CORA Cork Open Research Archive
Cartlann Taighde Oscailte Chorcaí

Title	Laptops initiative for students with dyslexia or other reading and writing difficulties: Evaluation report of early implementation, 2002-2003
Authors	Conway, Paul F.
Publication date	2005
Original Citation	Conway, P. F. (2005) Laptops Initiative for Students with Dyslexia or other Reading and Writing Difficulties: Evaluation Report of Early Implementation, 2002-2003. Dublin: National Centre for Technology Education (NCTE).
Type of publication	Report
Link to publisher's version	http://www.ncte.ie/NCTEInitiatives/Projects/
Rights	Copyright © National Centre for Technology in Education, 2005.
Download date	2026-11-07 11:52:25
Item downloaded from	https://hdl.handle.net/10468/307

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

Laptops Initiative for Students with Dyslexia or other Reading/Writing Difficulties: Evaluation Report of Early Implementation, Dec. 2000 to Sept. 2003

Report commissioned by the National Centre for Technology in Education (NCTE)



Dr. Paul F. Conway
Education Department,
University College, Cork (UCC)



UNIVERSITY COLLEGE, CORK
Coláiste na hOllscoile Corcaigh

Acknowledgements

I am grateful to the following people and organisations without whose generous assistance this report would not have been possible.

Individuals
J. Amberson (Research Assistant), E. Burke, L. Crossan, C. Dooley, Dr. J. Hanafin, J. Hannah, D. Harrington (Research Assistant), V. O'Brien, Dr. D. O'Sullivan.

Organisations
Blackrock Education Support Centre
Laois Education Support Centre
Boole Library, UCC
Education Department, UCC
Office of Research, UCC
Print Office, UCC

I want to thank especially the staff of the NCTE: Jerome Morrissey, Ellen Haughey, Anne Phelan, and Tom Daly.

I am particularly grateful to the many principals, teachers and students who have contributed to this report.

Copyright © National Centre for Technology in Education, 2005.

TABLE OF CONTENTS

EXECUTIVE SUMMARY VII

BACKGROUND VII
CHRONOLOGY IX
OVERVIEW OF *LAPTOPS INITIATIVE* PHASES IX
LAPTOPS INITIATIVE'S EVALUATION FOCUS: EARLY IMPLEMENTATION X
OVERVIEW OF EVALUATION AND REPORT X
SUMMARY OF FINDINGS XI
CONCLUSION AND RECOMMENDATIONS XVI

CHAPTER 1 INTRODUCTION: LAPTOPS INITIATIVE AND ITS EVALUATION

1.0 INTRODUCTION 1

1.1 THE ANNOUNCEMENT OF THE *LAPTOPS INITIATIVE* 2

1.2 PROJECT GOAL AND OBJECTIVES 4

1.3 CHRONOLOGY 5

OVERVIEW OF *LAPTOPS INITIATIVE* PHASES 5

1.4 *LAPTOPS INITIATIVE* EVALUATION 10

1.5 EVALUATION OVERVIEW 12

1.6 EVALUATION METHODOLOGY AND METHODS 13

LITERATURE REVIEW 14
FOCUS GROUP INTERVIEWS 14
SURVEY DEVELOPMENT AND ADMINISTRATION 15
ONE-TO-ONE INTERVIEWS 16
CLASSROOM OBSERVATIONS 16
CASE STUDIES 16

1.7 OVERVIEW OF EVALUATION REPORT 17

CHAPTER 2 THE LAPTOPS INITIATIVE IN ITS WIDER CONTEXTS

2.0 CHAPTER OVERVIEW 19

2.1 DYSLEXIA AND OTHER READING AND WRITING DIFFICULTIES 20

2.2 LEARNING TO READ AND WRITE AT POST-PRIMARY LEVEL 29

2. 3 THE ROLE OF ICTS FOR STUDENTS WITH DIFFICULTIES IN READING AND WRITING 32

2. 4 ICT POLICY IN IRISH EDUCATION 37

SCHOOLS IT 2000 38
INFRASTRUCTURE 41
USE OF ICT AND SOFTWARE 41
ICT TRAINING 42
SUPPORT MECHANISMS 43
SCHOOLS INTEGRATION PROJECT 43
FACTORS THAT DISCOURAGE THE USE OF ICT 43
RECOMMENDATIONS TO THE MINISTER FOR EDUCATION AND SCIENCE 43
EDUCATION CENTRES 43
CONCLUSIONS AND DISCUSSION OF NPADC REPORT VIS-À-VIS THE *LAPTOPS INITIATIVE* 44

2.5 CONTINUING PROFESSIONAL DEVELOPMENT AND THE LAPTOPS INITIATIVE .. 44

2.6 EVALUATING THE IMPACT OF EDUCATIONAL SOFTWARE ON LEARNING 48

LEARNING FROM DISCRETE EDUCATIONAL SOFTWARE 48
SOFTWARE AND CLASSROOM CONTEXTS 50

2.7 TECHNOLOGY/ICT INTEGRATION AS AN EDUCATIONAL GOAL 52

2.8 A TECHNOLOGY/ICT INTEGRATION FRAMEWORK 53

2.9 LAPTOP INITIATIVES: THE APPEAL OF ANYTIME ANYWHERE LEARNING 59

2.10 STUDENTS WITH LITERACY LEARNING DIFFICULTIES: POLICY CONTEXT 68

LITERACY AS A POLICY PRIORITY IN IRISH EDUCATION: 1990 TO THE PRESENT 68
LITERACY AND EDUCATIONAL DISADVANTAGE 70

2.11 CONCLUSION 71

CHAPTER 3 FINDINGS

3.0 INTRODUCTION 73

3.1 OVERALL DEVELOPMENT OF THE PROJECT ACROSS SCHOOLS 74

3.2 SCHOOL CASE STUDIES: OVERVIEW 94

3.2.1 GREENFIELD 98
3.2.2 NEWPORT 124
3.2.3 OLDTOWN 136
3.2.4 WESTTOWN 145

3.3 STUDENT CASE STUDIES 152

3.4 CONCLUSION 154

CHAPTER 4 SUMMARY OF FINDINGS AND DISCUSSION

4.0 INTRODUCTION 157

THE NATIONAL CONTEXT OF THE PROJECT 158
THE NATIONAL CONTEXT OF THE INITIATIVE IN AN INTERNATIONAL ARENA 159
APPROACHES USED BY SCHOOLS 162
RANGE OF LAPTOP MANAGEMENT MODELS 164
LAPTOPS AS PERSONAL SUPPORT TOOL FOR STUDENTS 165
MODELS OF CLASSROOM MANAGEMENT AND LAPTOP USE IN MAINSTREAM CLASSES 167
PARTICIPATING STUDENTS AND INITIATIVE'S ROLE IN LEARNING SUPPORT PROVISION 167
CHANGE IN CLASSROOM INSTRUCTIONAL AND LEARNING ACTIVITIES 169
IMPACT OF THE INITIATIVE ON STUDENTS' ACHIEVEMENTS AND ATTITUDES TO SCHOOL 170
RANGE AND NATURE OF SOFTWARE USE 171

CHAPTER 5 RECOMMENDATIONS AND CONCLUSION

5.1 INTRODUCTION 173

5.2 SYSTEM LEVEL 174

SYSTEM LEVEL RECOMMENDATIONS 174
SYSTEM LEVEL ISSUES FOR CONSIDERATION 176

5.3 SCHOOL LEVEL 176

5.4 CLASSROOM LEVEL 178

5.5 CONCLUSION 179

REFERENCES 183

APPENDICES 191

LIST OF TABLES AND APPENDICES

TABLE I PEDAGOGICAL DIMENSIONS AND LAPTOP DEPLOYMENT XIII
TABLE II ICT/TECHNOLOGY INTEGRATION FRAMEWORK (SANDHOLTZ ET AL, 1997) XIII
TABLE 1 FRITH'S THREE-LEVEL FRAMEWORK OF DYSLEXIA (1997; 2002A) 25
TABLE 2 ICT/TECHNOLOGY INTEGRATION FRAMEWORK (SANDHOLTZ ET AL, 1997) 55
TABLE 3 LESSONS PER WEEK WITH LAPTOP (MARCH 2003, N=24) 80
TABLE 4 NUMBER OF HOURS PER WEEK STUDENTS USE LAPTOPS (MARCH 2003, N=24) 80
TABLE 5 WHAT ARE YOUR OVERALL IMPRESSIONS OF THE *LAPTOPS INITIATIVE* TO DATE? (MARCH 2003) 83
TABLE 6 WHAT FACTORS, IF ANY HAVE HELPED THE PROJECT TO DATE? (MARCH 2003) 85
TABLE 7 WHAT FACTORS, IF ANY, HAVE HINDERED THE PROJECT TO DATE? 86
TABLE 8 TEACHERS' VIEWS ON PUPILS' RESPONSE TO ICTS AND LAPTOPS (MARCH 2003) 87
TABLE 9 PRINCIPALS' VIEWS ON PUPILS' RESPONSE TO ICTS AND LAPTOPS (SEPT. 2003) 89
TABLE 10 TEACHERS' VIEWS ON LAPTOP SECURITY, TAKING LAPTOPS HOME, TECHNICAL SUPPORT AND SOFTWARE COST (MARCH 2003) 92
TABLE 11 PRINCIPALS' VIEWS ON LAPTOP SECURITY, TAKING LAPTOPS HOME AND SOFTWARE COST (SEPTEMBER, 2003) 92
TABLE 12 STUDENTS USING LAPTOPS IN CASE STUDY SCHOOLS (MAY 2003) 97
TABLE 13 ICT INFRASTRUCTURE IN CASE STUDY SCHOOLS (SEPT. 2003) 97
TABLE 14 PROFILE OF CASE STUDY STUDENTS (GREENFIELD) 105
TABLE 15 INSTRUCTIONAL AND LEARNING ACTIVITIES FOR PARTICIPATING STUDENTS 107
TABLE 16 SOFTWARE USE IN GREENFIELD (SPRING 2003) 120
TABLE 17 CASE STUDY STUDENT PROFILES (NEWPORT) 132
TABLE 18 INSTRUCTIONAL AND LEARNING ACTIVITIES FOR PARTICIPATING STUDENTS 133
TABLE 19 EXISTING SOFTWARE USE (SPRING 2003) 134
TABLE 20 PROFILE OF CASE STUDY STUDENTS (OLDTOWN) 140
TABLE 21 INSTRUCTIONAL AND LEARNING ACTIVITIES FOR PARTICIPATING STUDENTS 141
TABLE 22 SOFTWARE REVIEW USE (MAY 2003) 142
TABLE 23 CASE STUDY STUDENTS - WESTTOWN 148
TABLE 24 INSTRUCTIONAL AND LEARNING ACTIVITIES FOR PARTICIPATING STUDENTS 149
TABLE 25 EXISTING SOFTWARE USE (MAY 2003) 150
TABLE 26 PEDAGOGICAL DIMENSIONS AND LAPTOP DEPLOYMENT 161
TABLE 27 LAPTOP DEPLOYMENT AND THEIR USE AS PERSONAL LEARNING TOOLS 166
TABLE 28 INCLUSION AND LAPTOP DEPLOYMENT 167

