schools. However, the achievement of this final objective lies not within the scope of this report. It is hoped the this document can operate as a spur for further, quantifiable research on effective methods of IT delivery in this province's schools.

St. John's Comprehensive School in Epping afforded its own unique perspective for the study of IT within the curriculum and supports the rationale for this internship. The on-site supervisor for the internship, Mr. Edward Barnes, had only just recently been appointed head of the newly formed IT department, a department that had recently been distinguished within the umbrella curricular area of Technology Education. Though he would only officially take over his post in September of 1996, it became necessary at the end of the '95 -'96 school year for Barnes to prepare and organize his department to offer new courses in Information Technology and to facilitate cross-curricular integration of IT. This setting offered the intern the experience of seeing what is involved in organizing an IT department "from scratch": auditing the present system of delivery; coordinating and enhancing school IT resources; making proposals and development plans; developing new curriculum; formulating a school IT policy statement; planning the physical layout and configuration of the school's computer systems; working with the various departments to develop and foster cross-curricular links with IT; and devising school inservice training for staff, all with a view to meeting specific National Curriculum requirements. The relationship with Mr. Barnes was at once collaborative and instructive, offering the data and feedback necessary to focus and complete the research.

**Internship Activities**

The focus of this internship was on the cross-curricular application of information technology. It therefore concentrated on understanding how IT was being integrated in each subject area and on studying the overall structure in place (hardware, software, inservicing and technical support, etc.) to guide and facilitate the acquisition of essential technological skills in those subject areas. The period of the internship afforded opportunities to gain the practical experience of operating in a different school system, to observe and facilitate the administration of an IT department, to study the theories behind accessing technological skills through the curriculum, and, informed by those theories, to design curriculum for Information Technology.

The internship has involved the following experiences:

1. Attendance at three seminars, one hosted by an Educational Administrator of the Essex County school system and two others hosted by a representative of the Graduate Programs office of Memorial University's Faculty of Education. The aim of these seminars was twofold: to provide orientation to the British Education System, including the administrative structure, the National Curriculum, assessment and testing, and the school inspection system; and to facilitate and offer support for the research being conducted.

2. Observing three classes at St. John's Comprehensive where teachers were conducting subjects lessons that employed Information Technology.

3. Conducting interviews at this school with the department heads of each subject area (or lead teachers in the use of IT within these subject areas) to determine the extent to which and in what ways IT was being used in their subject area and to gauge their attitudes toward the ability of the present system of IT delivery to meet the needs of students and teachers.

4. Assisting Mr. Barnes in developing a "Curriculum Map" of how IT skills are being taught across the curriculum at St. John's Comprehensive so as to assess whether the existing level of IT delivery met the attainment targets of the National Curriculum and school inspection standards and to determine the direction of the school's IT planning.

5. Visiting two other schools in the Essex County system and interview the department heads (or lead teachers) of IT to assess that school's approach to the curricular delivery of IT with a view to assessing the differences in IT delivery across the system.

6. Designing the word-processing curriculum for the Year 7 discrete course in IT (included in Appendix A), drawing on subject-specific tasks in Language Arts to foster the IT skills

in a cross-curricular approach.

## The Research Component

The original research design for the internship proposed a study of the curricular use of computers in the Essex County School System. A more specific focus soon emerged. It sought to identify the various approaches to the curricular integration of Information Technology and offer suggestions as to the most effective method(s) for the teaching and application of IT skills within the curriculum.

The British National Curriculum contains specific requirements for IT. It is to be integrated into every subject area (with the exception of Physical Education). One approach to meeting these requirements was a cross-curricular integration that divided IT skills into components and allotted the responsibility for each of these components to various subject areas (subject areas that seem most suited to certain modes of IT use). For example, the English department would take responsibility for teaching word processing and desktop publishing skills; the design technology department would cover the control element of IT; the Maths department would teach mainly spread-sheet skills but also some data base application; the Science department would use IT for data-logging and data base applications.

Another approach to teaching IT skills has been to offer Information Technology as

a discrete course only. The IT department takes responsibility for administering courses in IT which focus on developing a general knowledge of all dimensions of Information Technology and a proficiency in required IT skills. There was evidence of an attempt to bring a cross-curricular dimension to these courses by using tasks from other subject areas to foster the IT skills and make them relevant. However, within these two approaches, other factors appeared to affect the effective integration of IT, namely instructional time, skills transfer, availability of resources and professional development.

This internship experience probed the researchable questions related to the most effective means of teaching IT skills and integrating the technology across the curriculum. The essential questions were:

1. Can IT be integrated into all subject areas without an initial foundation of IT competency in teachers and students and with only casual administrative support?

2. Can IT skills be taught in isolation as a discrete course only (IT for IT's sake) in hopes that the skills will transfer to other subject areas?

3. Which is the better of the two approaches?

4. Can either of these approaches, operating independently, provide students

with the necessary IT competencies?

The research component included an analysis of the literature on the subject of IT delivery and integration, a report of the data gleaned from interviews conducted with teachers and key participants and from personal observation, as well as some recommendations for the effective curricular integration of IT based on this data. A more detailed discussion of research methodology follows in chapter three. A summary report would likely provide a series of guiding principles for selecting the best method of curricular integration of IT.

**Overview of the Report**

This report, as suggested by the title "The Curricular Integration of Information Technology in the Secondary School System," focuses on the teaching of IT skills to junior high and senior high school students. Indeed, in the British Education system where this study was conducted, the terms "Secondary," "Junior High" or "Senior High" are not commonly used to refer to the students from ages 12 to 17 or to the corresponding levels of schooling from grades 7 to 12. Instead, students aged 11 to 14 complete *Years 7 to 9* which fall into the level called *Key Stage 3*, while students aged 15 and 16 complete *Years 10 to 11* within the level of schooling referred to as *Keystage 4*. Keystage 3 and 4, then, correspond quite closely with our "Secondary" level of schooling and the report is thus titled because it is

assumed that those reading this report will be doing so within the context of the Newfoundland and Labrador Education System and because this report hopes to be relevant within that context.

This internship report will be organized into three sections. Chapter One seeks to offer a description of the internship setting to put this study into context. This chapter has provided a background to and rationale for the internship, as well as a formulation of the research questions that have arisen from it.

Chapter Two is comprised of the personal journal kept during the internship. It attempts to provide a reflective and critical discussion of the value of the internship activities. It offers insights gained from and a critical evaluation of the intern's experiences. Broader in scope than the particular area of research reported in Chapter Three, it also contains information on the administration of the British System of Education in general. It is written as a chronological narrative, most times in an informal, first-person style. It is not intended as a daily comprehensive journal of all internship activities. The dates chosen for individual entries are random and reflect moments in the internship process that warranted discussion, provoked insight or produced useful information. Names used in the journal are fictitious and have been changed to ensure anonymity.

Chapter Three has a more defined focus. It will form the research component on methods of the curricular integration of Information Technology. Again, the names of the participants in this study are fictitious and have been changed to ensure anonymity.

# Chapter 2

## Critical / Reflective Journal

***April 30, 1996 - St. John's Comprehensive School, Epping, Essex***

**Topics Discussed:**

- Staff briefings
- Administrative structure and nature of St. John's school
- Structure of the British Public Exam System (GCSE)
- Present system of IT delivery (curricular integration)
- Advantages/disadvantages of discrete course in IT

Today I began working in the school to which I was assigned - St. John's Comprehensive School in Epping , a smaller town south of Harlow in the County of Essex. It is a school which educates students from ages 11 to 16, from Year 7 to 11. The Head Teacher (or "The Head"), Mr. Albert White, introduced me to the whole staff in a briefing (a short staff meeting which they have every Monday morning). These "briefings" last only about 10 - 15 minutes usually and are for the presentation of important information to the staff. The staff was briefed by one teacher, a "head of year", who informed the teachers of the particulars of several students' cases. This was informative and, I would think, helpful to the staff as they deal with these students in class. So often in the system, teachers are "in the dark" about vital information pertaining to the students that they teach. The briefing is an abridged form of the staff meetings held in Newfoundland schools which delivers only relevant information that stems from the workings of smaller committees or groups.

The Head and the Deputy Head, Mrs. Judy Phillpott, put me in the care of Mr. Arthur

Taylor, one with the title of "Senior Teacher". This position is an administrative one quite similar to our vice-principal's job except that there are three such positions, each one responsible for a different area of administration. I spoke with Mr. Taylor about the British School System in general and St. John's School in particular. He informed me that there are two other strands of administration: department heads (or curriculum leaders) and year heads (or head of year). The department head is quite similar to, if not exactly like our own administrative position. The head of year is in charge of a particular grade or year level. It seems that this position has "pastoral" responsibilities which involve addressing the whole grade in assemblies (and perhaps working in collaboration with curriculum leaders on curriculum issues concerning the grade).

At St. John's there is no guidance counsellor position. It is approached in an ad hoc and open manner with guidance responsibilities being shared by the head of year (in his/her "pastoral" capacity) and any number of teachers acting as "mentors" in the school's mentoring program.

This school is a denominational school, affiliated with the Church of England. However, though they are under pressure from the 1988 Education Act, this school (and others like it) does not necessarily impose a denominational character or Christian content to assemblies.

I talked a little with Mr. Taylor of the British system of public exams - the General Certificate of Secondary Education (GCSE) exams. There are exams in all areas: arts, sciences, maths, humanities, etc. The level of difficulty in some of these exams is in 3 tiers. The grade that a student can receive in any give tier of difficulty is set. So, the

grade one receives in a tier 1 exam will be either A or B; the student doing a tier 2 exam will receive a grade of C or D; the tier 3 exam paper can only yield a grade of E.

I was introduced to Mr. Edward Barnes who is the newly-appointed department head for Information Technology (IT). Though he doesn't take over this position until September 1996, he is currently preparing a new IT curriculum plan for next year. At present the school policy for the curricular integration of IT requires the English department to teach and utilize word processing and desktop publishing software, the Socials/Humanities department to teach database software, and the Science and Maths departments to teach databases and spreadsheets. So at the moment IT is across the curriculum. However, there is a rolling plan in place to establish IT as a discrete subject area in Years 7 - 9 so that students learn how to use the hardware and software and then have the skills to apply the technology in the higher grades. At present, there is no GCSE exam subject in IT but there are plans to establish an exam course in Business studies and IT.

In order to establish IT as a discrete subject, Barnes has a plan to investigate just how IT is presently being used across the curriculum. He wants to create a curriculum map to determine in what subject areas and to what degree IT is being integrated. His research intentions coincide perfectly with mine and our work should compliment each other.

I then had a meeting with Mrs. Annette Windsor, the department head of English and the acting head of IT, about how the English department was approaching IT. She informed me that right now in Year 7, for instance, they are allotting one hour per week to learn the basics of word processing and desktop publishing. She herself is responsible

for making sure the teachers deliver IT in accordance with the National Curriculum. She is all for teaching IT as a discrete subject in the lower grades, but has some concerns about professional development. If the students come into the upper grades already knowing how to use the IT, the teachers of those grades have lost the opportunity to learn the IT along with the students and yet would still be expected to apply the use of IT to their lessons. Without that crucial learning opportunity, the subject teachers in the upper grades would need more professional development to get used to the technology and get over the uneasiness or fear of using IT. Mrs. Windsor is also finding, as is the case in the Newfoundland school system, that technical support staff are needed to relieve the IT teachers of some of the technical troubleshooting duties and free them up to teach.

***May 7, 1996 - Meeting with Martin Richards: the Maltings, Harlow***

**Topics Discussed:**

- Administrative structure of the British Education System
- British School Inspection System (OFSTED)
- National Curriculum

A meeting with Mr. Martin Richards, a retired educator in the Essex system, provided a wealth of information about the English School System:

Education in England is intensely politicized. Very often, in fact most times, educational decision-making is made not on research or on the basis of students' best interests, but on political ideologies.

There are three tiers of responsibility when it comes to authority and decision-making

in English education:

1) Central Government, which is elected, raises the bulk of educational revenue through taxation. It establishes the legal framework that guides the system. The government provides the funding which allows the Local Education Authorities (LEAs) to deliver service. However , current changes have seen antagonism toward the LEAs as government has cut influence and funding from them.

The present government is committed to a "market" philosophy in education. Their model of education is based on a view of schools as small business enterprises, competing with each other for resources and "clientele". Schools that can market themselves as having the best reputation, offering the best "product and service" will attract the best clientele. Far from fostering collaboration between institutions, this philosophy has greatly detracted from co-operation in education, nurturing feelings of competition and suspicion among schools. Some schools have accused others of "poaching" - drawing in students from outside their area.

In addition to taking to itself increased powers in areas like curriculum, assessment, inspection (through the Office for Standards in Education - OFSTED), and publication of league tables, the government has simultaneously delegated authority from the LEAs to the Governing Body of each school.

2) Local Education Authorities - Local Education Authorities, like the Essex County Council, are also elected. They pay for educational service with funds from Central Government and from locally raised revenue. Locally raised revenue is subject to

"capping", limiting the amount of allowable local fund raising and ensuring a "level playing field". Though the LEAs retain a strategic planning function, they no longer provide the following services which have now been devolved to the Board of Governors and the individual schools:

- hiring and firing of staff
- responsibility for curriculum
- decide "decapitation" levels
- decided building priorities
- "targeting" of funds

LEAs now have to delegate 95% of their budget directly to schools on a per capita basis and have no scope for targeting or directing funds. Such functions are now being centralized with the Board of Governors for each school.

3) Board of Governors - Each school has a Governing Body consisting of 10 - 20 members. These members are partly elected, partly nominated to represent the community, parents, teaching staff of the school, LEA, and Church. Members are unpaid volunteers. The duties of membership on the board are of a proactive nature, demanding major responsibilities in school budgeting, hiring/firing of staff, maintenance of the premises and accountability for standards.

This power structure has resulted in increased local authority, but also in the mass resignation of governors (feeling they lacked the necessary skills and time) and tension

between Governors and Central Government.