APPENDIX 1A - FOCUS GROUP REFLECTION SHEET: MARCH 2003 191
APPENDIX 1B - TEACHER QUESTIONNAIRE –MARCH 2003 192
APPENDIX 1C- DATA SUMMARY TEACHER FOCUS GROUP- MARCH 2003 195
APPENDIX 1D- TEACHERS' IMPRESSIONS OF THE LAPTOPS INITIATIVE 199
APPENDIX 1E- TEACHERS' VIEWS OF FACTORS THAT HELPED (MARCH 2003) 201
APPENDIX 1F – TEACHERS' VIEWS ON FACTORS THAT HINDERED (MARCH 2003) 203
APPENDIX 1G – TEACHERS' VIEWS OF TEACHING STRATEGIES 205
APPENDIX 1H - TEACHERS' SUGGESTIONS 207
APPENDIX 2A - PRINCIPAL INTERVIEW PROTOCOL (MAY 2003) 208
APPENDIX 2B - TEACHER INTERVIEW PROTOCOL (MAY 2003) 209
APPENDIX 2C - SOFTWARE REVIEW - EXISTING SOFTWARE USE 210
APPENDIX 2D - STUDENT CASE STUDIES 211
APPENDIX 3 – SCHOOL SURVEY SEPTEMBER 2003 213

Executive Summary

***Laptops Initiative for Students with Dyslexia or other Reading/Writing Difficulties*: Evaluation Report of Early Implementation, Dec. 2000 to Sept. 2003**

Report commissioned by the National Centre for Technology Education (NCTE)

Dr. Paul F. Conway
Education Department, University College, Cork (UCC)

Background

Why opt for a laptop initiative? The initial appeal in all laptop initiatives internationally seems to be the potential of laptops to meet the ambitious goal of providing ***personalised anytime anywhere access to ICTs*** for regular and/or special educational students One observation that has fuelled the appeal of laptops is that, despite the fact that the computer to student ratio may be low in many schools, computers are often located in relatively inaccessible computer labs which inhibit students' personal daily access and use across curricular areas. Consequently, laptops and other portable ICTs have been heralded as one solution to overcoming the obstacles to access and use that appear to plague even schools with a low computer-to-student ratio.

Within this context, on December 2000, then Minister for Education and Science, Dr. Michael Woods, TD, issued a press release stating that his Department had allocated IR£2million (2.54 million Euro) to 31 second-level schools to support a *Laptops Initiative for students with dyslexia and other reading and writing difficulties* (Press Release, Department of Education and Science, 18th December, 2000, available on-line www.education.ie See Figure 1). Announcing the *Laptops Initiative* the Minister stated that:

> *Students with dyslexia or other reading or writing difficulties often fall behind their peers in school achievement and develop feelings of frustration, low self-esteem and poor motivation. They may also be reluctant to read and write due to a sense of embarrassment.*

The press release also indicated that:

> *A grant of IR£2,700 per student participating in the initiative was paid to the schools for the purchase of laptop computers as well as associated software for those second year students identified as eligible for the project, in order that they may have a laptop for school and home use. Each school was also given IR£3,000 in grant aid to purchase back-up equipment for the teachers involved in the initiative.*

The National Centre for Technology Education (NCTE) was identified as the coordinating body for the project. Among the other project details noted in the press release were the following:

- The target group for the initiative was second year students
- Approximately 20% of second year students in participating schools were to be involved in the initiative

- Participating schools were to receive "extensive support in planning and developing their projects and dedicated teacher training will be also be provided"
- Participating schools were expected to target second year students with dyslexia and other reading and writing difficulties
- The names of thirty-one participating second-level schools

The government's *Task Force on Dyslexia* provided another key context for the *Laptops Initiative*. The Chair of the *Task Force on Dyslexia* commented as follows in relation to the *Laptops Initiative*:

> *This exciting project will add significantly to our knowledge of what works on the ground at second-level. It complements the work of the Task Force* (Cremin, December, 2001)

In writing the Foreword of the *Report of the Task Force on Dyslexia* (Department of Education and Science, July, 2001), the Minister for Education and Science, commented on the significance of the *Laptops Initiative* in the context of addressing some of the issues raised in the Task Force Report.

> *Late last year, I announced a £2 million initiative involving the delivery of laptop computers to students with dyslexia and other reading and writing difficulties in 31 post-primary schools. The project will explore ways in which Information and Communication Technologies (ICTs) can assist students with learning difficulties to work independently within mainstream classes, and provide flexibility in the time and place of learning. I am confident that this initiative will complement the work of the Task Force by adding to our knowledge of what works on the ground in schools* (2001, p. v)

This evaluation report presents findings from the ***early implementation*** of the *Laptops Initiative* for students with dyslexia and other reading and writing difficulties during the period December 2000 to September 2003. The report situates the *Laptops Initiative* in the context of the national and international focus on how best to ***integrate ICTs*** into the daily fabric of teaching and learning with a concurrent policy move toward providing support for students with learning difficulties in ***mainstream settings***. These three themes – early implementation, ICT/technology integration, and provision of learning support for students in mainstream settings - are the central themes in the report.

An overarching project goal and project objectives were elucidated by the NCTE. These were as follows:

Project Goal

- To identify how laptops and other portable ICT equipment can best be used to support students with dyslexia or other reading and writing difficulties in a manner that facilitates learning, and access to learning, in an inclusive environment.

Project Objectives

- To develop models of classroom management supporting the use of laptops in mainstream classes and identify associated practical issues, with a view to enabling students with learning difficulties to participate more fully in mainstream classes.

- To trial the use of laptop computers as a personal support tool for students with dyslexia or other reading/writing difficulties both in the school and home environments, with a view to identifying the most successful methods of use, their benefits and drawbacks.

- To identify ways in which different software products can be used to support students with learning difficulties.

Chronology

The *Laptops Initiative* can be characterised as having gone through two phases up to the end of August 2003. In line with DES directives, the NCTE's role has developed and expanded since its original role at the *Laptops Initiative's* commencement in December 2000.

Overview of *Laptops Initiative* phases

- *Start up and orientation phase,* (Dec. 2000 - Spring 2002)
  - DES role: Announcement of the initiative, selection of the participating schools in conjunction with NCTE, disbursement of funds to schools.
  - NCTE role: Advice to DES on schools selection, technical configuration of the initiative and breakdown of the financial and ICT resources for schools. Notification to schools of their nomination to participate in the project and securing their agreement to same. Provision of advice and guidance to assistance to schools in purchasing laptops and software. Contact point for schools about the project. Provision of teacher training in ICT through the existing mechanism (via local education centres).
  - School role: Purchase of hardware and software. Use of the technology in a manner that supports existing provision for targeted students. A small number of schools (up to a dozen) bought laptops and commenced using them with targeted students during this start-up phase.
- *Early development and implementation phase,* (May 2002 to August 2003)
  - NCTE role: Development and provision of a full project support and coordination structure, encompassing a higher degree of overall support and a more active role in promoting and supporting schools in technology integration. Elucidation of a project framework based on the project rationale as outlined by the DES. Appointment of a dedicated project coordinator to provide support to schools in their implementation of the initiative. Dissemination of support materials. Commencement of a series of meetings and workshops to develop the project and support networking between schools, targeting both principals and teachers...
  - School role: Development of schools' project implementation plans which were subsequently submitted to the NCTE. Expenditure of any remaining funding in line with guidelines provided. Implementation of the initiative in their school within the context of the overall project framework. Completion of a detailed School Report in June 2003, documenting evolution of the project, including expenditure of funds, and submission of this report to the NCTE.

This evaluation pertains to project development from December 2000 to September 2003, that is, the (i) start up and orientation, and (ii) early project development and implementation phases, with an emphasis on the second phase.

Laptops Initiative's evaluation focus: Early implementation

The terms of reference for the evaluation of the *Laptops Initiative* were broad (NCTE, December, 2002):

- To discuss **national context** of initiative, with some reference to relevant international developments
- To explore and summarise the **approaches used by schools** to implement the initiative and to identify the obstacles and successes experienced by schools
- To document the **range of models** that emerge from the initiative for using laptops and other portable ICT
- To determine how schools are using laptops as **personal support tool for students**
- To identify the **models of classroom management** that schools are using to support the use of laptops in mainstream classes
- To develop a **profile of the students** who were involved in this project and determine how the initiative is fitting within schools' current **learning support provision**
- To determine if **instructional and learning activities** have changed to support the use if ICT in the classroom as a result of the initiative
- To determine the impact of the initiative on students' **achievements** and **attitudes** to school
- To identify the types of **software** that schools are using and determine how the software is being used to support students involved in the initiative.

The description and analysis of the project's development, findings, and recommendations contained in this evaluation report are based on the *Laptops Initiative's* **early development** over a period of two years and nine months from its inception in December 2000 to September 2003, with a focus on the period from May 2002 when the full project support structures were in place. Adopting a long-term view over a three to five year period is important, as Sandholtz et al (2000) emphasized in relation to their longitudinal evaluation of the US-based *Apple Classroom of Tomorrow* (ACOT) initiative:

> *The experience of the Apple Classroom of Tomorrow project demonstrates the value of taking a long-term perspective on change and making the necessary personal and organisational commitments to bring about change* (p. 274).

Overview of Evaluation and Report

The ***first phase*** of the evaluation work on the early implementation involved ***orientation*** to the personnel, scope and developments to date in the project (January-March 2003). This phase involved meeting with relevant NCTE and DES personnel (the Director of the NCTE, the Project Coordinator, NCTE's National Coordinator for Special Needs, NCTE's Project Officer for Special Needs, and the DES Inspector providing advice to the project coordination team), meeting teachers in two focus group meetings in March 2003, review of some relevant literature on laptop and ICT

initiatives, advertising and hiring two research assistants to assist in data collection, and planning the case study phase of the evaluation. The ***second phase*** (April-July 2003) of the evaluation focused on gathering ***case study data*** in four selected schools, preparing an initial draft of sections of the report summarising data gathered during the March Focus Group meetings and outlining a framework for the school case studies. The ***third phase*** (August-November 2003) of the evaluation involved revisiting the case study schools and the development, administration and analysis of a school survey which was sent to principals. The subsequent report on the early implementation of the *Laptops Initiative* documents the development of the project from its inception in December 2000 to various strands of development at national, school and classroom levels until end of September 2003. The various interview protocols, survey instruments and other data collection guidelines are contained in the report as appendices.

Chapter One provides an introduction to the origins of the *Laptops Initiative*, outlined the *Laptops Initiative's* chronology from December 2000 to September 2003, detailed the terms of reference of the evaluation, and documented the evaluation methodology and methods.