One of the functions performed by the Central Government is to regulate and oversee the inspection of schools in the British System. The process of inspecting schools has been privatized and is carried out by independent companies. The government oversees the professional activities of these inspectors through the Office for Standards in Education (OFSTED). The inspection of any given school will take place generally every four years. The aim of these inspections is to evaluate and publish each school's effectiveness in order to improve quality, and assist parental choice of the best school in which to have their child educated.

Inspectors are trained by OFSTED and work for privatized companies. Using given criteria, the inspectors observe many lessons, grade them and evaluate the school's performance. It is stressed that this examination is not an inspection of individual teachers but rather an aggregate of observations. They interview students, teachers, parents and Governors. They will examine: past work of students, test performances, school policies, planning processes, assessment and recording processes, and development planning processes. They also audit the school budget, resources and their use, community links, management systems, etc..

With assessment completed, the inspectors will then publicly report on the standards of pupils' achievements, the quality of the teaching and the pupils' learning and on all the factors in the school which contribute to these findings. Being made available to the parents, Governors, the LEA, local and National press, and the local libraries, this report must achieve objectivity and contains recommendations. Then the Governors are

required within six weeks to submit an action plan showing how they intend to effect improvements. Schools felt to be "at risk" or "failing" may be re-inspected. Continued "failure" may result in the appointment of an "educational association" to run the school in place of existing management. This has not yet happened and likely will not because it would be unlikely that outsiders could get things right when insiders have failed over a long period. Unfortunately, there is no process for appealing the results of these inspection reports. Schools can merely file a complaint that they are unhappy with the results reported and observations made. The complaint is followed up but is not overturned.

Recently an organization has been set up by a group of academics and former head teachers to inspect the school inspectors. The group, calling itself the Office for Standards in Inspection (OFSTIN), arises out of a feeling that these inspections are independent of government and politics. It is felt that statistics are slanted to suit the government's needs. Having no government power and operating like a consumer awareness group, OFSTIN wishes "to challenge the fairness of the current inspection service and to question its value for money" (Rafferty, 1996, p.2). Carol Fitzgibbon, the director of the Curriculum, Evaluation and Management Centre at Durham University, heads the group and challenges that she has "yet to see evidence of reliable consistency" in the inspections. "Team member, Michael Duffy said: 'There needs to be an opportunity to apply the sort of checks OFSTED applies to registered inspectors to the whole organization.'" However, OFSTIN has not outlined the measures it can or will take. The organization is perhaps limited in its effectiveness and capabilities.

The statutory curriculum in England consists of:

a) National Curriculum - The National Curriculum is prescribed the Central Government in *core* subjects, such as English, Maths and Science, and in *foundation* subjects like History, Geography, Design Technology, IT, Art, Music, Physical Education, Modern Language (for students over 11 years). All schools must uphold the National Curriculum. Testing of the National Curriculum and its results are published for "consumer" decision-making on whose school is providing the best education.

b) Religious Education - Religious Education is to be taught according to a locally established syllabus within the National Framework. All schools must teach religious education. The LEA will determine the syllabus. All schools must have a corporate act of worship. The definition of "worship" is wide open.

c) Cross-curricular themes are devised to show how important issues are carried across as well as within subjects. These include health, environment, business, and multicultural education. These themes are seen as threads running through the core and foundation subjects. There are no prescribed syllabi. Therefore, they are not legally binding.

The time budget suggests that 15% be spent on each *core* subject with the rest of the time allotted for *foundation* subjects and religious education. Teachers protested the heavily

prescribed curriculum and hence, recent changes in the detail of the syllabi suggest that 4 days be given to covering the National curriculum and 1 day for the school to "do its own thing".

***May 8, 1996 - St. John's Comprehensive School, Epping, Essex***

**Topics Discussed:**

- Drama and IT
- Group work with computers: communication and collaboration

My original internship proposal sought to focus on the areas of computer-assisted learning and drama education / theatre arts. Shortly after undertaking this internship, I realized that there was a paucity of research and educational endeavour in these areas. In pursuing this interest in the areas of computers and drama, I spoke with one of the drama teachers at St. John's, Andrew Thomas. Though quite interested in the possibilities of integrating IT and drama, he does not presently incorporate IT in his drama classes. We spoke at some length about my ideas and the research I have done in the area and he was quite willing to try a particular unit I have designed which integrates computers and drama if both our schedules will permit.

I then attempted to contact by telephone the authors of a particular research study, *Computers as Catalyst: A Report on Information Technology in Drama Contexts*, which incorporated computers into educational drama (Manser, 1993). Their project has attempted to determine if IT can contribute to the "creation of atmosphere, symbol,

tension and mood within the drama" and to what extent this would affect outcomes (Manser, 1993. p.5). I also am interested in exploring the innovative curricular partnership of Drama and Information Technology to assess how each may enhance the other. So, given that Manser's study was conducted in Tower Hamlets, a borough in East London (only an hour away from Harlow), I was hoping to speak with and perhaps visit and interview members of the research team, using them as resource people to find answers to such questions as: How can the use of computer technology in the areas of drama education and theatre arts foster group communication? How can computers act as a catalyst in furthering the objectives of drama education? However, my call was not received with great enthusiasm and I was unable to get any further than a brief telephone conversation with one member of the team. I was therefore forced to give up on this aspect of my IT research.

Afterwards, I observed an English class taught by Mrs. Windsor, the English Department Head. This class was using IT as they completed a project where in small groups they designed their own magazine. Using software like Microsoft Publisher, Microsoft Word and a graphics package, the students devised the magazine cover, created graphics for the pages, designed the page layout and used the word processor to complete their written compositions.

During this process, I noticed that students worked well together at the computer. There was a sense of group ownership of the product. Some students I observed were very conscious of ensuring that any decisions made concerning the magazine were approved by all, stating that 'it belongs to all of us'. I noticed in one case that even when

students disagreed with how another student was performing a certain operation with the computer, they gave him the mouse and waited patiently for him to try the manoeuvre before reclaiming the mouse to try it themselves in a more efficient way.

***May 9, 1996 - St. John's Comprehensive School, Epping, Essex***

**Topics Discussed:**

- School assemblies
- "Collective Worship" and the Education Act
- IT as a discrete subject in year 7
- Focus of the research interview process
- TILE document - integrated/discrete approaches and professional development

Today, I sat in on an assembly presided over by Edward Barnes, the Head of Year 8. This is one of the pastoral duties of the Head of Year. These assemblies are held every Thursday and are attended by all the students in that particular year level. The approach to these assemblies, as with the approach to discipline in general, seems more regimented and demands more order than is typical in many Newfoundland schools. The agenda for this assembly focused on enforcing the school's uniform rules, pointing out to the students of their recent relaxed attitude toward the wearing of school uniform. The rest of the assembly was taken up with the distribution of commendation certificates for achievements and participation in various school activities (i.e. a dance competition).

Edward and I discussed the dimension of "collective worship" as required by the Education Act. It is these assemblies that are targeted to deliver this "worship". Though I failed to pick up on it in the assembly I attended, Barnes said he accounts for this

worship with a "scratch-the-surface" moral reflection. He says this fits the government definition of "worship". The issue of worship is a thorny one because, though the English system is not a denominational system, there are denominational schools. St. John's Comprehensive School is one of them. According to the Education Act, they must provide for collective worship every day. But the notion of "worship" is very vaguely defined. Do you assemble the whole school in one place for this worship? There is no place big enough in St. John's for such a gathering with the exception of the Physical Education Hall and using this would involve setting out a large number of chairs - a very time-consuming process. Can you provide for collective worship over the PA system? The problem here seems to be that the students and teachers in that school may not necessarily hold the same faith. If they broadcast the worship this way, they may be in violation of the people's rights. Also, these students and teachers can choose to "opt out" of this worship, making it difficult to broadcast it generally.

Following the assembly, I sat in on Mr. Barnes's meeting with Ethel Jones, an Education Welfare Officer. She is responsible for following up on students who are absent from school. She usually deals with cases of parentally condoned absence. She is more than a "Truancy Officer" in that she seems to find herself with duties that are not unlike those of a social worker and/or counsellor. The Newfoundland Education System does not seem to provide for such a role in its administrative structure - at least not in such a proactive manner. They discussed the cases of several students that Barnes teaches or for whom he is the Head of Year.

Mr. Barnes and I discussed his curriculum plans for the teaching of IT as a discrete

subject in year 7 (age 11). He outlined a basic structure for this course: As the first three weeks would be spent in setting students up with accounts on the school network, these initial weeks would be spent by teaching the students about the computer and its mechanics through the use of diagrams. During this time, students would learn about hardware and peripherals. Once they have accounts and access to the network, they would begin learning about the processes of encoding and retrieving data. They would afterward move into learning the specific software applications that will be employed in the coming years in Key Stage 4 (ages 14 - 16). The aim is to make them proficient and knowledgeable about how the computer and the specific software works so that it can be applied across the curriculum in the high school subjects.

From year 8 on, students get into a problem-solving approach to using IT, learning how computers can be used for tasking in various subject areas, with an increasing awareness of how IT impacts on our lives and changes society.

I then asked Barnes about his plans to approach the issue of teacher professional development. He proposes first to design the IT curriculum for year 7 and then to put a plan in place to facilitate staff development and bring the teachers up to speed.

As part of my research which coincides with Mr. Barnes's need to assess IT at St. John's School, I will interview the Curriculum Leaders in English, Maths, Science, Modern Languages and Humanities. My questions will be aimed at determining how IT is used in these subject areas whether the present level of IT delivery is effective for students' acquisition of IT skills and what skills they would wish to see fostered in a discrete IT course that students should be able to apply in the other subject areas.

In his estimation, it would seem that St. John's School is probably an "average" school in the Essex School System with regard to the integration of Information Technology. It is fairly well-equipped with the technology, but needs co-ordination of those resources. Therefore, this will serve as a model school upon which I may base my research. However, I will be visiting other schools for comparative analysis.

Following my meeting with Barnes, I had some personal thoughts and questions of technology integration as it relates to our own Education system: As proposed by its vision document, Technology in Learning Environments (TILE) (Department of Education and Training, Government of Newfoundland and Labrador, 1994a), the Newfoundland Education System seems to be moving away from the notion of teaching IT as a discrete subject. Does TILE account for any stage in its vision when students will be taught IT as a discrete subject? If not when will students learn these computer skills? Will the continuum of computer skills be divided up over each of the school years and successively built upon? If so, in what subject areas will these skills be taught? If they are to be integrated in all subject areas will there be an overlap in teaching these skills? To integrate it in all subject areas and provide for all the computer skills that way presupposes that all teachers will be computer proficient and able to teach those skills. What about the professional development needed to ensure that teachers are able to do this? What resources are available to facilitate PD?

*May 20, 1996 - St. John's Comprehensive School, Epping, Essex*

**Topic Discussed:**

- Plans for IT as a discrete subject in years 7-9

Mr. Barnes and I discussed in a little more detail his plans for IT as a discrete subject next year. He sees his job as one of training the students in the basic IT skills as a discrete subject. It will then be up to each department and individual subject teacher to help the students apply those skills and learn how IT is effective in the subject area.

Next year in year 7, he will approach IT as if they know nothing and have had no exposure to it. He will then focus on the necessary skills and knowledge of the relevant computer applications.

For next year, the year 8 students will not have IT timetabled as a discrete subject. They will continue to pick up IT as it is delivered now, by the various subject areas.

In year 9, however, they will be taught IT as a discrete subject in order to prepare them for high school and possible examination options in IT. Barnes will pre-test to assess their knowledge of hardware, software, peripherals, input/output devices and so on. The course will then build on that knowledge and also look at the wider issues of IT and give them a glimpse of what would be involved in taking an examination subject in IT. It will attempt to put the network concept into broader perspective and identify how IT effects industry and quality of life. Both year 7 and 9 IT will be timetabled for one hour per week for a total of 36 - 37 weeks.

*May 22, 1996 - St. John's Comprehensive School, Epping, Essex*

**Topic Discussed:**

- IT delivery - "Computer Lab" vs. Classroom Stand-alones

Following upon some of the interviews with teachers, I began to see a common concern which would also be of researchable interest. In an interview, Mr. James Collett, Curriculum Leader for Humanities expressed his problem with the set-up or "arrangement" of computer hardware in the school. He is not totally comfortable with the "computer lab" or network model for computer use adopted by the school. Having to re-locate his students to a computer lab to make use of IT, he has found difficulty keeping students focused on the true meaning of the humanities task at hand. He questions the efficacy of the network model for integrating IT into the various subject areas and wonders about a more effective use of stand-alone computers in the classroom. He feels that in the Humanities they are inhibited by the network model; that by changing rooms to get to the computers, they are sort of changing context and it becomes more of a lesson about IT than humanities. There is not a true integration where IT is seen as a tool for performing tasks in the humanities. IT becomes not just instrumental but an entity in itself, something of a "roadside attraction" (or distraction).

Collett calls for a re-evaluation of the role of IT in the Humanities - what has been done with it and what can be done to enhance the Humanities with IT. There is a need for a consensus or a balance between the teaching of IT as a discrete subject and its integration in the subject areas.

An interview with Mr. Richard Elliott, Curriculum Leader for Modern Languages

echoed similar sentiments. In addition to feeling that the available hardware is not particularly suited to the teaching of languages because it lacks the needed audio capacity, Levy feels it would be ideal to have stand-alone computers in the classroom which can be incorporated into the classroom and into teaching. He finds it to be a needless distraction to move his class to the lab.

An area, therefore, of further research could examine the efficacy of the network model for cross-curriculum IT integration versus that of stand-alone computers in the classroom.

***May 23, 1996 - Meeting with Martin Richards: the Maltings, Harlow***

**Topics Discussed:**

- Government / Teacher Relations
- Teacher Training
- GCSE Examination Boards
- Government *League Tables*

We arranged another meeting with Martin Richards to discuss concepts and issues that needed further clarification. The discussion yielded the following information:

- The government department responsible for education is called the Department of Education and Employment. This title reflects the government's view of education as a utilitarian business that caters to industry.