Chapter Two provides an overview of relevant research literature in order to contextualise the *Laptops Initiative* both in terms of Irish education and developments elsewhere. The following interrelated framing contexts are addressed: dyslexia and other reading and writing difficulties; ICT policy in Irish education; the state of teachers' continuing professional development (CPD) opportunities in the post-primary system in Ireland; issues in evaluating learning and teaching in relation to the use of educational software; a framework for technology integration as an educational goal; laptop initiatives in Ireland and elsewhere; the challenge of learning to read; the role of ICTs in supporting students with reading and writing difficulties; and students with literacy difficulties in the context of Irish educational policy.

Chapter Three presents the findings based on data gathered from January to September 2003. This chapter is organised into three main sections. The first section provides an overview of the project addressing issues such as the number and type of students and teachers involved; the number of hours and lessons laptops were used by students weekly; the types of schools involved in the initiative; and teachers' and principals' impressions of the project. The second section provides an overview of the four case study schools. The third section encompasses a case-by-case presentation of the four case study schools under a number of headings. The final section of each case study encompasses an appraisal of the extent to which each case study school has progressed along the continuum of technology integration presented in the second chapter.

Chapter Four provides a summary of the evaluation findings under the headings delineated in the call for proposals to evaluate the *Laptops Initiative*.

Chapter Five encompasses recommendations focused on system, school and classrooms.

Summary of findings

FINDING: Of the approximately 1,000 students participating in the *Laptops Initiative*, 21% have been assessed with dyslexia and the other 79% had either not been assessed or have other reading and writing difficulties.

FINDING: In terms of students involved in the *Laptops Initiative* in participating co-educational schools, boys outnumbered girls, on average, four to one.

FINDING: The NCTE's role in the *Laptops Initiative* expanded from an initial focus on information dissemination and teacher training provision to one encompassing development and provision of a full project support and coordination structure to assist in the *Laptops Initiative* implementation within each school.

FINDING: NCTE disbursed a sufficient amount of money per school to purchase the recommended number of laptops and necessary software to set up the *Laptops Initiative* in each school.

FINDING: As envisaged at its inception, the *Laptops Initiative* project goal and project objectives are very ambitious, in the context of current practice in Irish post-primary schools, in terms of both the hoped for level of ICT/technology integration and modes of learning support provision.

FINDING: Schools adopted the laptops readily and used them in ways consistent with existing organisational and pedagogical practices.

This finding, possibly the most important in the evaluation, draws together a number of prior findings, (see Chapter III), and can be summarised in tabular form (see Table I below and Table 26 in the main report). The **fixed model** of ***laptop management*** has been the dominant model in the *Laptops Initiative* to date (see shaded area of Table 1). During the course of his visits to schools, the project coordinator began to use the three descriptors 'fixed', 'floating' and 'fostered' to characterise the variety of co-existing laptop management models. These three terms were used in the Spring 2003 newsletter to schools, and attributed to one of the teachers who had started to use these terms as a way to understand and characterise the various possible laptop deployment options. In response the growing currency of these three descriptors, the evaluator has decided to use these as a way to address the issue of management models in this report. These can be equated, in part, with the descriptors used in the Rockman reports:

- **Concentrated**-each student has his or her own laptop for use at home or in school. This term is consistent with **fostered** model.
- **Class set** -a school-purchased classroom set is shared among teachers. There is no equivalent to this in the descriptors used in the *Laptops Initiative*. However, it is similar to the **fixed** model, whereby one set of laptops is available
- **Dispersed** -in any given classroom, there are students with and without laptops. This is consistent with the **floating** model where students use laptops in conjunction with other students who do not have laptops.

In an Interim Review carried out by the *Laptops Initiative* in February 2003, the 'fixed model' was identified as the potential early phase of a "possible emerging sequence of development", with the further models emerging in tandem with the growth of teachers' confidence and competence. The **fixed** model puts significant constraints on the mobility and the potential uses of laptops as personal learning tools and this organisational and structural stage of development, if not progressed, may have significant implications in terms of the potential of the *Laptops Initiative* to

create and maintain a more inclusive teaching and learning experience for students with dyslexia and other reading and writing difficulties.

Table I Pedagogical dimensions and laptop deployment

Pedagogical Dimension / **Laptop Management**	***Mobility***	***Inclusion***	***Personal Learning Tool***	***Technology Integration***
Fixed	Low	Low or High	Low – Moderate	Low - Moderate
Floating	Moderate	Moderate – High	Moderate - High	Low to high
Fostered	High	Moderate - High	High	High

Furthermore, if the deployment of laptops remains in fixed locations, it means that students or their mainstream class teachers are unlikely to have opportunities to use the laptops more than three or four times per week and it is likely that schools will remain at the lower two and maybe third levels of Sandholtz's model of technology integration (see Table II below, and also Table 2 in main report). That is, schools may find it difficult to move beyond adoption and even more difficult to get beyond adaptation (using laptops for about 30-40% of the time) and reach the appropriation and invention phases whereby the ICTs take on a central creative role and are embedded seamlessly into teaching and learning.

Table II ICT/Technology Integration Framework (Sandholtz et al, 1997)

Stage	**Characteristics of this stage**
ENTRY	Getting hardware and software in place. Set up. Opening boxes. Figuring out how things 'work'
ADOPTION	Keyboarding/typing Integration into existing practice Evaluating software Short duration of time using ICT (15-20 min. of lesson)
ADAPTATION	More time spent (30-40% of day) and productivity a concern i.e. test results
APPROPRIATION	Change in personal attitude and new relationship with ICTs
INVENTION	ICT drives new developments in teaching

Given the justifiable appeal of the fixed model to date, the *Laptops Initiative* schools have also by default circumscribed, at least temporarily, the manner in which other important goals outlined in the project might be reached. However, a very important insight from the Sandholtz et al study was that schools could, over time, move to higher levels of technology integration with sufficient support. Sandholtz et al (1997) note that it took schools, even with appropriate levels of support, three to four years to reach higher levels of technology integration. This insight from Sandholtz is

consistent with the view of the *Laptops Initiative* interim review that the extensive use of the fixed model may be just the first stage in a sequence of development, with other models emerging in time.

FINDING: Schools mainly relied on a withdrawal approach in providing support for students with literacy difficulties.

Given that the use of laptops to support students in mainstream settings was identified as a potentially key contribution of the *Laptops Initiative*, there is considerable scope for development in relation to how laptops might be used to promote inclusive experiences for students with learning difficulties in literacy.

FINDING: Schools developed numerous innovative and productive strategies to utilise the laptops

Schools typically adopted thoughtful, productive and, sometimes unique responses to the *Laptops Initiative*. This became clear in reviewing the growth of the initiative over time in different schools. Thus, it is important to note that many schools developed some innovative and potentially useful strategies for the wider project in relation to one in more aspects of the initiative. For example, reviewing the case study schools:

- One school initially purchased and used portable word processors (AlphaSmarts) to ensure some students had the support of mobile learning technology.
- One school has restructured its first year programme for all students and integrates laptops into a literacy-focused period each morning in which class teachers, learning support teachers, and other available personnel provide support for the development of students' literacy skills
- A few schools had an orientation for parents about the project early in its development during which there was a demonstration of software used by students on laptops
- Integration of the *Laptops Initiative* into existing collaborative links with a local dyslexia group
- Implementation of a process approach to writing using laptops where local authors were invited into the classroom engaging with the students as readers and writers
- Development of strong in-school CPD to support *Laptops Initiative* implementation
- Use of wireless hub with laptops to support students' printing their work
- Creation of student directories on a school network, so students could store their work and retrieve it easily in subsequent lessons.

Supports and obstacles

Teachers identified many supports and obstacles. Key supports identified by teachers were:

- Importance of support from the NCTE in developing an overall sense or vision of the project
- In-school support from principal
- Support of the project coordinator
- Significant financial investment in the project
- Students' enthusiasm for the laptops sustained teachers even when organising the use of the laptops became demanding on their time

- Opportunities to see and consider approaches being adopted in other participating schools, that is, teachers, consistent with Sugrue et al (2001), considered the opportunity to network with other teachers about the project as a very important and essential professional learning opportunity.

Teachers also identified some obstacles. The key obstacles identified were:

- Slow project start-up and need for more guidance initially
- Lack of **active support** by leadership (principal and deputy principal) in some schools
- Lack of time to organise and plan how the laptops might be best used
- Security concerns in relation to laptop theft
- Need for development of teachers' own ICT skills
- Lack of time/opportunity to experiment with relevant educational software

FINDING: Schools went beyond the initial target group of the initiative but remained consistent with spirit of the initiative.

In extending the target student groups beyond second year students and the involvement of large numbers of students in using the laptops in some schools, the participating schools have interpreted the initiative's remit in a broad fashion and in a variety of appropriate ways. The majority of school level organisers were Learning Support teachers (as envisaged by NCTE and advised to schools accordingly) and this contributed to the initiative's integration within schools' learning support provision. In summary, even though the project has extended beyond its initial target group, that is, second year students, the initiative remained rooted within a learning support framework. In relation to profiling students involved, a number of issues are important: (1) the ratio of boys to girls; approximately one-fifth of students involved in the initiative have been assessed with dyslexia; and (2) and the primary use of the laptops being in the area of skill development in reading.

FINDING: Students, teachers and principals were generally very positive about the impact of the project on students' literacy learning.

Teachers and principals said that participating students, in general, had a more positive attitude to school due to the *Laptops Initiative*. Students were positive about the laptop project, identifying in particular factors such as ease of use, opportunity to use computers more regularly and the excitement of being involved in what they viewed as a high status project. Some students noted the social interaction with other students and family members occurring as a result of their involvement in the initiative.

FINDING: Schools tended to use laptops to provide opportunities for students to use reading skill development software

All schools made use of reading skill software for most students involved in the initiative. Some use of 'anchored instruction' software, such as Don Johnson's 'Start-to-Finish Books' was made in many, but not all, schools. A small number of schools used meta-software that can contribute explicitly to the development of meta-cognition, e.g. Kidspiration/Inspiration. Using an appropriate balance of software is inevitably related to the specific learning needs of individual students in the context of their individual learning plans. As such, the reliance on skill development software may be appropriate. However, in the context of the *Report of the Task Force on Dyslexia* recommendation that intervention at post-primary level go beyond the development of skills at the word level, there is a role for exploring the use of

software that provides both 'anchored instruction' and support for the development of students' meta-cognitive capacities. In relation to meta-cognition, teachers perceptions of the capacity of students with literacy difficulties to engage in meta-cognitive thinking in reading and writing is important to address as the initiative evolves.

FINDING: Schools focused more on reading than on writing software

In relation to literacy teaching focused on comprehension of extended text or text composition, schools have focused primarily on using the laptops for the development of reading whole books rather than using the laptops for the development of writing. As the initiative evolves, there is considerable scope to develop a process approach to writing process using regular word processing software as well as the use of writing composition software such as Clicker 4.