- Government / Teacher Relations: There are 4 or 5 teachers unions or associations in England, among them the National Union of Head Teachers (NAHT) and the National Union of Teachers (NUT), the latter being the biggest. Contract negotiation is carried out by one National government committee consisting of representatives from each of the unions. The government however retains veto rights.

  Teachers are paid on a national scale and move up in yearly increments. There is however only one level of certification and corresponding salary scale. Further studies or professional development will not involve a higher certification or salary level. All teachers move along the same scale in yearly increments. However, a promotion to Head Teacher, Curriculum Leader or Senior Teacher will result in being bumped ahead a few extra years on the scale in compensation.

- Teacher Training: There are basically two routes of teacher training. Both beginning generally at age 18. One route would be to go to teacher college for a four year course that will involve 8 - 12 weeks of practicum. This would give the teacher a B.A. in Education. Another route, taken be most secondary teachers, would be to first do a B.A. in your subject area first and then take one year of Education studies which would be quite extensive in the practical side of teaching.

- Examination Boards: These boards were originally set up by universities to

ensure the academic abilities of graduating students. They are now commercial organizations that gain income from exam fees and are still linked with universities. The boards are responsible for designing the CGSE examinations for the various high school exam courses. Each board produces its own set of exam papers. Head Teachers usually decide which board's papers will be chosen for the school's students to write. In composing and correcting these exams, each board will retain a qualified professor of the particular subject being examined. This professor will act as Chief Examiner, though generally teachers are hired at extra salary to mark the exams.

- Based on GCSE examination results which must be published to aid consumer choice of schools, the government devises *League Tables*. These Tables are prepared by the Department of Education and show how each school fares with student achievement. They are set up for easy comparison between schools and are based on the annual reports of National Curriculum. These are made public to show the differences between schools for consumer decision-making.

*June 3, 1996 - St. John's Comprehensive School, Epping, Essex*

**Topics Discussed:**

- IT curriculum development for discrete course
- Cross-curricular approach to word-processing - IT and Language Arts

After some discussion with Mr. Barnes about other ways, outside of my research capacity, that I could help him in his IT development planning. We decided that I could design a part of the curriculum for the Year 7 discrete course in IT. He was planning a cross-curricular focus in his delivery of the IT course. Given that my undergraduate background was in English Literature and Language Arts, I will take over the development of the word-processing component of the course where I will draw from subject-specific tasks in Language Arts to introduce and reinforce word-processing skills. I have decided to design a curriculum unit that will teach the *Microsoft Word* word-processing skills through such tasks as creating poetry, a resume and a newsletter. I will have students concentrate on creating poetry, revising and editing it and then formatting it in different ways for effective visual presentation (likewise with resumes and newsletters). **(The completed curriculum unit has been included with this report in Appendix A).**

*June 6, 1996 - Brays Grove School, Harlow*

*Meeting with Mr. Vincent Ennis, Dept. Head of IT*

**Topics Discussed:**

- Nature of IT at Brays Grove School
- IT delivery in a strictly discrete approach with little subject integration
- IT skills taught in Years 7 - 8

Prior to an official interview with Mr. Ennis, the following information came from a discussion of the school's information technology set-up:

The school has only two computer labs, with enough terminals (including several stand-alone computers) to yield a ratio of 12 students for every computer. This is behind the average ratio in the Essex County system of 3 students to every computer. So they are "under-resourced". There is a problem with lack of facilities at Brays Grove. Vincent teaches all his classes in these two labs. There are 25 periods in a week. He has 22 periods of contact time. Of the other three periods, one is actually used to teach another IT class. So the lab is in use 23 out of 25 periods per week. This does not leave much opportunity for other subjects areas to gain access to and integrate IT resources in their lessons. A third lab would be needed in order to provide cross-curriculum access to IT.

IT is taught as a discrete subject in Years 7 & 8. They are without IT training in Year 9 and then, can pick up IT again in Years 10 and 11 with an CGSE course in Office Procedures. Originally, the school looked at integrating computers across the curriculum

and in theory, Ennis feels, this is the best method of curriculum delivery. But, in practice, it does not work out that way, he says. Most teachers are not confident enough with using IT. They are willing to incorporate it in their teaching, but they are not trained. So it gets left "on the backburner".

As an alternative, IT as discrete subject was opted for instead of the cross-curricular approach. The basic skills that are necessary are taught in Years 7 and 8. Students are taught:

- Word Processing - Students spend half the year on these important skills, using Microsoft Word 2 and 6.
- Spreadsheets - Using Excel, students gather data and then display it in graphical form.
- Data Bases - Students are introduced to the wider implications of data collection and the Data Protection Act in Britain. Students construct databases of names and addresses of friends and relatives, of information on artists and painters, etc..
- Graphics - Using programs like Paintbrush and Draw, students will produce posters and greeting cards, etc..

There is also a unit taught on the Internet and E-mail. There is, at present, one terminal with Internet access. Students may have E-mail sent to them at the school address. (This Internet terminal is only being used by about 4 members of the staff of Brays Grove though it is open to access by all teachers and they are encouraged to do so as the experience can only benefit the students and the school). This is a 5 week unit which runs concurrently with a 5 week unit on the use of the flatbed scanner and scanning software. The classroom is divided into two groups for the units. Each group will complete both units.

Students also learn the use of a desktop publishing package, Aldus PageMaker. As a final project in Year 8, they will create a newspaper.

Though IT is not used across the curriculum, Vincent attempts to equip the students within the discrete subject with the general skills to apply to the other subject areas and he also tries to draw on and refer to other subject areas to be the vehicle for the IT skills. Because of the workload involved in ensuring skills are taught in the discrete course, the compulsory IT components to be taught in the individual subject areas by the National Curriculum are the responsibility of those departments. However, without adequate resources, it seemed near impossible to me for each subject area teacher to fulfill the IT requirement stipulated by the National Curriculum.

IT is taught as an 'Option' in Key Stage 4 in a course called Office Studies. This is a practical and useful course that teaches students all the skills necessary to function in an office setting. It also fulfills the Compulsory National Curriculum requirement that students be aware of the wider implications of IT in society.

*June 26, 1996 - Meeting with Patricia Jefford, Deputy Head, Passmores School*

**Topics Discussed:**

- IT resources at Passmores School
- Proposals for upgrading IT resources

My meeting with Mrs. Jefford provided the following information about the school:

- With regard to technology in the school, there is a department head of Technology who is responsible for all aspects of technology. Separate and under him, there is a Coordinator of Information Technology - Mr. Ralph Myers.
- Year 7 and 10 have a discrete course in IT
- Passmores has recently acquired two laptops for Internet access as part of a program sponsored by the National Council for Education Technology (NCET). The purpose of the program under which this hardware has been supplied is to allow for Internet access to available online resources related to the subject areas.
- The school has generic software for all subjects but also there is subject-specific software.
- In current negotiations with the Board of Governors, the school is proposing to upgrade the existing IT facilities by purchasing 60 more stations for the 2 main IT labs. So many of these new computers will be used to upgrade the main labs but other computers will be allocated to each subject area in clusters of mobile machines. Professional development will also be provided as part of this upgrading package. The school has to seek bids from 3 companies to deliver the required Professional Development sessions on the new equipment.

*July 18, 1996 - St. John's Comprehensive School, Epping, Essex*

*Final Entry*

**Topics Discussed:**

- IT Development Planning at St. John's - assessment, planning and implementation
- IT curriculum development for discrete course - a cross-curricular focus to facilitate skills transfer
- Newfoundland, Essex and IT: Similarities and Differences
- Recommendations

My research at St. John's Comprehensive School in the area of Information Technology across the curriculum has been, I believe, mutually beneficial for me and my cooperating teacher, Mr. Edward Barnes. It was my focus to determine to what extent computers were integrated in all subject areas of the British National Curriculum, in particular in the schools of the Essex County Council. At the same time, Barnes, being newly appointed to Head of the Information Technology (IT) Department, was attempting to assess just how IT was being used in his school.

He was trying to ascertain the extent of IT integration across the curriculum at St. John's School as a starting point to developing policies and programs for the new IT department. I was able to assist in auditing the existing system of IT delivery by interviewing each department heads to ask how and which IT skills were being fostered in their subject area. This was the type of data collection that I had intended for my research as well.

Coupled with his own investigation and his administration of a questionnaire (concerning the staff's feelings about their level of IT competency), Barnes could use my

research to help make proposals and development plans, and to formulate a school IT policy statement. It also aided in planning the physical layout and configuration of the school's computer systems as it identified teachers' demands on the system. By identifying the level of IT integration in each of the departments, He could also determine which teachers and curricular areas could most benefit from his help in developing and fostering cross-curricular links with IT and staff inservice training.

I was further able to assist Mr. Barnes and the school in developing new curriculum for discrete IT courses. The level of teacher IT competency in the school was not conducive to a solely subject-integrated approach. The extent of IT integration across the curriculum was not even sufficient to meet the legal requirements of the National Curriculum. Discrete courses were therefore necessary to ensure that students were developing the essential IT skills. In order to give the skills taught in the discrete course some relevancy and to assist with the transfer of these skills to the other curriculum areas, the courses were designed to draw upon subject-specific tasks to foster IT skills. I took over responsibility for developing the word processing curriculum for the Year 7 IT course. I developed a unit to teach word processing skills by having students apply them to Language Arts tasks in poetry, resume and newspaper writing. This unit appears in Appendix B of this report.

From my observations and interviews with leading IT professionals at St. John's School and other schools in the Essex County School System, a picture of a school system has formed that exhibits both similarities and differences relative to schools in Newfoundland and Labrador. The policies or vision statements that guide the

implementation of IT programs in Britain differ from Newfoundland's documented guidelines that pertain to IT. The British Education System has outlined policy to guide the integration of IT within the structure of the National Curriculum. Here they have specified within the *Programme of Study* (POS), the *Strands and Attainment Targets*, the *Levels of Attainment* and *Statements of Attainment* for each subject area the general level of IT integration required. The requirements for IT are sometimes more specific in some subjects than others, but in any case has the weight of law.

In this way, British system of education is apparently ahead of Newfoundland's education system which specifies no requirements, policies or curriculum mandates for the integration of IT in all subject areas of the curriculum. Such a curricular mandate for IT could perhaps be beneficial for the province. As yet, there is only a vision statement in the form of the TILE document, much of which has yet to be implemented. However, in the present milieu of educational reform in the province, the role of technology has moved to the fore and all indications are that these guidelines will provide an impetus for curriculum development.

Technology is now given a new place of eminence in the curriculum. For years, the core of our curriculum centred on language, math and science. Yet, one of the *principles of reform* as dictated by the government document Adjusting the Course: Part II (Department of Education and Training, 1994a) makes technology synonymous with science and places it at the primary core of our curriculum: "At least 50% of the school program must be devoted to the primary core areas of language, mathematics and science and technology." Yet, there is little indication of whether this new degree of

prominence has both a discrete-course and a cross-curricular focus.

With regard to the degree to which the system is furnished with adequate technology, it seems that the Essex County schools may lag somewhat behind the Provincial system. The same discrepancies in levels of technology resources between individual schools exists in the Newfoundland system as it does in Essex. However, one was left with the impression that on the whole, Newfoundland schools are equipped with more resources. Yet, what statistics I could find on the matter seems to put these two school systems on a more compatible level as to resource provision. In 1996, the provincial average for number of students per computer is 12 (Government of Newfoundland and Labrador, Department of Education, 1997). This statistic was broken down according to school district whereas a similar statistic for Britain was divided according to the school level. In 1993-94, according to a summary of a Department for Education and Employment Statistical Bulletin. Primary schools were reported to have a ratio of 18 students per computer, Secondary schools had 10 students and Special schools had 5 (Kilkie, M., 1995a). It is difficult, however, to get definitive statistics as to the type and age of the computers available to British students. Profiles '96 provides some breakdown as to the status of the computer technology available (Government of Newfoundland and Labrador, Department of Education, 1997).

As well, educational telecommunications in Newfoundland are at far more advanced stages of development than the Essex County system. With development and implementation funding from the Canada-Newfoundland Cooperation Agreement on Human Resource Development (HRD), the Newfoundland government has instituted

STEM~Net, the Science, Technology Education and Mathematics network. STEM~Net is "a computer network for active professional K-12 and rural public-college educators in Newfoundland and Labrador. By assisting these educators in meeting their teaching, curriculum and professional development needs, STEM~Net aims to support their ongoing efforts to improve student achievement in this province" (STEM~Net, 1996). This "state-of-the-art provincial computer network, established in 1993, has greatly improved communication among educators and has become the vehicle for many new initiatives in professional development" (Government of Newfoundland and Labrador, Department of Education, 1997). STEM~Net users can avail of services which include electronic mail, general information bulletins and news groups, a wide range of on-line libraries and database resources, and access to the Internet and the World Wide Web. Educators at Memorial University's Faculty of Education, the province's public colleges and all of the K-12 schools have long had access to the network. In 1996, STEM~Net, administered 9400 accounts, and "since the beginning of 1996 there have been over 125,000 logins province-wide each month with a total of between 23,000 and 24,000 hours connect time per month" (Government of Newfoundland and Labrador, Department of Education, 1997). Through the financial assistance of government, STEM~Net is providing free access to E-mail and Internet to education professionals and pre-service teachers. It has also fostered projects that encourage the curricular use of the Internet.

Very few teachers in the Essex system seemed to have online access and fewer still were using the Internet as a teaching / learning tool in their schools. Internet access is

very costly and they have not had the benefit of government funding to fully subsidize these costs as Newfoundland has had. In any case, it is hard to compete with the advanced system which Newfoundland has in STEM~Net, considering that it is on the leading edge in North American Education.

In Britain, there have been some industry- and government-sponsored programs that have attempted to improve the schools' access to IT resources, if their applications met certain criteria. St. John's Comprehensive School and Passmores School have recently acquired two laptops for Internet access as part of a program sponsored by the National Council for Education Technology (NCET).

This program known as "The Multimedia Portables for Teachers Pilot" is funded by the Department for Education and Employment (DfEE), aims to build on existing research by providing teachers with portable computers which support multimedia and/or communications. Their research shows that using portable computers in schools:

- encourages innovative approaches to teaching;
- brings a flexibility to teaching, extending the use of IT beyond the classroom, and
- allows teachers to develop their IT skills in private and to use the portable whenever and wherever is most convenient to them.

(NCET, 1997b)

The project will evaluate the impact of this technology on teachers' competence and confidence in the use of IT. The pilot will be evaluated over a period of one year initially, beginning in September 1996. A total of 1141 teachers will be equipped with a portable computer and will take part in the project.

Those schools taking part in the pilot project were able to choose between two platforms - PC Compatibles and Apple Macintosh. All computers provided by the pilot are equipped with Internet access. The aim is to evaluate different types of access to the Internet and the experiences of the teachers using the PC portables. The purpose of the program under which this hardware has been supplied is to allow for student and teacher Internet access to available online resources related to the subject areas. The teachers in return agree to participate in an evaluation of the impact of this resource on teaching and learning. While these programs are helpful, resources are limited and participation is determined through a selection process. This raises questions about equity of access.

One is left with the view that in Newfoundland IT capacity is largely under-utilized, particularly if one looks at true curricular integration. We share similar problems and impediments with the Essex system: lack of teacher competency (which is further undermined by lack of teacher inservice training) and lack of human resources within the schools to provide IT support, system maintenance and trouble-shooting. In short, both education systems have some distance to go before effective IT delivery can take place. However, this province could be doing more to exploit its wide range of present advantages described above. Some recommendations from improvement would be:

- ensure that course work in educational computing is compulsory in the training of pre-service teachers

- provide increased resources and opportunities for professional development in IT

skills, IT integration and the generation / composition of HRD proposals for IT funding.

- outlining policy that places a curricular mandate on (or at least resource manuals that guide) the cross-curricular integration of IT within the Provincial curriculum

- including IT as a curricular subject from the elementary level onward to ensure a foundation of IT literacy that will facilitate IT use in the curriculum

- recognition that IT support services within schools are essential and allocate funding at the school or board level to provide increased access to these services.

Upon reflection, this internship has met with all my expectations and objectives. It has given me new insight into the methods of IT integration and the levels of IT resource provision at work in Newfoundland. While analyzing the systemic approach to computer integration taken by the British Education System and those particular IT strategies and policies of certain schools in the Essex School System, I have been provided a great opportunity for professional development. I have obtained valuable experience in the administration of IT delivery and in IT curriculum development.

# Chapter 3

## The Curricular Use of Information Technology: Discrete Delivery or Cross-Curricular Integration

### *Background and Rationale*

In an information age where the human knowledge base is constantly changing and expanding, largely due to the proliferation of technology, it becomes increasingly necessary to be able to sort through and make some sense of all the data that carries the aegis of knowledge. Students, therefore, in today's schools must develop skills for lifelong learning. Among these skills are those necessary for handling and communicating information.

An essential component of a child's education is technological literacy.

> Being literate involves making meaning from a variety of sources and communicating it to a variety of audiences. Increasingly, those sources and the communications means are technological in origin. Literacy in a modern society requires a high degree of technological literacy.
>
> (Department of Education and Training, Government of Newfoundland and Labrador, 1995).

This compels students to become literate with the technology that helps us organize, measure, control, handle and communicate information. They need to develop the necessary skills for utilizing this technology to make the task of dealing with information easier.

Hence, Information Technology (IT), that body of technologies we have come to group under this heading, begins to distinguish itself as a relevant curricular area in its own right. Information Technology has been variously defined. Rice (1995) specifies IT

to be "the use of computers, CD-ROM, laser disc, digital video, satellite communications, telecommunications, etc. in the classroom, as well as access to databases, such as the Internet" (p. 67). The School for Information Technology in the University of Pretoria, South Africa (1997) is another source that describes IT:

> Information technology refers *inter alia* to areas such as advanced micro electronics, software technology, advanced information processing, office systems, data communications and computer aided manufacturing and computer aided education.

Herring (1992, as cited in Ashley, C., 1994) defines IT as:

technology that has emerged from the integration of the previously separate technologies of:

- computers, including microcomputers, work [sic] processors, and large main frame computers;
- communications technology, including the telephone, satellite communications, video and computer communications, facsimile transmission (fax) and the field of fibre optics;
- microelectronics
- data storage technologies
- networking technologies
- technologies relating to robotics, AI, hypertext, remote sensing, voice recognition, artificial vision and scanning.

The skills involved in this broad area of technology are obviously many and varied. Herein lies the challenge - to impart these various skills effectively so as to engage the learner and allow him or her to see the relevance of the skills, to use them in all subject areas where appropriate and to recognize the ways in which these skills may be employed

in different situations to solve problems. It is the role of the school to impart such skills and knowledge to students.

> Many schools today are aware of the exciting opportunities that IT affords to enrich the learning experience of students. But equally, many are confused and uncertain how to proceed, hesitating between a number of apparently contradictory models of IT implementation and delivery.
>
> (NCET, 1997a)

This begs the question as to what is the best method of imparting these skills and what are the factors that influence the teaching and learning of these skills. What is the best approach to facilitate the most effective curricular use of information technology?

As this area of technology emerged and distinguished itself from the general umbrella of Technology in the 1980's, a debate slowly arose in Britain about educational computing. It was between those educators who thought that the only place of computers in the curriculum was to enhance all subject learning and those who believed that IT and computers in their own right was now a valid subject for learning and furthermore that enhancement in other subjects was unlikely to raise students abilities in using IT tools above a very low ceiling (Kilkie, 1995b). Such tension is perhaps characteristic of IT's place in today's National Curriculum as it is both a prescribed subject syllabus and a cross-curricular medium or tool. It is interesting to note Kilkie's assertion of a limitation to the 'subject enhancement' role of IT, where IT's inclusion as an enhancement to subject learning (without a discrete teaching of IT skills) has limited effectiveness for raising students' abilities in IT.

As research was conducted within Essex County's School system from April to

June 1996, it became apparent to the author of this report that there was no consistent approach to the integration of IT. Various methods were tried with varying degrees of success. The schools involved had to walk the line between what approach is deemed most effective given the school's context (ie. availability of resources and administration's "best thinking") and what will cover the dictates of the National Curriculum.

The National Curriculum was given the weight of law upon its inclusion in the Education Reform Act of 1988. This national framework for education prescribes ten school subjects, distinguishing between Core Foundation subjects, such as English, Mathematics and Science and Foundation subjects, such as History, Geography, Modern Languages, Art, Music, Physical Education and Technology (divided into Design Technology and Information Technology). Specified for each subject are the knowledge, skills and understanding which students of different ability and maturity levels should have; the required skills and processes which must be taught to these students; and the arrangements for student assessment of these skills and processes. Within the National Curriculum, IT is delineated as a separate subject syllabus and also IT requirements are outlined in each subject syllabus.

For the purposes of clarifying terminology, the categories for the age grouping of students in Britain are called *Key Stages*. There are 4 such groupings. Key Stage 1 spans students' ages 5 to 7, Reception to Year 2. Key Stage 2 covers students' ages 7 to 11, Year groups 3 to 6. Students aged 11 to 14 in Years 7 to 9 fall into Key Stage 3, with Keystage 4 covering students in Year 10 and 11, aged 15 and 16.

The study of Information Technology is compulsory at every Key Stage from 1

to 4. In a separate IT subject syllabus, the National Curriculum specifies what educational opportunities and experiences with the use of IT that should be made available to students and the IT skills that each student should perform. These skills and experiences increase in complexity through the Key Stages. At the same time, IT must be integrated into all the subjects of the National Curriculum. The school must ensure that these IT elements are covered in the context of each subject area, but the National Curriculum does not prescribe the method of IT delivery.

The National Curriculum outlines what needs to be taught in each of these Key Stages according to the Programme of Study (POS), the Strands and Attainment Targets, the Levels of Attainment and Statements of Attainment for each subject area. Programmes of Study provide information for the teacher about the ways in which they may teach the attainment targets and statements of attainment for a particular subject area. The POS outlines generally the content of what is to be taught as well as methods or approaches for teaching. An example of a POS for a discrete course in Information Technology for Key Stage 3 would be:

> Pupils should be taught to become critical and largely autonomous users of IT, aware of the ways in which IT tools and information sources can help them in their work; understand the limitations of such tools and of the results they can produce; and use the concepts associated with IT systems and software and the associated technical terms.
>
> (Department of Education and Employment, 1995)

Each POS is outlined by a number of Strands. These strands are very general types of skills within each subject area. IT, for instance, is subdivided into 5 strands: Communicating information, Handling information, Controlling, Measuring, and

Modelling. Each of these strands is in turn broken down into a number of Attainment Targets that more specifically indicate the type of activities that will foster these skills. Using IT as an example, some attainment targets for Key Stage 4 would be:

- use IT to handle and communicate information in a variety of contexts.
- apply their existing knowledge and understanding of measurement, control and modelling to a wide variety of contexts, in a range of subject or vocational areas.
- increase their understanding of the social, ethical, moral and economic impact of technology.

(Department of Education and Employment, 1995)

The National Curriculum also specifies requirements for IT to be integrated into every subject area (with the exception of Physical Education and Religion). These requirements, however, are not overly prescriptive, only stipulating in each subject syllabi that "pupils should be given opportunities, where appropriate, to develop and apply their information technology (IT) capability in their study of . . ." each subject (Department for Education, 1995). In some subject syllabi, the curriculum requirements for IT are more specific with regard to the tasks to which IT skills should be applied, but generally it is non-prescriptive and is left to the schools to interpret and implement. This governmental thrust for the cross-curricular integration of Information Technology forces schools to confront the issue of effective IT delivery.

Several approaches to meeting the National Curriculum's IT requirements have emerged. The two methods examined by this study are on opposite ends of a continuum, with combinations of both approaches falling somewhere in between. The two approaches examined for the delivery of IT skills in the curriculum are:

- a **subject-integrated** or totally cross-curricular approach - where IT is used to enhance learning in each subject area and all IT delivery is by subject teachers, and students receive no specific IT teaching at all, and
- a **discrete subject** approach - where IT is delivered through a clearly defined, taught programme as a separate subject.

Some schools have entrusted the teaching of IT skills solely to this subject-integrated method or cross-curricular approach, where ideally the teachers of all subject areas would take every opportunity to integrate the use of IT in their lessons. This has, however, translated into an approach where only some subject areas take responsibility for instilling the required IT skills. Information Technology and its requisite skills are divided into components and allotting the responsibility for each of these components to various subject areas (subject areas that seem most suited to certain modes of IT use). For example, the English department would take responsibility for teaching word processing and desktop publishing skills; the design technology department covers the control element of IT; the Maths department teaches mainly spread-sheet skills but some data base application as well; the Science department uses IT for data-logging and data base applications.

Another approach to teaching IT skills in these schools has been to offer Information Technology as a discrete course only. The IT department takes responsibility for administering courses in IT which focus on developing a general knowledge of all dimensions of Information Technology and a proficiency in required IT skills. There may also be an attempt to bring a cross-curricular dimension to these courses by using tasks from other subject areas to foster the IT skills and make them relevant. However, within

these two approaches, various factors (having to do with instructional time and skills transfer, availability of resources, opportunities for assessment and professional development) impinge upon the effective integration of IT.

This study probes research questions about the most effective means of teaching IT skills and integrating the technology across the curriculum. It focuses only on these two methods of IT delivery, employed by the schools studied, to determine the following:

- whether a solely cross-curricular approach to delivering IT can be effective
  - what level of IT competency is necessary for teachers and students and what level of administrative support is required
- whether a solely discrete course approach to delivering IT can be effective
  - whether IT skills, taught in isolation the skills, will transfer to other subject areas
- which is the better of the two approaches

This study gathers narrative data from interviews with teachers on the relative worth of two approaches to IT delivery: a discrete subject or a cross-curricular approach. This type of interview data allows one to identify the strengths and weaknesses of these approaches. Coupling this with data from the literature and other published studies provides a tentative picture of the most effective means of IT integration.

## ***Review of the Literature***

Given that the use of information technology in education very clearly exists within a social context, this inquiry sought understanding within a paradigm that accounts for the dynamics of such a context. This study was informed therefore by data collected using qualitative methods. The qualitative paradigm seeks knowledge construction within "a world in which reality is socially constructed, complex and everchanging" (Glesne & Peshkin, 1992, p. 6).

Some would suggest that one's choice of research methods is not determined by the type of research question. Rather we adhere to particular methodologies given that they are commensurate with our view of the world.

> Our constructions of the world, our values, and our ideas about how to inquire into those constructions, are mutually self-reinforcing. We conduct inquiry via a particular paradigm because it embodies assumptions about the world that we believe and values that we hold, and because we hold those assumptions and values we conduct inquiry according to the precepts of that paradigm.
>
> (Schwandt, 1989, p. 399, as cited in Glesne & Peshkin, 1992, p. 9)

Elliot Eisner (1990), in *The Meaning of Alternative Paradigms for Practice*, rejects the notion that there is one epistemology or way of knowing. He points to the pervasiveness of the "scientific method" and the dominant attitude that it is the only paradigm that can provide valid and reliable "knowledge". He calls for a "broader and pluralistic view of knowledge" which will "contribute to a less dogmatic view in our schools of what it means 'to know'" (Eisner, 1990, p.90). Eisner advocates the notion

of multiple ways of knowing and, therefore, multiple intelligences.

He recognizes the need for teachers to employ their 'ways of knowing' by researching areas of their own practice in what is called *action research*. Action research, conducted by teaching professionals, will produce "the kind of knowledge secured by those on the inside, working in local contexts and needing to act upon what they know" (Eisner, 1990, p. 98). As Eisner points out, we are not looking for "dependable prescriptions for action, but ... analogues to increase the quality of teachers' deliberations." It will at least give us 'food for thought,' foster reflection that may inform our future teaching practice or curricular directions.