Conclusion and Recommendations

"*The project is in its infancy"* was one teacher's comment on the School Report sent to the NCTE in June 2003. This comment is a timely reminder of the fact that the project is in the early stages of implementation. In that context, this final chapter provides a number of recommendations in terms of the potential development of the initiative involving its various stakeholders: the DES, the NCTE, school and other relevant bodies such as NEPS and NCCA. In addition to recommendations, issues for consideration are also identified. These are more broadly focused and might form the basis of initiatives by the NCTE or other agencies working collectively to: (a) meet the needs of students with dyslexia or other reading and writing difficulties; (b) enhance ICT integration in Irish post-primary classrooms; and (c) develop more inclusive school cultures at post-primary level. The project goal and objectives provide a very ambitious set of targets for the *Laptops Initiative*. These goals must be seen in the context of both existing practice in relation to ICT integration and inclusion in the wider context of Irish post-primary schooling. For example, in relation to the integration of ICT across the curriculum at primary and secondary level, *The Impact of Schools IT 2000*, report noted that:

> …*post-primary principals perceive ICT as being more vital as an administrative tool than teachers do as a teaching tool. Hence, teachers need more encouragement to use ICT in teaching and to recognise its value* (National Policy Advisory and Development Committee, p. 7)

Consequently, attention to this wider context of ICTs in Irish second-level schools is necessary in order to fully appreciate the challenges facing the *Laptops Initiative* and to understand that difficulties in meeting some of these challenges are not necessarily indicative of limitations in the planning and enactment of the initiative itself.

'Technologising literacy' for students with literacy learning difficulties (Kamil, Intrator, and Kim, 2000) has become a policy focus in numerous developed countries as ICT policies evolve from their initial focus on hardware, getting connected and preparing teachers to use computers toward the integration of ICTs into the daily fabric of teaching and learning in classrooms. Thus, the lessons learned from the early phase of the laptop project can contribute both to this larger general question about technology integration across the curriculum, but also more

specifically to questions about how mobile learning technologies can be used to support students with literacy learning difficulties at post-primary level.

This evaluation of the *Laptops Initiative* reflects the ***early development of the project***. In many respects the *Laptops Initiative* could be seen as the SIP of SIPs, (SIP being the acronym for the School Integration Project, one of the three strands in the *Schools IT 2000* initiative). That is, the *Laptops Initiative* provides an opportunity to examine a large-scale school integration pilot project across thirty-one post-primary schools, with a number of supporting conditions such as:

- the freedom given to each school to design and craft the project according to its locally identified needs and strengths,
- funding for substitute teacher cover to support participating teachers,
- an experienced seconded project coordinator supporting the schools, with additional support provided by local ICT advisors,
- NCTE personnel overseeing and providing further expertise to the project,
- involvement of principals in national project meetings,
- in-service days and further training for teachers and principals, and
- a *Laptops Initiative* newsletter designed to support teachers in sharing their *Laptops Initiative*-related teaching practices.

There are a number of very positive developments and overarching observations worth reiterating at this point:

- Teachers, principals, and students alike are generally very positive about the project and see it as having made a worthwhile contribution to literacy learning. They identified significant successes to date, real obstacles to its fuller implementation, as well as areas for future development.
- Over a thousand students have been using the laptops across the thirty-one schools. Students were positive about their laptop-related learning experiences.
- The 2002-03 year marked a turning point during which many teachers and principals moved from being somewhat sceptical about the initiative to being strongly committed to its actual benefits and further potential.
- The *Laptops Initiative* is well rooted in almost all participating schools
- Schools made very significant progress during 2002-03 in purchasing, organising, planning, developing awareness of the project in other schools and distributing the laptops for use across different class and year groups.
- The dominant approach to provision of support for students with learning difficulties in literacy is withdrawal. Consequently, to date, the laptops have fitted into rather than transformed provision for students with dyslexia and other reading and writing difficulties. As such, dominant organisational and cultural patterns tend to exert a significant and powerful assimilationist pressure on innovations such as the *Laptops Initiative*.
- Significantly more boys than girls are involved in the project
- The fixed model of laptop deployment (allocating laptops to one location) has been the dominant model for laptop management to date. However, many schools have also used the floating model (allowing students to bring laptops around the school) and a small number have allowed students to occasionally bring a laptop home, that is, use of the fostered model.

One of the main lessons learned from both the US-based *Anytime, Anywhere* laptop initiative (Rockman, 2001) and the ACOT (Sandholtz et al, 1997) longitudinal studies was that **schools can, over time with appropriate internal and external supports,**

develop their capacity to integrate ICTs into the mainstream curriculum. The NCTE *Laptops Initiative*, however, provides yet another challenge in that the target group is students with dyslexia and other reading and writing difficulties. As such, the ambitious and worthy goal of the NCTE *Laptops Initiative* remains a two-fold challenge: the integration of ICTs into the mainstream curriculum and the simultaneous technology-supported inclusion of students with learning difficulties.

The report concludes with a total of eighteen recommendations at the system, school and classroom levels.

System level recommendations

- **RECOMMENDATION 1 –** CONCURRENT APPROACH TO PROJECT ORIENTATION: That initial information about initiatives be undertaken simultaneously with project orientation meeting(s) for relevant schools.
- **RECOMMENDATION 2 –** INTEGRATED SCHOOL LEADERSHIP FOCUS IN INITIAL PLANNING: That the initial project orientation meeting and at least one meeting per year include both the school principal and school organiser.
- **RECOMMENDATION 3 –** SUPPORTING SCHOOLS' USE OF ICTs FOR PROJECT ADMINISTRATION: That schools be supported in their use of ICTs to administer the project (including completion of reports, surveys and other communication with NCTE project personnel)
- **RECOMMENDATION 4 -** TEACHER NETWORKING: Build on existing relationships to foster more frequent and "sustained interaction" (Huberman, 1999) among project teachers and IT technical support teachers in order to foster collegial professionalism (Hargreaves, 2000), including continued support for once per term issue of the project newsletter.
- **RECOMMENDATION 5** - FRAMEWORK OF LAPTOP MANAGEMENT MODELS: Develop documentation for describing and characterising the nature, scope and advantages/disadvantages of various approaches to laptop management in the *Laptops Initiative* schools vis-à-vis ICT/Technology Integration e.g. fixed, floating and fostered models.
- **RECOMMENDATION 6 -** UTILISING TEACHERS' PROFESSIONAL PRACTICAL KNOWLEDGE: Build on the developing expertise among project teachers, by showcasing individual teachers curriculum-driven uses of ICTs e.g. using laptops as part of the writing process.
- **RECOMMENDATION 7 -** ON-GOING PROJECT EVALUATION: In light of project continuation and the demonstrated progression of laptop initiatives over time in other countries (e.g. the aforementioned Rockman studies over three years), plan and budget for the project's continued evaluation in order to track its development over time.
- **RECOMMENDATION 8 –** FOCUS ON THE LEADERSHIP ROLE OF PRINCIPALS IN SUPPORTING ICT INTEGRATION: Develop strategies (e.g. information focused on the role of the principal; case studies from the Schools Integration Project and elsewhere) to provide possible paths of progression for school principals, consistent with School Development Planning, drawing on appropriate models of technology integration (e.g. Sandholtz, et al, 1997).

- **RECOMMENDATION 9 –** INFORMATION ON DYSLEXIA AND OTHER READING AND WRITING DIFFICULTIES: Provide information to schools on the role of ICTs in relation to dyslexia (e.g. forthcoming DES video on dyslexia) *and* general reading and writing difficulties with a focus, in part, on presentation of information in the form of school, classroom and student level cases.
- **RECOMMENDATION 10 –** PROVISION OF FUNDS FOR DIFFERENTIATED ON-GOING TECHNICAL SUPPORT: Continue to provide annual funds to school in order that they can purchase technical support.

School level recommendations

- **RECOMMENDATION 11 –** DEVELOPMENT OF *LAPTOPS INITIATIVE* SCHOOL DEVELOPMENT PLAN: Building on the project implementation plans submitted to NCTE, develop a School Development Plan to support the project's ambitious goal of supporting inclusion via laptops.
- **RECOMMENDATION 12 -** LAPTOPS BEYOND ***FIXED*** CLASSROOM AND SCHOOL WALLS: Initiate discussion with teachers and principals to develop strategies for extending laptop use beyond the confines of the fixed classroom and in-school models of laptop deployment.
- **RECOMMENDATION 13 -** COORDINATION AT SCHOOL LEVEL: In the context of overall project coordination, develop strategies, guidelines and some reporting mechanisms that enhance in-school coordination and coherence around the project goals and objectives e.g. schools to address inclusion with teachers in the context of models of laptop usage.
- **RECOMMENDATION 13A –** MAINSTREAMING THE *LAPTOPS INITIATIVE*: Develop a set of strategies with principals and school level organisers to mainstream use of laptops as a key priority with a view to meeting the *Laptops Initiative* main objective.
- **RECCOMENDATION 14 –** INVOLVING PARENTS: In the context of the initiative, identify and disseminate information on strategies that involve parents in supporting the literacy learning of students struggling with reading and writing (e.g. annual parents' event and/or newsletter in conjunction with the project).
- **RECOMMENDATION 15 –** DEVELOPING WIRELESS AND NETWORK CAPACITIES: Schools to identify the technical support, hardware and other supports needed to develop school's capacity in both the development of wireless and networking infrastructures.

Classroom level recommendations

- **RECOMMENDATION 16 -** FOCUS ON SOCIAL NATURE OF LEARNING: Providing opportunities for students to learn from each other (use of group and pair work, peer editing, group reading e.g. reciprocal teaching) in addition to the more individually focused skill software approaches evident to date (Bean 2000; Conway, 2002).
- **RECOMMENDATION 17 –** MORE EXPLICIT ATTENTION TO CONGITIVE STRATEGY TEACHING AS PART OF THE INITIATIVE: Development of explicit teaching activities and use of software that supports

students' development of cognitive strategies for both reading and writing.

- **RECOMMENDATION 18 -** CREATION OF ACTUAL OR VIRTUAL STUDENT PORTFOLIOS: Focus on the development of strategies to archive participating students' work in order to foster self-regulated learning (SRL) among participating students. This might include developing schools' network capacity in order to archive and retrieve student work as the initiative evolves.

Paul Conway
Education Department
University College, Cork (UCC)
December 2004

Chapter I Introduction: *Laptops Initiative* and its evaluation

1.0 Introduction

This evaluation report presents findings from the ***early implementation*** of the '*Laptops Initiative* for students with dyslexia or other reading/writing difficulties' during the period December 2000 to September 2003. The report situates the *Laptops Initiative* in the context of the national and international focus on how best to ***integrate Information and Communications Technologies (ICTs)*** into the daily fabric of teaching and learning with a concurrent policy move toward providing support for students with learning difficulties in ***mainstream classroom settings***. These three themes – early implementation, ICT/technology integration, and provision of learning support for students in mainstream settings - are the central themes in this report.

The apparent immense educational potential of the new ICTs has captivated politicians, policy makers, educational leaders, teachers, communities and business over the last decade around the world. ICTs are seen as having the capacity

> *…to offer unlimited access to information and invite a profound rethinking of the purpose of education and its relevance to national development. They have the potential to widen access to education at all levels, to overcome geographical distances, to multiply training opportunities, and to empower teachers and learners through access to information and innovative learning approaches – both in the classroom, from a distance, and in non-formal settings"* (UNESCO, 2003, p. 9).

In the context of this global press toward ensuring ICT penetration in schools, the integration of these new technologies into the curriculum of primary and post-primary schooling in Ireland has been both a key policy priority and site of heavy investment since 1997/8. Given this intense global interest in ICTs, in line with other

developed countries, Ireland is now embarking on its third wave of planning for ICTs in education (Conway and Zhao, 2003b). Like other developed countries the second wave of ICT planning in Ireland has had a greater emphasis on the integration of technology into the day-to-day curriculum in schools than the first wave of planning (Conway and Zhao, 2003b). In many countries, according to Lankshear and Bigum (1999), literacy and language initiatives have become a focus of efforts to integrate technology into the curriculum (e.g. Kamil, Intrator, and Kim, 2000; Lankshear and Bigum, 1998). Given this international trend toward planning, implementing, examining, and understanding the role of ICTs in promoting students' literacy learning, including those students with literacy difficulties, the *Laptops Initiative* can provide some insights, raise questions and influence policy in the utilisation of ICTs, particularly in relation to the use of mobile learning technologies for students with literacy difficulties in post-primary schools. The findings of this, and similar projects, can be seen as important in the context of promoting social inclusion, in the emerging knowledge society (Hargreaves, 2003), for those students deemed most at risk of having persistent low levels of literacy, and the attendant long term social and economic consequences of their limited engagement and success in literacy practices in school and other settings (Boldt et al, 1998). Furthermore, consistent with the international trend toward creating more inclusive mainstream classroom settings for students with special needs (UNESCO, 1994; Evans and Lunt, 2002), this report can provide some insights into models of inclusion that work or might work on the ground for schools, teachers and students.

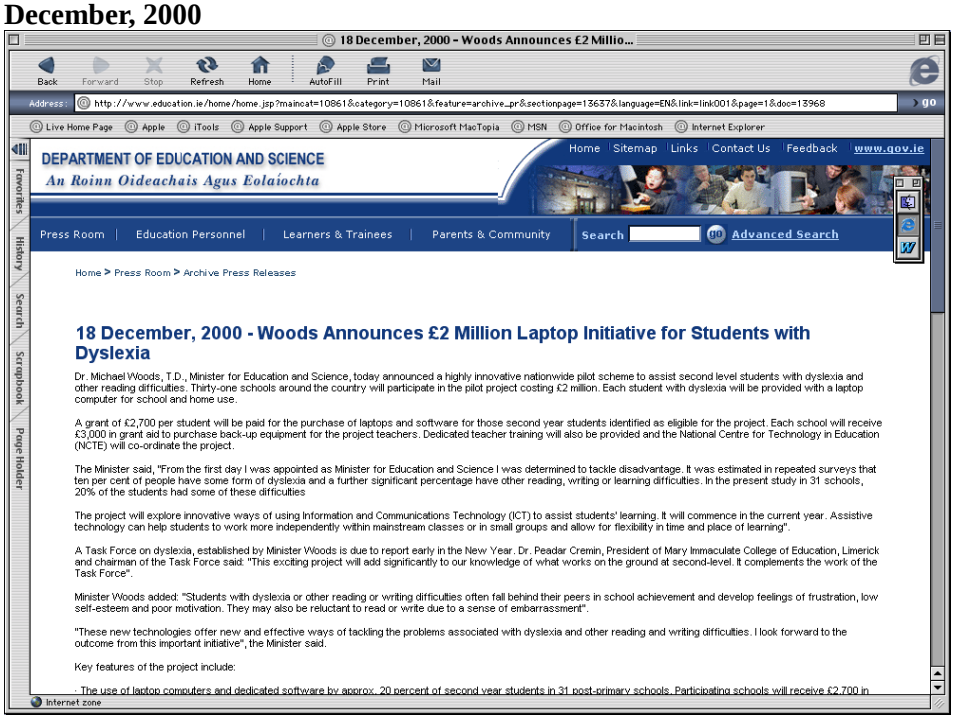
1.1 The announcement of the *Laptops Initiative*

Within this emerging focus on ICTs and literacy, in December 2000, then Minister for Education and Science, Dr. Michael Woods, TD, issued a press release

stating that his Department had allocated IR£2million (2.54 million Euro) to 31 second-level schools to support a *Laptops Initiative for students' with dyslexia and other reading and writing difficulties* (Press Release, Department of Education and Science, 18th December, 2000, available on-line www.education.ie See Figure 1). Announcing the *Laptops Initiative* the Minister stated that:

> *Students with dyslexia or other reading or writing difficulties often fall behind their peers in school achievement and develop feelings of frustration, low self-esteem and poor motivation. They may also be reluctant to read and write due to a sense of embarrassment.*

Figure 1 Department of Education and Science *Laptops Initiative* Press Release, 18th December, 2000



The press release also indicated that

> *A grant of IR£2,700 per student participating in the initiative was paid to the schools for the purchase of laptop computers as well as associated software for those second year students identified as eligible for the project, in order that they may have a laptop for school and home use. Each school was also given IR£3,000 in grant aid to purchase back-up equipment for the teachers involved in the initiative.*

The National Centre for Technology Education (NCTE), it stated, would play a lead role in coordinating the project. Among the other project details noted in the press release were the following:

- Approximately 20% of second year students in participating schools were to be involved in the initiative
- Participating schools were to receive "extensive support in planning and developing their projects and dedicated teacher training will be also be provided"
- Participating schools were expected to target second year students with dyslexia and other reading and writing difficulties
- The names of thirty-one participating second-level schools

The Chair of the government's *Task Force on Dyslexia*, commented as follows in relation to the *Laptops Initiative*:

> *This exciting project will add significantly to our knowledge of what works on the ground at second-level. It complements the work of the Task Force* (Cremin, December, 2001)

In writing the Foreword of the *Report of the Task Force on Dyslexia* (Department of Education and Science, July, 2001), the Minister for Education and Science, commented on the significance of the *Laptops Initiative* in the context of addressing some of the issues raised in the Task Force Report.

> *Late last year, I announced a £2 million initiative involving the delivery of laptop computers to students with dyslexia and other reading and writing difficulties in 31 post-primary schools. The project will explore ways in which Information and Communication Technologies (ICTs) can assist students with learning difficulties to work independently within mainstream classes, and provide flexibility in the time and place of learning. I am confident that this initiative will complement the work of the Task Force by adding to our knowledge of what works on the ground in schools* (2001, p. v)

1.2 Project goal and objectives

An overarching project goal and project objectives were elucidated by the NCTE. These were as follows:

Project Goal

- *To identify how laptops and other portable ICT equipment can best be used to support students with dyslexia or other reading and writing difficulties in a manner that facilitates learning, and access to learning, in an inclusive environment.*

Project Objectives

- *To develop models of classroom management supporting the use of laptops in mainstream classes and identify associated practical issues, with a view to enabling students with learning difficulties to participate more fully in mainstream classes.*

- *To trial the use of laptop computers as a personal support tool for students with dyslexia or other reading/writing difficulties, both in the school and home environments, with a view to identifying the most successful methods of use, their benefits and drawbacks.*

- *To identify ways in which different software products can be used to support students with learning difficulties.*

1.3 Chronology

The *Laptops Initiative* can be characterised as having gone through two phases up to the end of August 2003. In line with DES directives, the NCTE's role has developed and expanded since its original role at the *Laptops Initiative's* commencement in December 2000.

Overview of *Laptops Initiative* phases

- *Start up and orientation phase,* (Dec. 2000 - Spring 2002)
  - DES role: Announcement of the initiative, selection of the participating schools in conjunction with NCTE, disbursement of funds to schools.
  - NCTE role:. Advice to DES on schools selection, technical configuration of the initiative and breakdown of the financial and ICT resources for schools. Notification to schools of their nomination to participate in the project and securing their agreement to same. Provision of advice and guidance to assistance to schools in purchasing laptops and software. Contact point for

schools about the project. Provision of teacher training in ICT through the existing mechanism (via local education centres).

- School role: Purchase of hardware and software. Use of the technology in a manner that supports existing provision for targeted students. A small number of schools (up to a dozen) bought laptops and commenced using them with targeted students during this start-up phase.

❖ *Early development and implementation phase,* (May 2002 to August 2003)

- NCTE role: Development and provision of a full project support and coordination structure, encompassing a higher degree of overall support and a more active role in promoting and supporting schools in technology integration. Elucidation of a project framework based on the project rationale as outlined by the DES. Appointment of a dedicated project coordinator to provide support to schools in their implementation of the initiative. Dissemination of support materials. Commencement of a series of meetings and workshops to develop the project and support networking between schools, targeting both principals and teachers..
- School role: Development of schools' project implementation plans which were subsequently submitted to the NCTE. Expenditure of any remaining funding in line with guidelines provided. Implementation of the initiative in their school within the context of the overall project framework. Completion of a detailed School Report in June 2003, documenting evolution of the project, including expenditure of funds, and submission of this report to the NCTE.

This evaluation pertains to project development from December 2000 to September 2003, that is, the (i) start up and orientation, and (ii) early project development and implementation phases, with an emphasis on the second phase.

During the start-up and orientation phase, information on purchasing procedures and hardware guidelines were sent to participating schools on February 19th, 2001. NCTE support during this phase consisted mainly of the provision of ICT purchasing information/guidelines and of teacher training. A meeting of principals was also due to be held but it could not take place, primarily due to restrictions on travel, as a result of an array of precautions taken nationally to counteract the potential spread of 'foot and mouth'

The second phase of the project saw the NCTE's support to the project being expanded considerably, in line with DES directives. The NCTE recruited a seconded teacher as a full-time, dedicator project coordinator for the Laptops Initiative. The person appointed had considerable experience in the design and management assistive technology projects for students with special educational needs. This coordinator liaised with the NCTE special needs staff charged with managing the project, who also brought considerable expertise to the *Laptops Initiative*.

The second phase also involved developments in a number of other areas. A project framework with goals and objectives was developed, followed by development of school supports intended to enable schools to adapt this framework to their local situation. As well as the support of the aforementioned full-time coordinator and other NCTE staff, these supports included a project implementation plan template with guidance on how to develop such a plan, organisation of meetings with principals and of workshops with school level teacher organisers in Autumn and Spring, allocation of funding to provide for substitution of school level teacher

organisers to plan and coordinate the initiative (six days sub cover and three hours per week teacher release time per school in total during 2002-03), appointment of a project evaluator (January, 2003) and compilation and distribution of a newsletter (Spring 2003) by the project coordinator with examples of laptop usage written by teachers for their colleagues into other participating schools.

The Autumn meeting of principals encompassed an overview of the project framework as communicated to principals the previous May, a summary of laptop case studies (both local and international), and feedback from principals. It also emphasised schools' role in identifying their own particular needs and localising the *Laptops Initiative* accordingly (Interview notes with NCTE personnel, February, 2003).