This piece of research sought to determine teacher's perceptions of the curricular uses of computers and the extent and nature of their own use. Therefore, the qualitative research task of "coming to understand and interpret how various participants in a social setting construct the world around them" (Glesne & Peshkin, 1992, p. 6) was well suited to the aims of this research. The objective of qualitative research is to "gain access to the multiple perspectives of the participants" (Glesne & Peshkin, 1992, p. 6) and this study recognized the importance of these perspectives to an accurate picture of the curricular use of IT and the best methods of the teaching of IT skills.

Several organizations and authors have been exploring and defining the curricular role of IT. The National Council for Educational Technology (NCET) is a British government-funded registered charity. Its role is to: identify the relevance of new technologies to education; evaluate the potential of new technologies to enhance learning and to raise standards; and promote, enhance and support the effective use of information

technology across all sectors of education. With information gleaned from their TV series, *Teaching and Learning with IT*, broadcast in cooperation with the BBC, NCET publishes 'TV fact sheets'. In their most recent fact sheet publication, *Access to IT / IT as a curriculum subject* (NCET, 1997c), they recognize that IT is both a subject in its own right and a resource for teaching and learning. Published after this present study was completed in Essex, this NCET document produced findings which are consistent with the findings to be outlined in this report and therefore will be discussed in more detail below.

In another NCET publication (1997a), *Delivering IT Capability*, ten contrasted case studies are presented which detail unique approaches and solutions to the problems and opportunities associated with IT delivery. The methods used in these cases range from:

- The 'centralised' approach where IT is delivered through a clearly defined taught programme
- The 'skills core' and 'kick start' approach where a small central unit teaches IT skills which are then applied across the curriculum
- The totally cross-curricular approach where all IT delivery is by subject teachers, and students receive no specific IT teaching at all

This document also outlines the advantages and disadvantages of each model of IT delivery.

*Delivering IT Capability* delivers the central message that effective delivery of IT at Key Stage 3 is dependent on the school context, that there is "no right way," no generalizable blue print to be used in all situations. The type and effectiveness of the model used will depend upon the dynamics of ...

> the resources and spaces available, the commitment and effectiveness of the management team, the IT confidence and competence of staff in all subject areas, and the personality of the IT co-ordinator.
>
> (NCET, 1997a)

Regardless of the model adopted by the school, this document notes some factors which seem to be essential prerequisites of successful delivery of IT. NCET recognizes the importance of:

- full support of the senior management team
- a high level of staff expertise and suitable training to maintain this
- careful and systematic curriculum planning and interdepartmental liaison
- a well thought out procedure for monitoring and assessment
- appropriate technical support.

(NCET, 1997a)

Similarly, Rice (1995) focuses on one of these important considerations that, in addition to the choice of effective IT delivery methods, determine the success of the IT curriculum. In examining some issues that surround the integration of IT into the classroom, she highlights the issue of professional development (PD) and IT support and its effect on effective integration. Her study finds such support to be greatly lacking. Yet, the teachers she has interviewed showed "a strong desire for inservice programs and resource personnel to support their use of technology in the classroom and sufficient time to take classes and to learn on their own" (p.79). Thus far in the development of IT as a curricular subject and tool, support and resources for PD has not been made a priority.

The literature available pertaining to this area of study is scant. Indeed, Information Technology is an emerging discipline within education. This would likely

account for the paucity of research reported in this area.

## ***Method***

Various means of data collection were utilized in this study. The data was triangulated using data sources such as classroom observation, document collection and interviews. Such triangulation of data helps to meet one of the criteria of credible qualitative research, that of *confirmability*. This helps reduce the risk of researcher bias in the data. Tapping these sources has allowed for a deeper understanding of the issues. Though there was less focus on classroom observation, the collection of documents was fairly extensive. Relevant and useful information was gathered from documents published by one of Britain's leading organizations in the field of educational technology, the National Council for Educational Technology, accessed through Internet searches.

Much of the data for this study, however, was gleaned from personal interviews with teachers in various schools in the Essex County Local Education Authority (LEA). A review of the literature by Jeffery et al (1995) found that personal interviews were considered "the most effective approach to collecting data" as it enables the interviewer to probe and challenge participants' responses (p. 47). They acknowledged the potential bias in reporting interview data, given the interviewer's ability to influence participants by directing their responses. This study hopes to have limited such bias through standardized, structured interviews.

**Participants**

This study took place in one school primarily, St. John's Comprehensive School in Epping, Essex. This school, under the jurisdiction of the LEA - the Essex County Council, covered Key Stages 3 and 4, with students aged 11 to 16. The participants in this study were drawn from the staff of St. John's who volunteered to be interviewed. The names used in this report are fictitious and have been changed to preserve anonymity. Those interviewed were mainly department heads. However, regular classroom teachers were interviewed where they were found to be more knowledgeable about IT's use within the department in question. A total of thirteen interviews were conducted.

A second site was also chosen to provide a contrast to St. John's School. Brays Grove School in Harlow, Essex was suggested by the newly-appointed department head of IT at St. John's as being a useful counterpoint for this study. Time did not permit extensive interviewing at this school. However, the sole participant drawn from Brays Grove School was the department head who had been in the position for several years. He therefore was fully knowledgeable about the delivery of IT in this school, especially given the centralized approach taken.

Two more interviews were conducted with leading IT resource persons in two other schools, St. Mark's Roman Catholic School and Passmores School in Harlow. These interviews added a little more depth to the perspective. However, the interviews were more superficial than those conducted at St. John's Comprehensive and Brays Grove given time constraints and therefore, little of these are used in this study.

**Instrumentation**

The instrument used to collect data was a standardized list of interview questions which was asked of all participants. A list follows of the questions asked of the participants at St. John's School:

1. How are you using IT in your department / classroom? To what purpose? (For Department head: How many teachers in your department are actively using IT in their classes?)

2. Why are you using IT to achieve these aims? Why not some other method or medium? Does it necessarily help to achieve these aims better?

3. To what extent does the available hardware meet the needs of your students? Do you feel that there is any upgrading necessary to meet your aims and goals?

4. Do you consider the current method of IT delivery effective for students' acquisition of IT skills?

5. Are you able to effectively integrate IT into your subject area?

6. What factors (if any) detract from this integration?

These questions only varied slightly when the interview was administered to the IT Department Head at Brays Grove given the different approach to IT delivery:

1. How well equipped is your school with hardware and software to facilitate IT? To what extent does the available hardware meet the needs of your students? Do you feel that there is any upgrading necessary to meet your aims and goals?

2. How is IT approached in your school - as an integrated or discrete subject?

3. How are your teachers using IT in their classrooms? To what purpose?

4. How many teachers in your school are actively using IT in their classes?

5. Why are they using IT to achieve these aims? Why not some other method or medium? Does IT necessarily help to achieve these aims better?

6. Do you consider the current method of IT delivery effective for students' acquisition of IT skills?

7. Are you able to effectively integrate IT across the curriculum?

8. What factors (if any) detract from this integration?

***Procedure***

The interviews were conducted during the participants' preparation periods or at lunchtime and usually lasted about 30 - 40 minutes. The opinions and views of the participants were sought to piece together the picture of how IT was being delivered in and across the curriculum at St. John's. All interviews conducted were recorded on audio cassette and later transcribed for analysis.

Given the subject-integrated approach to IT delivery at St. John's, another school was sought as a research site that used the discrete course approach to IT delivery in order to provide a counterpoint for comparison of methods. One interview was conducted at Brays Grove School with the Head of the IT Department in order to determine the extent and type of IT curricular use. Time did not permit further interviews with other members of the staff. However, due to the strictly discrete course approach to IT at this school, he was able to provide all the necessary data and no further interviews were really needed.

***Discussion of Results***

St. John's Comprehensive School has entrusted the teaching of IT skills solely to the cross-curricular or 'subject-integrated' approach. With this method of IT delivery, the teachers of all subject areas should take every opportunity to teach their students the IT skills required for use in their subject area and integrate the use of IT as a tool for problem solving in their lessons. This has, however, translated into an approach where only some subject areas, those that seemed most suited to certain modes of IT use, have taken responsibility for instilling the required IT skills.

From interviews with department heads, it was determined that 'covering the IT requirements' meant that the English teachers took responsibility for teaching word processing and desktop publishing skills; the design technology teachers covered the control element of IT; the Maths teachers taught mainly spread-sheet skills but some data base application as well; the Science teachers used IT for data-logging and data base applications; the Humanities teachers taught mainly data base management and interrogation; and the Modern Languages teachers used IT for word-processing, data base and spreadsheet work. Some IT work was also done to lesser degrees in the subject areas of art and music, but the IT use in these areas did not meet the National Curriculum requirements.

In addition, with this approach in this school, it was not clear if the IT requirements were being met at all Key Stages. An interview with the Department Head of Humanities, James Collett, revealed that very little IT work was being done at Key Stage 4. In Key

Stage 4, Collett claimed it was difficult to timetable the use of IT because of a) the teachers' perception of shortage of instructional time in which to get the required curriculum covered and b) inability to access the network.

As indicated, one of the difficulties with this approach was related to available instructional time. Subject teachers already felt pressed for time to meet the subject-specific demands of the National Curriculum. With this IT approach came the added pressure of teaching computer skills so that students may apply them to the tasks of the subject. Teachers had tended to regard the use of their class time to teach IT skills as detracting from what they believed to be more relevant subject demands. The inability to come to grips with the required instructional time had contributed to poor curricular integration of IT as all subject teachers did not give IT the attention it required.

The subject integrated approach offered the added challenge of the assessment of student learning in IT. As various departments and teachers were responsible for teaching the students different IT skills, it was very difficult to monitor individual student progress. However, the National Curriculum demands for the subject area syllabus of Information Technology required that each student be given a level of attainment on the scale of 1 to 8. The various departments responsible for IT however failed to provide a comprehensive assessment of each students' IT attainment.

Several teachers described the school's approach to IT delivery and cross-curricular integration as "an unsuccessful attempt." Their concern was that:

> . . . this approach has failed to meet all requirements of the National Curriculum and to really provide an approach to the tool/medium of IT as a cross-curricular subject. The students fail to make the links for IT between subjects. IT skills are not transferring across subject areas.

(Personal Interview, Edward Barnes)

With IT components being 'farmed out' to various subjects and in some cases, some subjects having exclusive responsibility for a certain mode of IT use (ie. the use of data-logging in Science), cross-curricular links were not being made to ensure the transfer of the students' IT skills in one subject to other subjects and to promote student awareness of the wider application of IT.

As an added challenge to successfully implementing this method of IT delivery, just about every member of the teaching staff must possess an adequate level of IT competency. They must be knowledgeable in the area of IT and comfortable with its use in their classroom. The newly-appointed Department Head for St. John's, Edward Barnes, reported (based on his own staff survey) that his staff did not possess a high level of IT confidence or competence. Barnes indicated that the teachers' lack of competency may be compounded by a feeling of lacking control when it comes to integrating IT in the classroom as students seem to know more than them or by a feeling that they may "ruin the system or machine" through wrong use. One teacher who admittedly had little experience with computers commented, "I personally don't use it much because I find that I can't get the structure from the lesson when using IT."

Due to this lack of competency very few teachers were utilizing IT. Barnes claimed that those teachers using it were likely those who were self-interested. According to his investigations, there was mainly one teacher using IT in Maths; in English, mainly one teacher; in Modern Languages, mainly 2 teachers. Interviewing each department head at St. John's during this study, the number of teachers reported to be using IT was somewhat

higher than this:

- the Maths department head reported that all 6 teachers in the department use IT, but to varying degrees;
- Humanities also reported that all six teachers are using IT to teach information handling and database management;
- Modern Languages set a target for IT use of at least 3 times a year by all teachers, but 3 out of 6 teachers used IT more than that;
- All 6 science staff members were using IT to some degree - four occasionally and "two regularly with some real meaning attached to it" (Personal Interview, Mr. Roger Perchard);
- In Art, 1 out of 2 teachers were using IT to some degree;
- The Music teacher used IT where possible;
- The Drama department used IT only in the form of computerized lighting for which students could receive an IT attainment level
- The Physical Education department made no use of IT, not being mandated to do so by the National Curriculum.

There was a discrepancy between the new IT Department Head's perceptions of the extent of IT use and what was actually reported by each department during the interviews. The reasons for this discrepancy may have stemmed from a difference in opinion of what constituted true IT integration. Also, in a milieu of teacher accountability and impending school inspections by the Office for Standards in Education (OFSTED), some of these reported numbers may have been due in part to what the participant felt he or she *should* report. Regardless, lack of IT competency was an important factor which inhibited the cross-curricular approach to the degree necessary to enable effective integration at this school.

At St. John's School, unlike many other schools, the availability of IT resources did not really impede IT delivery. There were about 100 computers available for use - some networked, others stand-alone. They had a fairly up-to-date network of 486 computers which needed some upgrading to allow for the use of CD ROMs. However, Barnes felt that

> . . . at St. John's, it may not be so much a matter of upgrading the software and hardware but more so updating the aims and objectives for IT use under the guidance and support of the "new" IT department so as to bring it in line with the National Curriculum requirements.
>
> (Personal Interview, Edward Barnes)

Brays Grove School had opted to deliver IT using the discrete subject approach. IT skills were taught in a course designed specifically for this purpose. A set curriculum of skills and topics were selected. A discrete IT course was taught at Keystage 3 in Years 7 & 8. Students were given instruction in the use of word processing, spreadsheets, data bases, graphics, and telecommunications. IT was also taught as an 'Option' in Keystage 4, throughout Years 10 & 11 in a two year CGSE course called Office Studies. This was a practical and useful course that taught students all the skills necessary to function in an office setting. It also fulfilled the compulsory National Curriculum requirement that students be aware of the wider implications of IT in society.