Principals had earlier been encouraged to appoint a school level teacher organiser and principals were advised by NCTE to choose a person with a background in learning support for this role. The Autumn meeting of school level teacher organisers encompassed the following topics: project context and background, matching technology and students, using ICTs to support students with learning difficulties, and extensive guidance on project planning as well as time to begin composing the plan. The meeting also informed participants about the appropriate use of software. Follow-up information on software licensing, mailing lists and other items was subsequently sent to schools. The project coordinator visited schools to provide one to one assistance on site and had completed visits to 30 of the 31 participating schools by January 2003. Early in 2003, based on initial conversations with participating schools, an eight-page hard copy project newsletter was compiled by the project coordinator, and distributed to all participating schools. The newsletter included short articles by teachers noting developments, plans for laptop use and other

information about the project and a reminder of details contained in earlier communications with schools.

A second set of professional development workshops was organised for teachers in Spring 2003. On March 10th and 11th 2003, two regional meetings for teachers were held (one in Blackrock Education Centre and the other in Laois Education Centre). Both of these meetings focused on software demonstrations, discussion of progress, problems and planning (roundtable discussion), and provision of feedback to the project evaluator. The project evaluator met with teachers on both days, during which teachers completed a survey and took part in a focus group discussion about the *Laptops Initiative.* The discussion included teachers' impressions of the project to date, their views on supports and hindrances, and preferred strategies for teaching students with learning difficulties. Twenty-six teachers, all from different schools, took part over the two days.

The Spring meeting with school level teacher organisers included discussion of progress and focused on two topics: software demonstration (2 hours) by the NCTE project officer for special needs (an experienced teacher of students with special needs) and focus group discussion (1 hour) with project evaluator.

The Spring meeting of principals focused on principals' perspectives on the initiative to date, evaluator's perspective (some lessons from research on mobile learning technologies and parallels to Laptops Initiative); and feedback and continuing the work of the *Laptops Initiative*. There was a clear message of support for the continuation from the 29 participating school principals present at the meeting. Many commented how the *Laptops Initiative* had progressed significantly over the course of the 2002-03 school year and that students, in general, seemed to be responding very positively to the learning opportunities provided by the laptops (Field

Notes, May 2003). The project evaluator was invited to make a short 20-minute presentation about the evaluation findings to date. Following the morning session with principals, a small group of principals (six) met with the project evaluator for a focus group meeting about educational change and technological innovation in schools. The NCTE communicated to schools in May 2003 that, following on from the principals' request, support for the project would continue for 2003-05 and would include a continuation of the three hours per week release time for school level organizers and provision for of relevant teacher professional development during the school day.

1.4 *Laptops Initiative* Evaluation

Tenders for the evaluation of the *Laptops Initiative* were sought in December 2002 and the evaluation contract commenced in January 2003. The terms of reference for the evaluation of the *Laptops Initiative* were broad (NCTE, December, 2002):

- *To discuss **national context** of initiative, with some reference to relevant international developments*
- *To explore and summarise the **approaches used by schools** to implement the initiative and to identify the obstacles and successes experienced by schools*
- *To document the **range of models** that emerge from the initiative for using laptops and other portable ICT*
- *To determine how schools are using laptops as **personal support tool for students***
- *To identify the **models of classroom management** that schools are using to support the use of laptops in mainstream classes*

- *To develop a **profile of the students** who were involved in this project and determine how the initiative is fitting within schools' current **learning support provision***
- *To determine if **instructional and learning activities** have changed to support the use if ICT in the classroom as a result of the initiative*
- *To determine the impact of the initiative on students' **achievements** and **attitudes** to school*
- *To identify the types of **software** that schools are using and determine how the software is being used to support students involved in the initiative*

In addition to these terms of reference, the evaluator recommended a focus on the relevant **beliefs of principals and teachers** about the initiative in the context of their practice. While the larger education reform issues and issues of inclusion are not the focus of the evaluation, they nevertheless provide vital background and contextual details within which the genesis and evolution of the *Laptops Initiative* can be evaluated.

The description and analysis of the project's development, findings, and recommendations contained in this evaluation report are based on the *Laptops Initiative's* **early development** over a period of two years and nine months from its inception in December 2000 to September 2003, with a focus on the period from May 2002 when the full project support structures were in place. Adopting a long-term view over a three to five year period is important, as Sandholtz et al (2000) emphasized in relation to their longitudinal evaluation of the US-based *Apple Classroom of Tomorrow* (ACOT) initiative:

> *The experience of the Apple Classroom of Tomorrow project demonstrates the value of taking a long-term perspective on change and making the necessary personal and organisational commitments to bring about change* (p. 274).

1.5 Evaluation Overview

The ***first phase*** of the evaluation work on the early implementation involved ***orientation*** to the personnel, scope and developments to date in the project (January-March 2003). This phase involved meeting with relevant NCTE and DES personnel (the Director of the NCTE, the Project Coordinator, NCTE's National Coordinator for Special Needs, NCTE's Project Officer for special needs, and the DES Inspector providing advice to the project coordination team), meeting teachers in two focus group meetings in March 2003, review of some relevant literature on laptop and ICT initiatives, advertising and hiring two research assistants to assist in data collection, and planning the case study phase of the evaluation.

The ***second phase*** (April-July 2003) of the evaluation focused on gathering ***case study data*** in four selected schools, preparing an initial draft of sections of the report summarising data gathered during the March Focus Group meetings and outlining a framework for the school case studies.

The ***third phase*** (August-November 2003) of the evaluation involved revisiting the case study schools and the development, administration and analysis of a school survey which was sent to principals. The subsequent report on the early implementation of the *Laptops Initiative* documents the development of the project from its inception in December 2000 to various strands of development at national, school and classroom levels until end of September 2003.

1.6 Evaluation methodology and methods

Evaluation research provides an important convergence of theoretical, practical and policy concerns. In particular, as Piggott and Barr have observed, "Literacy interventions represent an important class of studies where theory, practice and policy intersect" (2000, p. 99). Three traditions have shaped the nature of evaluation research: experimental and quasi-experimental; interpretive; and formative. This report adopts an interpretive approach.

The experimental/quasi-experimental tradition seeks to compare the effectiveness of involvement versus non-involvement in interventions, and based on this comparison seeks to provide an answer to the question as to whether an intervention 'works' or not. If the answer is 'Yes', the assumption is that firm predictions can be made about the implementation of similarly designed interventions in the future.

The interpretive tradition seeks to document and describe the process of an intervention, and is focused on understanding the dynamics of an intervention's development in specific social and historical context. Furthermore, an important stance within the interpretive tradition is its attention to both the unintended as well intended consequences of an intervention (Cronbach, 1963).

The formative tradition seeks to contribute to an intervention's effectiveness by contributing to the actual development of the project itself as it unfolds. Quinn-Patton (1997) has described this emphasis as utilisation-focused evaluation.

This report adopts an interpretive methodology in evaluating the *Laptops Initiative*. An interpretive perspective adopts some key assumptions in relation to the nature of knowing and the relationship between the knower and the known (Mertens, 1998). In terms of knowing, an interpretive perspective assumes that there are

multiple representations of reality and that our knowledge is socially and historically situated. In terms of the relationship between the knower and the known, this approach assumes that the "inquirer and inquired-into are interlocked in an interactive process; each influences the other" (Mertens, p. 13). As such this evaluation sought to understand the process of the *Laptops Initiative's* development and contribute to its future development.

Specific research methods used (literature review, focus group interviews, one-to-one interviews, school case studies, classroom observations, and surveys) are detailed in this chapter and as appropriate in Chapter 3. Interview protocols and survey instruments are provided in the Appendices. To the extent that it is feasible, both Chapter Three (Findings) and the Appendices (see Appendices 1C to 1F) provide the reader with an 'audit trail', as recommended by Lincoln and Guba (1985).

Literature Review

Given the scope of the *Laptops Initiative* and its ambitious goals, the literature review provides a discussion of some relevant literature rather than attempting to provide an exhaustive review of literature in all the relevant areas that need to be addressed in order to contextualise the initiative. For example, much has been written about educational software including the design, the learning assumptions underpinning design options and the impact of particular types of software use on students' learning (Kulik and Kulik, 1991). However, this report addresses these issues in this area and others by drawing upon key articles and recent reviews of literature, to the extent they are available, in relevant areas.

Focus group interviews

Drawing up on Frey and Fontana's (1993) typology of 'Group Interviews and Dimensions' the use of focus groups in this evaluation was guided by the following assumptions: focus groups usually have a formal preset venue; a relatively directive

interviewer/moderator; and a semi-structured question format. In this instance, the focus group interviews undertaken in March 2003 with 26 school level organisers, from 26 of the 31 *Laptops Initiative* schools, involved the teachers completing a brief reflection sheet and subsequent audio-taped discussion of issues raised in their reflections.

Survey development and administration

Two surveys were developed and administered for the purpose of gathering data across participating schools. Survey items were generated based on experience of other ICT projects documented in educational research literature and orientation information gathered from project personnel during January and February 2003. The initial survey was completed by school level teacher organisers in March 2003 at two day-long meetings convened by the NCTE in Blackrock, Co. Dublin (Blackrock, Education Support Centre), and Portlaoise, Co. Laois (Laois Education Support Centre). The second survey (September School Survey 2003/SSS03) was sent to principals of participating schools by e-mail, or posted if a school had not provided a contact e-mail (see Appendix 3). Follow up was made where necessary to clarify issues and/or encourage schools to return the surveys. Five schools returned the survey via e-mail (the four case study schools and one other school). Over half of the schools commented on difficulties experienced with their e-mail such as viruses, difficulty (e.g. “that thing never works”, Deputy Principal; “computer system has been down for seven weeks”, Deputy Principal) in managing attachments and limited use made by the school of e-mail (e.g. “E-mails are never checked here”, School Secretary). Twenty-six schools had returned completed surveys by mid-November 2003.

One-to-one interviews

This study used semi-structured interviews rather than structured interviews (Smith, 1995). Compared to structured interview protocols, semi-structured interviews focus less on the order of the questions than on developing an understanding of the informant's stance in relation to the focal phenomena. Thus, the interviews occasionally meandered to address issues viewed as important by informants. The preference for semi-structured rather than structured interviews can be seen as consistent with an interpretive methodology. As Smith (1995) has noted a

> …*phenomenological position is adopted by most semi-structured interview projects. The interviewer has an idea of the area of interest and some questions to pursue. At the same time, there is a wish to try and enter the, as far as possible, the psychological and social world of the respondent. Therefore, the respondent shares more closely in the direction the interview takes and he or she can introduce an issue the investigator has not thought of. In this relationship, the respondent can be perceived as an expert on the subject and should therefore be allowed maximum opportunity to tell his or her own story*. (p. 12)

Classroom observations

Reading classroom life is a complex and multi-faceted endeavour (Good and Brophy, 2003). For the purposes of this evaluation, open field note taking was adopted as the primary strategy for gathering observation. However, one of the two researchers also video-taped a portion of one lesson in two schools.

Case studies

Drawing upon interview data, document analysis and classroom observations, case studies of four schools were developed. Consistent with the semi-structured approach adopted in relation to both the focus groups and one-to-one interviews, data gathering in relation to the case studies was attentive to the informants' stance.

1.7 Overview of Evaluation Report

Chapter One provides an introduction to the origins of the *Laptops Initiative*, outlined the *Laptops Initiative's* chronology from December 2000 to September 2003, detailed the terms of reference of the evaluation, and documented the evaluation methodology and methods.

Chapter Two provides an overview of relevant research literature in order to contextualise the *Laptops Initiative* both in terms of Irish education and developments elsewhere. The following interrelated framing contexts are addressed: dyslexia and other reading and writing difficulties; ICT policy in Irish education; the state of teachers' continuing professional development (CPD) opportunities in the post-primary system in Ireland; issues in evaluating learning and teaching in relation to the use of educational software; a framework for technology integration as an educational goal; laptop initiatives in Ireland and elsewhere; the challenge of learning to read; the role of ICTs in supporting students with reading and writing difficulties; and students with literacy difficulties in the context of Irish educational policy.

Chapter Three presents the findings based on data gathered from January to September 2003. This chapter is organised into three main sections. The first section provides an overview of the project addressing issues such as the number and type of students and teachers involved; the number of hours and lessons laptops were used by students weekly; the types of schools involved in the initiative; and teachers and principals impressions of the project. The second section provides an overview of the four case study schools. The third section encompasses a case-by-case presentation of the four case study schools under a number of headings. The final section of each case study encompasses an appraisal of the extent to which each case study school has progressed along the continuum of technology integration presented in the second

chapter. **Chapter Four** provides a summary of the evaluation findings under the headings delineated in the call for proposals to evaluate the *Laptops Initiative*. **Chapter Five** encompasses recommendations focused on system, school and classrooms.

Chapter II The *Laptops Initiative* in its wider contexts

2.0 Chapter Overview

Chapter Two provides an overview of the *Laptops Initiative* in its wider contexts. An important context for the *Laptops Initiative* is the recent publication of the Task Force Report on Dyslexia (DES, 2001). The definition of dyslexia, main findings and recommendations from this report are discussed. Then, in the context of the *Laptops Initiative*, the challenges of learning to read and the importance of reading to learn in post-primary schools are outlined. Given that the *Laptops Initiative* goal notes the potential of ICT in general, and laptops in particular, as a powerful tool in supporting the learning needs of students with dyslexia and other reading and writing difficulties, key dimensions of computers as learning tools for such student populations are outlined. Given that the project goal stipulates the potential of laptops to support inclusive provision for students with learning difficulties in literacy, the debate over "full inclusion" versus "responsible inclusion" is noted as a significant challenge facing many education systems (UNESCO, 1994; Evans and Lunt, 2002).

Moving to the broader context of ICTs in post-primary schools, in order to identify a baseline upon which to evaluate the *Laptops Initiative*, the current state of ICT policy and practice in Irish post-primary schools is outlined. In this section attention is drawn to waves of ICT policy development nationally and internationally, and the impact of *Schools IT 2000* is summarised as it forms the key policy and practice context within which to evaluate the *Laptops Initiative* (NPADC, 2000). On the basis that a major impact study of *Schools IT 2000* commissioned by the Minister identified teachers' CPD as a key factor, among others, in the integration of technology, a recent large-scale evaluation study on CPD provision in Irish education at primary and post-primary levels provides important insights into system-level

challenges in relation to current CPD policy and practice (Sugrue, Morgan, Devine and Raftery, 2001; Sugrue, 2002). Noting the limited degree of ICT/technology integration as documented in the impact study of *Schools IT 2000* (NPADC, 2000), the next section provides a five-phase framework for evaluating technology integration (Sandholtz et al, 1997) in schools and classrooms. In this section on technology integration, the Silicon Valley study (Cuban, 2001) of technology integration is highlighted as insightful in demonstrating the challenges of promoting technology/ICT integration, even in highly favourable settings such as those in Silicon Valley schools. Subsequently, the lessons learned from key research and evaluation projects on the impact of laptop projects elsewhere are outlined. This section draws on the longitudinal study undertaken to evaluate the *Anytime, Anywhere Learning* multi-year laptop initiative in order to illustrate the potential for project development over time (Rockman, 1999). In light of the *Laptops Initiative* as a targeted intervention for students with reading difficulties in post-primary schools, the majority of which are educationally disadvantaged, the final section of this chapter addresses the policy significance of literacy in the context of educational disadvantage.

2.1 Dyslexia and other reading and writing difficulties

"Dyslexia has many faces" (Miles and Miles, 1999, p. 15)

Efforts to understand the nature of learning and teaching for students who struggle with literacy has typically focused on two groups: those with dyslexia (often viewed as having a specific reading difficulty) and those students with general reading difficulties (sometimes termed the 'garden variety poor reader' or 'ordinary poor reader'). 'Dyslexia' is sometimes the term of choice for students with any reading difficulty, even though more circumscribed (although changing) definitions

have long been used in educational contexts. This confusion and/or overgeneralisation in the use of the term dyslexia may, in part at least, explain what the *Report of the Task Force on Dyslexia* noted as a frequent theme emerging from over 1,200 submissions received: "the misunderstandings about dyslexia held by some class and subject teachers" (p. xiii). Dyslexia as a focus of public, educational, and media interest has been prone to various myths, one of which is that letter reversal is a distinguishing characteristic of the 'syndrome'. However, as Pennington (1991) and Snowling (2000) note, letter reversal is a developmental pattern and not always a distinguishing criteria among students with dyslexia. Beyond this powerful myth about dyslexia, a number of important findings have emerged consistently from various strands of research. Among these findings/observations are the following:

- Dyslexia appears as a particularly prevalent learning disability in childhood and adolescence (Miles and Miles, 1999; Pennington, 1991; Snowling, 2000)
- It is probably the most researched learning disability with strong research traditions in medical research (neurology e.g. Adams, Victor and Ropper, 1997 discuss dyslexia as a developmental abnormality) as well as in cognitive, educational psychology and neuro-psychology (e.g. Frith, 2002a, 2002b; Hjelmquist and von Euler, 2002; Miles & Miles, 1999; Pennington, 1991; Snowling, 2000)
- It is, more often than not, a life-long concern for individuals, but many people with dyslexia are very successful in demanding careers involving considerable reading and writing (Snowling, 2000)
- It typically comes to the attention of teachers, parents and others or, reflecting the influence of medical terminology, has its 'onset' in childhood or adolescence (Pennington, 1991)

- Appears to run in families as evidenced in family histories (Pennington, 1991; Snowling, 2000)
- There appears to be a moderate genetic influence as evidenced by twin studies (Pennington, 1991).

Despite the confluence of opinion on some aspects of dyslexia, the area remains highly contested in other ways. For example, according to Nosek (1995), there have been 30-40, sometimes different and sometimes overlapping, definitions of dyslexia offered over the last one hundred years. Furthermore, two widely and very different but influential models have guided the understanding and interventions in relation to dyslexia: a visual model and language-based phonological model. In the 1920s, a focus on dyslexia as a visual system problem led to a variety of eye muscle training interventions. Why? In order to solve the letter and word reversal symptoms thought to typify dyslexia. Later, the persistence of the visual system explanation of dyslexia led to the continued focus on eye muscle training, various ocular pursuits, and glasses-focused interventions.

The language-based, and now dominant, phonological model of dyslexia emerged in the last thirty years (Frith, 1997; Frith, 2002a; Miles and Miles, 1999; Snowling, 2000). The proliferation of definitions, the variety of interventions, and competing models led Nosek to conclude that "…dyslexia has had a confusing and erratic history" (1995, p. 6). Despite Nosek's claim that dyslexia has had a somewhat confusing history, some consistent themes have emerged in the conceptualisation of dyslexia in the research literature. These themes have remained constant since the late 19th century.

One hundred and eight years ago, in November 1896, Pringle Morgan, a medical doctor in England, published a description of what has now become known

as dyslexia or specific reading disability (Morgan, 1896). Pringle described a boy called

> *Percy F….aged 14,…who has always been a bright intelligent boy,…quick at games, and in no way inferior to others of his age. His great difficulty has been - and is now - his inability to learn to read.*

A particularly significant insight contained in Morgan's 1896 study is the paradox that continues to be presented as typical of students with dyslexia, that is, a "bright" student who struggles as he or she learns to read. The surprise at a bright student having difficulty in learning to read betrays our reliance, or 'folk theory', of reading as a proxy measure of a learner's intelligence. As such, this 'folk theory' could be summarised in the following statement "if you are smart you ought to be able to learn to read". However, the widely assumed logic that intelligent learners ought to learn to read rather easily appears to break down in the case of dyslexia. The breakdown in this assumed link between intelligence and the ability to read has led to a discrepancy criterion, operationalised in various ways, being used to identify students with dyslexia. Typically, this discrepancy has been operationalised as the existence of sufficient difference between general ability in the average or high range (based on full-scale IQ) and low achievement (based on standardised norm-referenced achievement test) (DES, 2001). However, as acknowledged by the *Report of the Task Force on Dyslexia*, despite "strong criticism"(p. xii), the IQ-based ability-achievement discrepancy model has played a central role in framing educational and psychological understanding, assessment, and interventions in relation to students with dyslexia.

As noted earlier there have been many definitions of dyslexia. A very simple one would be that dyslexia is a specific learning difficulty which makes it hard for some people to learn to read, write and spell correctly. Marking a shift from the 1993

definition offered in the *Special Education Review Committee* (SERC) report (Department of Education, 1993), the recent *Report of the Task Force on Dyslexia* (2001) offered the following definition:

> *Dyslexia is manifested in a continuum of specific learning difficulties related to the acquisition of basic skills in reading, spelling and/or writing, such difficulties being unexplained in relation to an individual's other abilities and educational experiences. Dyslexia can be described at the neurological, cognitive and behavioural levels. It is typically characterised by inefficient information processing, including difficulties in phonological processing, working memory, rapid naming and automaticity of basic skills. Difficulties in organisation, sequencing and motor skills may also be present. (p. 31)*

The report goes on to say that the learning difficulties arising from dyslexia:

- Occur across the life-span and may manifest themselves in different ways at different ages;
- May co-exist with difficulties in the area of numbers;
- May be associated with early spoken language difficulties;
- May be alleviated by appropriate intervention;
- Increase or reduce in severity depending on environmental factors;
- Occur in all socio-economic groups;
- Can co-exist with other learning difficulties such as Attention Deficit Disorder, and may or may not represent a primary difficulty.