Mr. Vincent Ennis, Department Head of IT, accounted for some of the reasons why his school has decided on the discrete teaching of IT:

> Originally, the school looked at integrating computers across the curriculum and in theory, this is the best method of curriculum delivery. But, in practice, it does not work out that way. Most teachers are not confident enough with

> using IT. They are willing to incorporate it in their teaching, but they are not trained, so it gets left "on the backburner".
>
> (Personal Interview, Vincent Ennis)

Coupled with the problem of teachers lacking the required IT competency was the problem with lack of computer facilities. Brays Grove had only two computer labs, with enough terminals (including several stand-alone computers) to yield a ratio of 12 students for every computer. This was behind what Mr. Ennis felt was the average ratio in the Essex County system - 3 students to every computer. He indicated that they were "under-resourced". Mr. Ennis taught all his classes in these two labs. There were 25 periods per week in the school's schedule. He had 22 periods of contact time. Of the other three periods, one was actually used by another teacher to teach another IT class. So the lab was in use 23 out of 25 periods per week. This did not leave much opportunity for other subjects areas to gain access to the lab and integrate IT in their lessons. A third lab would be needed in order to provide cross-curriculum access to IT. He had put in a bid for an extra lab which would run off the same server as the other labs. He figured the school would need to have 15 more stations if they were to reach to goal of having IT taught across the curriculum.

At the time of the study, there was very little use of IT by teachers in their classrooms because the Computer Labs were used continually for discrete IT courses. However, Humanities had a small outdated network of 186's (7 stations) but it was used mainly for wordprocessing. Science also had a similar network and it was used for a little Control Technology.

To counteract limited IT use resulting from lack of access, the IT department consulted with the other subject areas to include content from those areas. In this way, IT was used across the curriculum to a certain degree. Although IT was not integrated across the curriculum in the truest sense, Mr. Ennis attempted to equip the students within the discrete subject of IT with the general skills that they could apply to other subject areas. He therefore tried to draw on and refer to content or subject-specific activities from these other subject areas to be the vehicle for the teaching of IT skills. It should be noted that this still did not fully address the problems associated with teaching IT skills in isolation. This can make skills acquisition less relevant as they are not truly contextualized. The skills may not transfer to the other subject areas when the opportunities arise.

Integration of IT across the curriculum was, however, still required by the National Curriculum and expected in the school. Yet, because of the workload involved in ensuring skills were taught in the discrete course, the compulsory IT components of the National Curriculum to be taught in the individual subject areas were the responsibility of those departments. Lack of resources (time, IT hardware, IT support) did not allow Ennis to forge strong cross-curricular links in cooperation with the other departments. Regardless of National Curriculum dictates and the pressure of possible poor evaluation in an OFSTED school inspection, it would seem that Brays Grove School provided the best IT delivery it could given limited resources.

## *Limitations of the Study*

One of the limiting factors to this study was the lack of time available to conduct further and more detailed interviews to assess other teachers' views of the successfulness of their school's approach to IT delivery. It would have been interesting to find out the department heads' perceptions of how effectively IT was delivered with a centralized approach and to what extent they were able integrate IT in their subject areas and draw on the students' foundation in IT skills. The study could have benefitted from the individual teachers' views on their role in utilizing IT tools, given the limited access they had to the IT resources.

## *Recommendations*

Determining the best method for the curricular integration of IT will depend in part on the context and distinct character of the school setting. Any recommendation must be made with this acknowledgement. At both St. John's and Brays Grove, it was apparent that the current levels and methods of IT delivery were unsatisfactory and failed to meet the schools' goals and the National Curriculum requirements. In the case of Brays Grove, this was apparent by the inability and/or failure to integrate IT to a level necessary to meet National Curriculum requirements. It was also evident in the Department Head's opinion that "integrating computers across the curriculum . . . is the best method of curriculum delivery." The feasibility of such an approach at Brays Grove was prevented by lack of

IT resources and low levels of teacher competency.

At St. John's, their desire to improve the IT delivery at the school was evidenced by their plans to change those methods. With Mr. Edward Barnes appointed head of the newly formed IT department, St. John's school was to implement discrete course delivery of IT, starting with the 1996-97 school year. However, Barnes had decided to employ both the integrated and discrete approaches to cover the required IT skills. He had then proposed that the school implement a discrete delivery of IT, while at the same time, building up the knowledge of software availability / compatibility and use of the computers among staff and students in order to develop an integrated approach with strong cross-curricular themes and links. The curriculum for discrete IT courses was designed and, as this report is being written, is presently being implemented. For the '96/'97 school year, there would be a discrete course in IT for Years 7 - 9. It would cover the continuum of IT skills across these years in word processing, database management, spreadsheets, desktop publishing, graphics, control, telecommunications and Internet. These skills would be grounded in the context of relevant tasks drawn from subjects across the curriculum. At Key Stage 4, there were no IT courses at the time of the study, but there were two planned approaches for implementation in the '97/'98 school year: 2 year GCSE exam courses in either IT alone or a combined IT and Business Studies.

Mr. Barnes had also planned professional development in-service to foster teacher competency and, in turn, curricular integration. This should address the concerns of one teacher, Mrs. Annette Windsor, former co-ordinator of IT for St. John's School She

readily supported teaching IT as a discrete subject in the lower grades, but had some concerns about professional development. She felt that, if the students come into the upper grades already knowing how to use IT, the teachers of those grades have lost the opportunity to learn the IT along with the students and yet would still be expected to apply the use of IT to their lessons. Without that crucial learning opportunity, the subject teachers in the upper grades would need more professional development to get used to the technology and get over the uneasiness or fear of using IT.

Admittedly, schools must account for their own individual contexts in deciding which method of IT delivery would best suit the needs of the school. A number of factors influence which is the most appropriate model for a school's delivery of IT:

- the commitment and effectiveness of the school management team;
- the level of resources and their locations;
- the IT competence, knowledge and confidence of the different subject teachers
- an adequate number of well trained and qualified IT specialist teachers.

"There is no one right way for a school to enable pupils to acquire these skills. However, learning the underlying concepts and processes is most effectively taught as a separate subject but relating the work to the wider curriculum" (1997c). There are schools which use the subject-integrated or the discrete course method with great success, but the publication by NCET (1995), *Approaches to IT Capability*, warns that there are dangers with either approach.

> IT courses can lead to thorough but sterile coverage of IT, while fully cross-curricular IT can lead to many pupils missing out on certain

> aspects of IT, or not making any progress beyond learning rudimentary skills. A way of avoiding these two extremes is to develop a carefully designed IT course together with appropriate consolidation across the curriculum to enhance learning in the other subjects.
>
> (NCET, 1995)

The data appears to suggest, then, that the new direction taken by St. John's Comprehensive School would provide the most effective curricular integration of Information Technology. (However, further research may be needed to obtain quantifiable data to support this suggestion.) It offers the strengths of both approaches while one method in this combined approach compensates for the weakness of the other. The discrete course in IT would provide students with the foundation skills they need. This will reduce the instructional time needed for the teaching of IT skills and allow teachers to use IT as a problem-solving tool. With discrete course skills linked across the curriculum, the road to subject integration is made easier. "Teaching specific skills and concepts within a context, or an IT activity that can be related to other tasks carried out elsewhere in the curriculum, often increases pupils' understanding of the wider applications of IT" (NCET, 1997c). IT teachers can then work with other subject teachers to help them integrate and contextualize IT, develop cross-curriculum links and provide opportunities for professional development.

***Summary***

Implementing one of these two IT delivery approaches over the other will not afford the students a complete education in the use of IT. To be completely effective and totally integrated across the curriculum, a school's IT delivery should employ both a discrete course approach and a subject-integrated approach. A discrete course, where students are given a foundation in essential IT skills, will cut down on the loss of instructional time in other subject areas. Teachers won't have to be concerned with teaching the basics, but can get right to the task of employing IT as a tool in problem-solving.

However, the discrete course alone will not account for true integration of IT into the curriculum. The knowledge imparted in this course must have a focus.

> It is important for us as educators to impart knowledge, but knowledge with purpose and direction. The "why" of education is quite often over looked in search of knowledge. Knowledge needs direction to reinforce and give purpose to information ...
>
> (Blieske, 1996)

Even if the course utilizes a cross-curricular focus and applies IT to subject-related tasks, this will have only limited effectiveness as the subject-related tasks are performed out of context. The transfer of these skills for use in other subject areas is not ensured unless the use of the skills are demanded within the context of the individual subject areas. Therefore, there must be, in addition to the discrete course, an honest attempt at IT integration in each subject within the curriculum.

True integration is hampered by the limitations of the curriculum and the lack of opportunities for professional development. Without in-service and pre-service training

in the use of Information Technology in teaching and learning, we cannot hope to achieve cross-curricular integration of these technologies. Educational reform should also address the issue of IT's place within and across the curriculum. Until universities, governments, schools, and professional teaching associations address these issues, IT education will have limited effectiveness in our schools and IT skills limited application to the wider world of work outside the confines of the school.

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# *Curriculum Unit:*
# *Word-Processing*

## *Year 7 Discrete Course in Information Technology*

***September 1996***

***Designed for:***

***St. John's Comprehensive School***
***Epping, Essex***

***Designed by:***

***Michael Coady***

## Writing a Poem

Poetry has a way of saying something meaningful and significant using language in an original way. Poetry can be described as painting pictures with words. You try to capture a scene and/or a feeling by describing it and making it come alive for another person. Language can be used that appeals to our senses - words which give images that one can see, hear, taste, touch, smell. For example:

- **see** - The summer flowers bow to each other and dance in the lakeside breeze.
- **hear** - The chainsaw snarled and rattled in the backyard.
- **taste** - The little boy squirmed as the lemon juice seized his taste buds.
- **touch** - Sue felt a moist brush of sandpaper roughness on her cheek as her cat's tongue roused her from sleep.
- **smell** - Fresh baked bread wafted its warm doughy scent throughout the house.

Now start thinking about a poem that describes the sights, scents, sounds, tastes and touches of any topic you choose or of one of the following topics:

- An Outdoor Market (What noises do you hear? What do the people dress like? What colors do you see? What do you smell? Is it a hot or cold day? How do you feel? Etc.)
- After a Spring Rain Shower (What do the grass and trees look like? What do you smell? How does it feel to walk through the streets and/or the fields? Etc.)
- Autumn (What are the colors, sights, sounds, feelings and ideas that come to mind when you think of autumn?)

- Starting the School Year (How do you feel? Nervous? Excited? Disappointed? Who will be there the first day? What are the noises you will hear? The sights you will see? etc.)

## Word Processing Your Poetry

### Word Processing Skills used:

- loading the program
- entering text from keyboard
- highlighting text
- cutting and pasting text
- saving your document

A Word Processor can help us to organize our ideas and to present them in a readable, attractive form. We will use Microsoft Word 2.0 to record our ideas about our poem as they pop into our heads as we brainstorm about our topics. So, . . .

1. At the **Program Manager** window, load Microsoft Word 2.0 by double clicking on the Word icon with your mouse.

2. Once you have the program running, start typing into the computer as they occur to you all your ideas about the sights, smells, sounds, tastes and touches of your topic.

3. When you have collected so many ideas, images or phrases, you may want to rearrange them in a different order or combine them to create a certain flow, effect or meaning to your words. Here is how you can move these words or phrases around:

    - use your mouse to point to the first letter in the word or phrase you want to move. Holding down on the left mouse button, drag your mouse across the word or words, you want to move, highlighting them in black. Release the mouse button.

    - With the mouse, click on the **Edit** menu at the top of your screen. Select **Cut**. The word or phrase will disappear.

- With the mouse pointer, click to place the cursor where you want the word or phrase to appear. Click on the **Edit** menu again and Select **Paste**. The word or phrase will reappear in this spot.

Try moving things around using this method.

**Saving your Poem**

Now that you have a start on your poem, you will want to save it to work on it again later:

1. Use your mouse to open the **File** menu and select **Save**. Name the new file you have started **poem1.doc** and click **OK**. A window will then appear, asking you to give more details on the type of file you are saving. At the **title** line, type **poem1.doc**. Click on the **subject** line and type **word processing poetry**. Click **OK**.

*Activity 2*

**Formatting your Poem with the Word Processor**

With the final draft of your poem completed, you may now begin to format it with the word processor to make it look presentable. Your poem should appear in the centre of the page, centred from left to right, top to bottom. It could look like the formatted poem on the following page:

# The Writer of This Poem

The writer of this poem
Is taller than a tree
As keen as the North wind
As handsome as can be

As bold as a boxing-glove
As sharp as a nib
As strong as scaffolding
As tricky as a fib

As smooth as a lolly-ice
As quick as a lick
As clean as a chemist-shop
As clever as a ✓

The writer of this poem
Never ceases to amaze
He's one in a million billion
(or so this poem says!)

Roger McGough

*Activity 2 (contd.)*

**Formatting your Poem with the Word Processor**

**Word Processing Skills used:**

- loading the program
- entering text from keyboard
- highlighting text
- changing font and size of characters
- using the TAB key to set out work
- using Page Set-up and Section Layout to change margins and vertically centre text
- using the Spell Checker
- saving your document
- printing your document

Trying formatting your poem in the same manner as the poem on the previous page:

1. Load the Word program from the **Program Manager** window by double clicking on the icon.

2. Once you have loaded the program, use your mouse to open the **File** menu and select **Open**. From the **Filename** window, select **poem1.doc** or type **poem1.doc** at the filename line and click **OK**.

3. You should type the title of your poem at the top on a separate line followed by a space. Your name should follow at the end of the poem after a line space.

4. Change the font size and style of the title of your poem to distinguish it and make it stand out:

   - Highlight the title of your poem with your mouse pointer as you did when cutting and pasting (in Activity 1, step 3).

   - Click on **Format** to show the menu and select **Character**. At the **Font** box, click on the down arrow to show all the different types of

font styles you can choose from. Scroll through them and select one. The **sample** window should show you what it will look like.

- Click on the arrow next to the **points** box and select **18** for your font point size. Click **OK.**

5. Indent your name at the bottom of your poem to set it in from the left margin:

   - Use the mouse pointer and click at the beginning of your name to place the cursor

   - Press the **tab** key 2 or 3 times to move your name in from the left.

6. Try to adjust your left margin so that the poem appears to be *horizontally* centred on the page *(that is, centred from left to right on the page)*:

   - Open the **Format** menu at the top and select **Page Set-up.**

   - Click in the **left margin** box and change the value to **3"** . Click **OK.** (Note: You may have to adjust this value. Perhaps 3" may move the poem in too far or not far enough from the left. It may not appear in the centre of the page. To check how it will appear from left to right on the page, open the **File** menu and click on **Print Preview.** You may have to go back and readjust the left margin value.)

7. Now adjust the poem so that it appears to be *vertically* centred on the page *(that is, centred from the top to the bottom of the page)*:

   - Open the **Format** menu at the top and select **Section Layout.**

   - In the **Vertical Alignment** box, select **center**. Click **OK**.

8. Check the spelling in your poem and edit any mistakes:

   - Open the **Tools** menu and click on **Spelling**. You may be asked, *"Do you want to continue checking at the beginning of the document?"* Click **Yes**.

   - The words that the Spell Checker will question are not necessarily spelled wrong. You will have to use your judgement on this. The Spell Checker will present you with suggestions for changing the spelling of certain words. You must click on the

correct suggested word and click **Change** (if the word is misspelled and you wish to change it) or you can choose to click **Ignore** (if the word is actually spelled as you mean to spell it and you wish to ignore the suggestion).

Read through the poem once again and make sure there are no spelling mistakes or typing errors. This should prepare your poem for presentation in a nicely readable format.

### Saving Your Work

If you have not done so already, you should save your work now. It is recommended that you should save your work often to avoid losing it if something goes wrong with your computer or with the network. Saving your work every 10 - 15 minutes is a good practice.

Do you recall how to save your work from Activity 1? Try to do so. Another quick and easy way to save your work would be to take your mouse pointer and click on the icon (picture) of the floppy disk in the top left corner of your screen (the third icon from the left on the toolbar).

### Printing Your Work

With your poem completely formatted, try printing it.

9. Open the *File* menu and select *Print Preview*. This will give you a look at how the whole page should look when printed. Ensure that the centering of the poem looks right from left to right, top to bottom. You may have to re-adjust margins.

10. From this screen (with the reduced view of your page), click on the *Print* button, top left. This will give you another window. Click OK. Check the hard copy of your poem.

**For Homework:**

Think of all the excuses that you have ever used for not having your homework done. Write them down. Create as many wild and original new excuses as you can think of. You should at least have a total of eight. See if you can make the last word of each excuse rhyme with the last word of the next so that you have pairs of rhyming excuses. This will be your **Homework Excuses poem**. You may want to begin it with:

Dear Sir (Madam),
I am very sorry to have to say
My homework is not done today
Because:

- List each of your excuses . . .
- about your homework abuses!

*Activity 3*

## Word Processing Your "Homework Excuses" Poem

### Word Processing Skills used:

- loading the program
- entering text from keyboard
- using Bullets and Numbering
- highlighting text
- changing font, size and color of characters
- using Page Set-up and Section Layout to change margins and vertically centre text
- using the Spell Checker
- saving your document
- printing your document

You are going to design your **Homework Excuses** poem in such a way that each excuse has its own unique appearance on the page. **Using different colors**, ***FONT STYLES*** and **SIZES**, make each *excuse* look ***DIFFERENT.***

1. Load the Word program from the **Program Manager** window.

2. Once you have loaded the program, open a new document by going to the **File** menu and selecting **New**. Click **OK** at the window that asks if you will use the **Normal** template.

3. Start typing your Homework Excuses poem. Separate each excuse by using **Bullets** and/or **Numbering**, for example:

   - The mice in my attic shred it to use for their nest.

**OR**

1. Aliens landed and took my homework as a speciment of excellence for their schools.

You can do this simply by using the **Toolbar** (the strip of icons below the **menu** bar which contains the **File, Edit, View** . . . pulldown menus):

a. On the **Toolbar**, find the icon with the numbers 1, 2, 3 and lines opposite these numbers and next to it the icon with the square bullets and lines opposite the bullets.

b. Before you start typing each excuse, click on one of these icons with your mouse it will give a number (or bullet) and indent a few spaces from the number (or bullet) to where you can start typing the excuse. You can also insert numbers or bullets after you have typed your excuse. To do this, click with your mouse pointer to place your cursor at the beginning of the excuse you have typed. Then click the number or bullet icon.

Note: If you are using numbers and you find that the wrong number is given when you click the icon, you will have to reset the numbers to where you want them to begin. To do this, open the **Tools** pulldown menu and select **Bullets and Numbering**. Double click in the **Start at** box and erase the number. Replace it with the number you want to use next.

***Have you saved your work lately?***
***Remember how?***
***See Activity 1***

**Changing the Font Style, Size and Color for Each Excuse**

When you have completed typing your excuses, highlight each one of them in turn with your mouse (Remember how to highlight? Click and Drag? If not, check Activity 1, Step 3). With the excuse highlighted, you will change its font style and size. Remember that you have done this already in Activity 2, Step 4:

- Click on **Format** to show the menu and select **Character**. At the **Font** box, click on the down arrow to show all the different types of font styles you can choose from. Scroll through them and select one. The **sample** window should show you what it will look like.
- Click on the arrow next to the **points** box and select the font point size you desire.

You can now **change the color** for this excuse:

- With the **Character** window still open, click in the **color** box. Select the color you desire. Click **OK**.

Now your poem is just about complete. Put a title on it if you haven't done so yet and don't forget to put your name at the bottom of the poem. All you have left to do now is to format and centre the poem on the page, spell check your document, save your work and print your poem. Do you remember how to do this? If you need help to complete these operations, go to Activity 2 and follow the instructions from Step 5 to the end of the activity.

**Printing Your Excuses Poem**

As this poem uses colored text, you will have to send your document to a color printer.

- open the *File* menu and select *Print Set-up*. In the window that comes up, you should find the name of the color printer in your lab (If you do not know the computers name, go to the printer and read it or ask your teacher). Select the name of the color printer and click OK.

Now you can print the document. Check how it looks first using *Print Preview.*

***For Homework:***

This time we will try to write a poem whose words form a certain shape on the page. When we word-process your poem next lesson, we will work on

shaping your poem to look like the object you desire. For now you will concentrate on writing a poem about the object you choose. For instance, you might write a poem about an apple (how it looks, feels, tastes, sounds when you bite it, smells when it's baking; how you feel when you eat it) or a poem about a snowball (how it looks, feels and tastes, the fun you can have with it, how you feel when making it and throwing it or being hit by it). Perhaps write a poem about "Time" or the "Passage of Time" - What shape could you use for a poem about Time? There are limits to how well the word processor can make the shape you want, but choose any object you wish to write about and go to it!! Some other suggestions:

- race car
- leaf
- snake
- tree

***Activity 4***

**Word Processing Your Shape Poem**

**Word Processing Skills used:**

- loading the program
- entering text from keyboard
- highlighting text
- alignment of text - left, right, full and center
- using Section Layout to vertically center text
- using the Spell Checker
- changing the paper orientation
- saving your document
- printing your document

*Shape Poetry* uses words to describe an object or idea and arranges those words in the shape of the object or idea being described. The reader is working with the mental images that your words have created and with the image created by the shape of the words on the page.

Snowball

Aging hands
delve into newborn snow and
extract, shivering, a memory. Eager
hands, once again agile, shaping and mold
-ing, memories unfolding. This ball of crystals
reveals a distant past as fragmented in memory
as the flakes of which it is formed. This hand-held
sphere, with crystals like shards of broken mirror,
reflects a child's rosy face, laughing, snowball in hand,
taunting and teasing, chasing girls, puffing and wheez
-ing, the past unfurls. And with once-deadly aim, a
nostalgic throw. The fleeting memories go and
smash against . . . A stop sign on a lonely
street as memories, splattered, slide down
to the ground below, blending with
the other snow on the ageless,
slumbering ground

Michael Coady

Before we start to shape your words into the object you have written your poem about, first let's enter the text of your poem into the word processor.

If you still have not completed your poem continue to brainstorm on the computer. Pick the object you want to write about and type down ALL the words that come to your mind about that object as soon as they pop into your mind. Worry about deleting or rearranging the words afterwards. If someone else is still working on their poem, perhaps you can brainstorm together and bounce ideas off each other.

Now with the poem that you have written about the object of your choice, you will attempt to arrange the words of your poem into the shape of the object you are writing about. To position the words on the page so that they take the shape you need you will use a number of word processing tools:

- Alignment (left, right, center and full)
- Space bar
- Tab key

With these tools you can create shapes like those on the following pages:

tree tree tree
tree tree tree tree tree
tree tree tree tree tree tree tree
tree tree tree tree tree tree tree tree
tree tree tree tree tree tree tree tree
tree tree tree tree tree tree tree tree tree tree
tree tree tree tree tree tree tree tree tree tree
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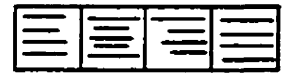
By simply aligning the text to center the tree above was created. The leaf was a little more complicated to create as it required the use of the tab key, the space bar and centering. You will have to use a combination of spacebar and tab key (while the text is set to center alignment) and use your eye and judgement to create the shape you want.

The word processing tools of Text alignment, spacing and tabbing can be operated by following easy steps:

1. To adjust the **Alignment** of the text, it is easiest to use the icon buttons at the top of your screen. The group of four buttons for alignment may be found on the second row of buttons, about 5 buttons in from the right, looking something like:



By pressing the first button, each line of text will line up along the left margin - **left alignment**

By pressing the second button, each line of text will line up along the right margin - **right alignment**

By pressing the third button, each line of text will line up in the center of the page - **center alignment**

By pressing the fourth button, each line of text will spread out to take up the full space from the left margin to the right margin - **full alignment**

2. The **Tab key** is used to indent / space words apart by a set number of spaces (usually about 6). It may be found on the left hand side of your keyboard above the Caps Lock key.

3. The **Space Bar** advances the cursor by one space each time it is pressed and is found at the bottom of the keyboard.

Let's try an exercise using some of these tools. Try to duplicate the (very loose) shape of race car below. Its shape was created typing the words "race car" over and over following these steps (Remember that "car" must always come after "race" even if it must go on the next line):

1. First set your font to "Utah" or "MS Sans Serif" 14 point (if you don't recall how to do this, check Activity 2, step 4).

2. Align text to center for the first seven lines. Type 3 words beginning with "race". Enter. Type 5 words. Enter. Type 6 words. Enter. Type 12 words. Enter.

3. For the fifth line, type 12 words. Put a space after every second word. Put cursor at the beginning of the first word of the fifth line and hit the space bar about 5 times until it the first word of the fifth line lined up under the fourth line. Put cursor at the end of the line and hit Enter.

4. For the sixth line, type 13 words. Put a space after every second word. Put cursor at the beginning of the first word of the sixth line and hit the space bar about 5 times until it the first word of the sixth line hangs out a little further than the fifth line. Put cursor at the end of the line and hit Enter.

5. For the seventh line, align text to Left. Hit the tab key twice. Type four words. Tab twice more. Space 6 times. Type 6 words. Enter.

6. For the eighth line, Tab 2 times. Space 4 times. Type 3 words. Tab 4 times. Type 3 words. Enter.

7. For the tenth line, Tab 2 times. Space 7 times. Type 2 words. Tab 4 times. Space 5 times. Type two words. Enter.

The race car on your screen should look something like this:

race car race
car race car race car
race car race car race car
race car race car race car race car race car race car
race car race car race car race car race car race car
race car race car race car race car race car race car race
car race car race car race car race car race
car race car race car
car race

As you type your own poem, the number of words and the length of the words will vary. You'll have to adjust your spacing, tabbing and which lines will be aligned center, left, right or full.

Experiment with Font style, size and color as you try to shape your poem. Remember when you are finished, your title should be at the top in a font size and style that is different and your name should be at the bottom, indented with the tab key.

Do you remember how to vertically center your text so that it appears in the center of the page from top to bottom? If not check Activity 2, Step 7.

Be sure to **Spell Check** and **Save** your work!

**Printing Your Shape Poem**

If the shape of your poem will allow it, you may want to change the *orientation* of your page set-up. This means that you may print your poem on the page that is *landscaped* (with the page being wider across the top and narrower along the side of the page, in other words, with the page turned on its side!) as opposed to the more usual *portrait* page set-up (with the page being narrower across the top).

- select the *Format* menu and click on *Page Set-up.* At the top of the window, click *Size and Orientation.*
- In the *Orientation* box, click on *Landscape.* Click OK.

Now you can preview the poem to ensure that it fits on a landscaped page and then print it.

***Activity 5***

**Creating a Resume / Personal Interests Inventory**

**Word Processing Skills used:**

- loading the program
- entering text from keyboard
- highlighting text
- cutting and pasting text
- using the Spell Checker
- saving your document

As you move through school and out into the workforce, resumes or CVs (curriculum vitaes) become very important. They are a summary of all your education, skills and experiences which may be valuable to prospective employers. At this point in your education, you may not have a great deal of work experience, but you have had certain experiences and you do have personal interests, hobbies and valuable skills. Employers look not only for work experience but for a well-rounded person who has had many experiences and interests which may prove valuable in the workplace.

It would be a useful exercise to brainstorm all these skills, interests and experiences and try to summarize them in a resume or personal interest inventory. Work with the student at the computer next to you and try to jog each other's memory for the experiences, skills, and interests you have had to date. Typing your findings into the word processor as you go, try to think of every significant experience, skill or interest which you have had in the following areas:

- **education** (your highest level of education achieved [i.e., the year you completed last] and the courses you are presently taking)

- **scholarships or awards** (any awards that you have received through school, sports or other organizations)

- **summer or part-time jobs** (jobs for which you were paid or performed as a volunteer and the dates that you held these jobs)

- **work or chores at home** (tending the garden, painting the fence, baby-sitting, etc. and the periods over which you carried out this work)

- **skills** (abilities or talents that you may have, i.e., computer skills, painting, drawing, writing, wood-working, gardening, music, sports, etc.)

- **hobbies or interests** (any past-time which interests you, i.e., constructing model cars, wood-working, painting, etc.; any group or organization that you belong to. i.e., Boy Scouts / Girl Guides, church groups, sports teams, etc.. Try to recall the dates when you were involved in these activities.)

As you think of each activity and experience, type it into the word-processor. When you have brainstormed all the important experiences and activities you have been involved in, now you should go back and fill in necessary details or summarize just the important details (deleting things that you don't need).

For instance, you may have just come up with one word to describe your experience, for example, baby-sitting. You would need to give a little more explanation of this experience to show the responsibility you had. You would probably include information on the age of the child you took care of, for how many hours at a time, and the dates during which you had this responsibility.

Perhaps you came up with too much information and will need to summarize and slim it down. For example, if you wrote:

> Played on the school football team, played 25 games as striker and 5 games as goalie, was assistant captain of the team.

You may want to shorten it to:

> Assistant captain of the school football team.

To shorten the first statement to make it look like the second, you will use the *highlighting* function, the *delete* key and the *cutting and pasting*

functions. You remember how to perform these functions from our first poetry exercise. For the cutting and pasting functions this time, try using the icons on the button bar (below the menu bar). For cutting, use the scissors icon; for pasting use the clipboard icon.

To quickly shorten the first statement, you could:

- highlight "assistant captain of" and cut it.
- Then highlight "played on" and hit the clipboard icon to paste in what you have just cut. Now "played on" is replaced by "assistant captain of".
- Then highlight all text after "team" and hit the delete button.

The name of the game in describing your experiences is to be brief, giving only the important and necessary information.

**Don't forget to spell check and save your work in a file called *resume*.**

***Activity 6***

**Word Processing Skills used:**

- loading the program
- entering text from keyboard
- highlighting text
- changing font and size of characters
- alignment of text - left, right, full and center
- inserting text from another Word document
- using the Spell Checker
- saving your document
- printing your document

Now that you have all your significant information collected and summarized, you can start the important task of organizing and presenting it. We will use the word processor to format this document so that it looks neat and presentable.

Your information should be saved in file called *resume*. Now you will start a new document which will be the framework of your resume. You

will fill in this framework document with the information from your *resume* document.

1. Load the word program and open the *resume* document.

2. Open a new document by opening the *File* menu and clicking on *New*, or by clicking on the new document icon (the blank sheet icon - the first button on the left of the button/tool bar).

3. Save this new document as *resume2*

4. You will start first by aligning to center your name, address and phone number on the top of the page. You remember how to align text using the buttons on the tool bar (Activity 4).

5. Make your name stand out more than the rest of your address. How could you do this?

You will now type into this document all the headings for the information that it will contain.

6. Align the cursor to the left, hit your caps lock button and type the word *EDUCATION*. Highlight this word with your mouse and hit the bold and underline buttons on the tool bar.

7. Type in other headings like SCHOLARSHIPS AND AWARDS, WORK EXPERIENCE, SKILLS, HOBBIES AND INTERESTS. Bold and underline these words as well.

You now have the outline that your resume/personal interest inventory will take. You have only to drop the information into this document to fill it out. You will copy the information from the first document you created (which should be open now) and paste it into the new document outline, *resume2*.

8. Open the *Window* menu. At the bottom of the menu you will see *resume*. Click on this to bring you to that document.

9. Highlight with your mouse all the information you have typed on your education. Use the copy button on the tool bar to make a copy of this (You can also hold down the control button and hit the "C" key to copy).

10. Open the *Window* menu and click on *resume2.* Move your cursor under the EDUCATION heading and paste in the information you have just copied by hitting the paste/clipboard icon (You can also hold down the control button and hit the "V" key to paste).

You will arrange this information in a time sequence, starting with the most recent followed by the older information (chronological order). You will keep the dates to the left and indent the information from the left.

11. Type the year and hitting the indent button twice, type the information. As the typing scrolls onto the next lines, it will not line up with the tab you set for the first line. You will have to do this manually. Put the cursor at the beginning of each of the lines below the first and hit the indent button twice.

When finished it should look something like this:

1996 - Year Seven studies at St. John's Comprehensive School, Epping, Essex County. Taking courses in: English, Maths, Science, Socials, French, Information Technology, . . .

1995 - 1996 Complete Year Six at *name of school, community, county* . . .

You will keep the same format for each of the headings in your resume - dates to the left, information indented with the tab key from the date. Move the cursor below each heading, switch to the *resume* document, copy the necessary information, piece by piece, and paste them into the *resume2* document in the proper time sequence or chronological order (most recent experience first).

***Don't forget to save your work every ten minutes or so!***

When you have filled in all the necessary information under each heading, run a spell check, give your document a final read through, save and print your resume.

**For Homework:**

As your next project will be to create a newsletter, you will need story and content ideas. Write down as many story and news feature ideas that you can come up with: the title of the newsletter, headline stories, interviews, surveys, comic strips, etc..

*Activity 7*

## Using the Word Processor to Create a Newsletter

### Word Processing Skills used:

- loading the program
- entering text from keyboard
- highlighting text
- changing font and size of characters
- alignment of text - left, right, full and center
- setting out work with tab key
- inserting text from another Word document
- using WordArt
- inserting work from Microsoft Draw
- laying out work in columns
- using the Spell Checker
- saving your document
- printing your document

For the next couple of classes you will spend time assembling the material to put into your newsletter. Working in small groups, you will brainstorm news ideas and other features to include in your newsletter.

Use the word processor to record your newsletter ideas. Create a file called *news idea* and keep a list of the stories,and features that your letter will contain.

When you have finished this list, you can proceed to develop the stories and ideas. You may divide up the duties for developing the features, putting one person in charge of developing a story, another in charge of a conducting a survey or interview, etc..

It would be helpful if you kept one floppy disk for the whole group as a *master* of all the files that will be used in the newsletter. Name each file in a way that makes it easy to recognize what the file contains and as each file is completed copy it on to the master disk. (*Do you remember how to specify which drive you are opening from or saving to?*) You will later use all those files, cutting and pasting them into the main newsletter document (as you did in Activity 6).

When you have assembled all your material and saved it in separate files, you may begin formatting and assembling your newsletter.

### Formatting the Newsletter

You will no doubt have a lot of material to put in your newsletter and you will likely need to maximize your space on the page, using as much of the page as possible. You should therefore adjust your left, right, top and bottom margins to be narrower. (You may remember how to do this from formatting your poetry).

### The Title

Let's begin with the title. Type the title of the newsletter, highlight it, select a distinctive font and enlarge the font size so that it takes up the width of the page.

### Using *Microsoft WordArt*

You may wish to make your title more distinctive by using *WordArt*:

- Pull down the *Insert* menu and select *Object*. In the window that appears, find and select *Microsoft WordArt 2.0*.
- Type the title of your newsletter in the box, *Enter Your Text Here.*
- Below click on *Choose a Shape* box and select the shape you want your title to take.

Within WordArt, experiment with the font style, size, color, alignment, stretch, etc. until you are satisfied with your title and then hit the *Apply* button. and then hit OK.

### Editing your *WordArt* title

If the title is not to your liking, you can edit it:

- click on the title with your mouse and you should see a grey frame appear.

- pull down the *Edit* menu and select *Microsoft WordArt 2.0 Object.* This will bring you back to the WordArt window and you can change the design.

You can also change the shape of the your WordArt title, by clicking and dragging on any of the little grey blocks in the WordArt object's frame. For instance, if the title doesn't span the whole page, place your cursor on the button on the right side of the frame and click and drag the title across the page until it takes up the whole width.

Below the title, in smaller font (perhaps Times New Roman, 12 point), type the name of your school and the date. Place the cursor at the beginning of the date and hit the tab button until the date is aligned to the right of the page.

**Drawing a Line or Other Object with *Microsoft Draw***

Let's separate the newsletter's title from the rest of the paper with a line. The Word program does not have a ready-made line to insert so you'll have to draw one yourself using the *Microsoft Draw* Program

- Place the cursor of the end of the date and hit return.
- Click on the *Microsoft Draw* icon on the toolbar (about the eighth button in from the right - with a circle, triangle and square on it).
- Choose the *straight line* button, third down the left side of the window. Click and drag yourself a line across the window.
- Pull down the *File* menu and select *update*.
- Hold down the ALT key and hit the tab key until you see the Word program icon and title come up or just click your mouse inside the Word window to bring the Word program window forward again. The line you have drawn should now appear beneath the place and date of your newsletter. (If this fails, try copying the line in the *Draw* window and pasting it into place in the newsletter).
- The line will not be long enough to reach across the width of the page. You will have to click and drag it to the right length. Click on the line with the mouse until the grey frame appears. Click and drag on the right side of the frame until the line reaches across.

You may want to use this line again to separate stories in your newsletter. You can either repeat the above steps or simply click on the line that you have created, copy it and paste it where it is needed.

Note: You may want to refer back to these steps as you perhaps may use *MS Draw* to create your own pictures or comic strips to include in the newsletter.

The top of your newsletter should look something like this:

**The Comprehensive**

*St. John's Comprehensive School* *September 30, 1996*

---

***OR***

**The Comprehensive**

*St. John's Comprehensive School, Epping* *September 30, 1996*

---

**The Main Headline**

The next feature to follow may be your main headline. The headline font is usually the same as the font you will use throughout the newsletter (perhaps Times New Roman). Choose a larger font size to make the

headline stand out. Center the Headline. (Note: The smaller stories to follow will have smaller font size).

### The Columns

Placing the cursor of the end of the headline and hitting return, you will now need to set out your document in columns:

- Pull down the *Format* menu and select *Columns.* Increase the number of columns to four (or less). Click on the *Apply to* box and select *This Point Forward.*

Note: It would be best to look at the document in *Page Layout* format so you know what your page will look like:

- Pull down the *View* menu and select *Page Layout*

Everything after this that you type will appear in column form. The program will continue with one column until it fills up the whole page before starting another column. But you may wish to stop a column at a certain length and continue your writing in the next column. You can ***insert a column break by:***

- placing your cursor at the end of the line where you want to begin a new column and pull down the *Insert* menu, selecting *Break.*

- click on *Column Break* and click OK.

### Inserting the Text of the News Story

You are ready to drop text into the columns you have set up. First thing to do is to set your alignment of text to *Full.* This allows the text to take up the full width of the column.

You have probably already typed the story into another file which should be on the *Master disk* for your group. You can copy and paste the text of this file into your newsletter as you did in Activity 6, but there is another way to

insert the text of a file when you want to use the whole file in the order in which it is written:

- pull down the *Insert* menu and select *File*.
- select the a: drive, select the file you want and click .

Your story will likely appear as one column. Insert column breaks at points in the column so that your story spans the page in the number of columns that you have set up.

### Inserting Clipart into Your Newsletter

You may want to include some graphics which may relate to your news story. Insert clipart by:

- placing your cursor where you want the graphic inserted.
- pulling down the *Insert* menu and selecting picture
- In the *Directories* box, find the *clipart* directory and select it. A number of files should appear. You will have browse through them to see if they suit your purposes. You can preview the graphic in the file by selecting a file and clicking the *Preview* button.
- If the graphic is suitable, click OK and it will be inserted where your cursor was.

Your first story could look something like the one on the following page:

# The Comprehensiv

*St. John's Comprehensive School, Epping* *September 30,*

# A New School Year Begins at St.John's

Much rejoicing could be heard for miles around this month as students made their way to school to begin a new academic year. Students could not hide their joy (or their ear-to-ear grins) as they made their way through the doors of their beloved school after a refreshing summer break. Some students were heard to exclaim, "Thank goodness, we don't have to spend anymore long hours in the hot summer sun playing football!" Others were over-

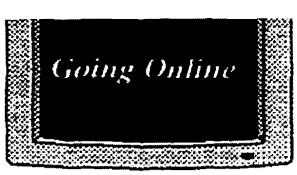
heard to gleefully say, "I can't wait to get back to some challenging maths problems and rewarding science experiments!" Still others were overjoyed at the prospect of tackling such satisfying IT projects as newsletters! All over the school

eager yelps of sheer bliss be heard from the mou students busily ap themselves the happy ta their education. With a excitement and enthusiasm no wonder that the Teacher could be heard t "These students make com school each day such an e pleasure for me and the s St. John's that I'll ask Governors to lengthen the year."

When you start shorter news articles, you may use more (and consequently narrower) columns. If a news item takes up only one column, you can insert vertical lines betwee the columns in the column set-up. For example, see next page:

## Goes Online

This school year will mark the beginning of St. John's Comprehensive School's journey into cyberspace. With the acquisition of two full multi-media, lap-top computers, the school now has Internet access and email capability for students and teachers.




YOU KNOW YOU'VE BEEN ON THE INTERNET TOO LONG WHEN...

...you are reading a book and look for the scroll bar to get to the next page.

From Newfoundland comes the SchoolNet RINGS Project. The project consists of a number of participating classes or local RINGS working together online on a project over the Internet. Local RINGS can be made up of groups of students anywhere in the world.

Latest developm the alien-ol Summer of '96: M might not just Saturday-morning toon figment; ther be life on Mars August, a meteo Mars fell to Scientists found fo organic life suggests that ther was life on

When you see both of these elements combined, you will get an idea of what your completed newsletter will l like. See the next page:

The Comprehensiv

*St. John's Comprehensive School, Epping* *September 30, 1*

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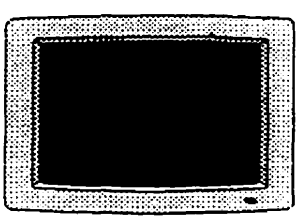

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## Life on M

Latest developm the alien-ob Summer of Martians might n be a Saturday-m car-toon figment; could be life on In August, a n from Mars fell to Scientists found of organic life suggests that once was life on

***You now have all the skills you need to produce an impressive looking newsletter. All you need to do now is apply your creativity and play around with the layout. Good luck!***

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