A number of points are worthy of comment in relation to the Task Force definition. First, it is drawn from a British Psychological Society (BPS, 1999) publication on dyslexia and although not cited in the list of references appended to the report, the definition adopted by the Task Force appears to draw on the conceptualisation of dyslexia developed by Frith (1997). Frith (1997; 2002a; 2002b), based on a detailed examination of evidence on the nature of dyslexia, has created a model to integrate different sources of evidence at the neurobiological, cognitive and behavioural levels

taking into account the interactive influence of each level on the other as well as between each level and the cultural environment (see Table 1).

Table 1 Frith's three-level framework of dyslexia (1997; 2002a)

'Culture' - Environment	'Brain' or Neurobiological
	'Mind' or Cognitive
	Behaviour

Second, the Task Force definition, even though apparently based on Frith's model, underplays the interactive relationship between the three levels (brain, mind and behaviour) and the culture-environment in understanding dyslexia. The downplaying of the interactive relationship between brain, mind and behaviour on the one hand and culture/environment on the other, in the Task Force Report definition of dyslexia, tends to convey an endogenous rather than interactive model of dyslexia. The origins of such a shift in emphasis and its implications are beyond the scope of this report. However, an important implication of this emphasis may be in communicating an undue or overemphasis on intrinsic factors in understanding dyslexia to the exclusion of important environmental factors and their role in contributing to and ameliorating dyslexia.

Third, like almost all earlier definitions, the Task Force definition incorporates a version of the ability-achievement discrepancy hypothesis, what the Task Force noted as "difficulties being unexplained in relation to an individual's other abilities and educational experiences". Fourth, the Task Force Report emphasises both in its definition of dyslexia and in numerous other parts of the report, the desirability of viewing dyslexia on a continuum of learning difficulties rather than as a discrete categorical phenomenon. Although a detailed discussion of the arguments surrounding the continuum-categorical understanding of dyslexia is beyond the scope

of this evaluation report, it is worth noting that the continuum stance on dyslexia clearly positions the Task Force definition on one side of an on-going debate in the field of dyslexia. As Frith (2002) has noted recently:

> *…the consensus about the nature of dyslexia is still somewhat precarious. One body of hotly debated points is whether dyslexia is a condition that makes reading and reading-related skills qualitatively different from normal, or whether it is simply the tail end of a normally distribution of skills. The implication of the continuum view is that dyslexia may not be a separate entity and not necessarily a disorder – merely a normal variation. The implication of the category view is that dyslexia is a separate entity and a disorder (p. 180)*

The Task Force continuum stance draws attention, thus, to what students with dyslexia or dyslexic tendencies may have in common with students who are seen as 'garden variety poor readers' or 'ordinary poor readers'. The Task Force continuum is informed by recent evidence from researchers who have argued that "several recent studies have seriously challenged the discrepancy-based definition of dyslexia and in particular the assumption that people with dyslexia are qualitatively different from 'garden-variety' poor readers" (Samuelson, 2002). As Samuelson (2002), Vellutino, Scanlon and Lyon (2000), and Stanovich and Stanovich (1996) have argued, various tests of cognitive skill, phonological and orthographic processing skills, visual processing, and short-term memory have demonstrated non-significant differences between readers with dyslexia and 'garden variety' poor readers. Furthermore, researchers have argued that students with dyslexia and 'garden variety' poor readers do not respond differently to intervention.

In addition to offering an important and considered definition of dyslexia (Ch. 3) the report made observations on the current state of provision of services for students with dyslexia (Ch. 4), discussed the learning difficulties arising from dyslexia (Ch. 5), delineated aspects of implementation at both the school and system-levels (Ch. 6). The final chapter of the report contains 61 recommendations organised

under six headings: system level, pre-service teacher education, in-career professional development of teachers, school/local level, class level, and other service providers. Overall, the *Laptops Initiative* relevant Task Force findings about current provision and the state of information in the system highlight the following:

1. The less than optimal state of current provision across different levels of the education system;
2. The lack of information and confusion among some teachers in relation to the nature of dyslexia;
3. The serious dearth of information at the system level on:
    a. the prevalence of students with dyslexia,
    b. the nature and impact of current interventions
    c. the nature and effectiveness of learning support and resource teaching
    d. the need for appropriate CPD for learning support, resource and subject teachers on assessing and planning interventions for students with dyslexia.

Based on these and other system weaknesses, the Task Force made sixty-one recommendations.

In relation to the *Laptops Initiative*, the following issues and recommendations are of particular relevance. First, the Task Force

> *recognises that a systematic approach implementing the recommendations in this report needs to be adopted, since implementation of some recommendations (e.g., the involvement of class/subject teachers in planning, implementing and reviewing individual learning programmes with students with learning difficulties arising from dyslexia) depends on the prior implementation of other recommendations (e.g., the involvement of class/subject teachers in appropriate in-career professional development activities).* (p. 107)

As such, the Task Force recognised the complex interplay of factors at both the school and system levels that account for the manner in which individual students with dyslexia are supported in the classroom.

Recommendation 12 focused on the need to implement interventions in a flexible and appropriately individualised manner for students with dyslexia:

> *The DES should support primary and post-primary schools in providing a level of learning support that is flexible and appropriate to the needs of each student with learning difficulties arising from dyslexia. Where necessary, intervention should include one-to-one teaching from a learning support teacher* (p. 109).

At the system level, in relation to the monitoring of the operation and effectiveness of support services and interventions at post-primary level, the Task Force recommended that:

> *The DES should commission a study on the operation and effectiveness of the learning support and resource teaching services in post-primary schools, including the nature of provision for students with learning difficulties arising from dyslexia* (Recommendation 26, p. 111).

Two recommendations in relation to CPD are of particular importance in relation to the *Laptops Initiative*. The first focuses on appropriate CPD for learning support and resource teachers:

> *In-career development courses for learning support and resource teachers dealing with the identification of learning difficulties arising from dyslexia, and the planning and implementation of appropriate interventions should be provided as a matter of urgency* (Recommendation 36, p. 113).

The second relevant CPD recommendation focuses on the need for appropriately intensive in-career education for class and subject teachers:

> *Intensive in-career development courses dealing with the identification of learning difficulties arising from dyslexia, differentiated teaching, and programme planning and implementation at the individual student level should be arranged for all class and subject teachers on an ongoing basis* (Recommendation 37, p. 113).

2.2 Learning to read and write at post-primary level

Few would argue against the claim that reading consists of the simultaneous application of many skills encompassing phonological, orthographical, semantic and context processing. However, the exact manner in which students do or do not learn to read and write has been one of the most extensively researched and hotly contested areas in education, educational psychology and cognitive science. While there has been extensive debate (e.g. the so-called 'reading wars', for a discussion see Adams, 1990) often founded on fundamental and consequential disagreements about the definition of reading (or more recently literacy) and the relative emphasis that ought to be put on different teaching methods (often framed as a choice between a bottom-up 'breaking the code' or top-down 'meaning' emphasis in the pedagogy of literacy), there have been efforts to come to some accommodations and policy compromises over the last decade. In the USA, for example, the publication of two reports on learning to read, that is, National Research Council's report on the '*Preventing reading difficulties in young children*' (2001) and the report of National Reading Panel's (1999) have been undertaken according to Snow and Burns (2001),

> …*with the assumption that empirical work in the field of reading had advanced sufficiently to allow substantial agreed-upon results and conclusions that could form a basis for breaching the differences among warring parties* (Preface, p. v).

The process of learning to read begins well before children come to school, and by the time students have reached post-primary school they will have had considerable time to *learn how to read, read to learn* and also appraise their *self-perceived competency in the highly valued cognitive tool of reading*.

Learning to read

Many authors distinguish between the acquisition of language and basic meta-linguistic awareness as a relatively natural process, and the acquisition of reading as a

less natural process, requiring intervention in the form of direct teaching and explicit attention to language patterns and conventions of print in the learner's environment. In particular, competence at three and four years of age, in both phonological (i.e. sound structure of language) and phonemic awareness, have been identified in various studies as powerful and reliable predictors of later achievement in reading at seven to ten years of age (for a discussion see Niemi and Poskiparta, 2002; Olson, 2002; Torgesen and Hecht, 1996). The NRC report defines these two key factors as follows

> *The term phonological awareness refers to a general appreciation of the sounds of speech as distinct from their meaning. When that insight includes an understanding that words can be divided into a sequence of phonemes this finer-grained sensitivity is termed phonemic awareness.* (p. 51)

The central role accorded phonological skills (encompassing both phonological and phonemic awareness) is reflected in educational software to support students with reading difficulties which support students in developing their skill of recognising, identifying and manipulating phonemes at various different levels (i.e. *syllable* [in the word protect /pro/ and tEkt/]; *onset and rime* [the onset /pr/ and the rime within the syllable /o/, /t/, and /Ekt/]; and at the level of *individual phonemes* [/p/, /r/, /o/, /t/, /e/, /c/, and /t/]) (NRC, 2001). In the case of students with dyslexia, problems in the phonological processing system are viewed as causing a 'bottleneck' in cognitive processing which has a knock-on effect on orthographic, semantic and contextual processing skills (Frith, 2002a). As such, there has been an emphasis (e.g. *Report of the Task Force Dyslexia*) in interventions for students with dyslexia on word level phonologically-focused activities. In the context of the *Report of Task Force on Dyslexia*, there was a recognition that addressing dyslexia in adolescence, while dependent on a student's learning profile, nevertheless ought to include but extend beyond word level phonologically-focused interventions, and also focus on strategies

for reading and writing involving extended text encompassing the development of meta-cognitive strategies.

Reading to learn

By the time students reach post-primary level, reading is an essential and ubiquitous tool in navigating the challenges of content-laden curriculum and textbooks written in various genres (Bean, 2000; Lewis and Wray, 1999; Roe, Stoodt, and Burns 2001). Thus, by the time students reach post-primary school there is considerable pressure on them to read competently, and any weaknesses in the array of skills needed for strategic, efficient and fluent reading has a ripple effect on learning across subject areas (Roe, Stoodt, and Burns, 2001; Wray, 2002), on their self-perceived competence in reading (Pintrich and Schunk, 1996; Harter, 1999), and overall self-esteem (Harter, 1999).

Self-perceived competency in the highly valued cognitive tool of reading

The central role reading plays in school learning results in it having a significant impact on students' perceived self-competence in reading (Pintrich and Schunk, 1996) and their engagement in and motivation to read (Guthrie and Wigfield, 2000). Traditionally, simplistic conceptions of global self-concept have historically overlooked both (i) the domain specificity of children and adolescents perceptions of self-competence in particular domains, and (ii) how children and adolescents self-perceived competence becomes more differentiated as they grow older (Harter, 1999; Pintrich and Schunk, 1996). In the context of school-based interventions such as the *Laptops Initiative*, students' motivation to read and their reading specific perceptions

of self-competence might be difficult to change given participating students' long-standing difficulties in both learning to read and reading to learn.

However, Guthrie and Wigfield (2000) outline what they call an 'engagement model of reading' consisting of a set of teaching or instructional processes that, contingent on their successful enactment, positively influence both students' degree of engagement in reading and their self-perceived competence. Synthesising a variety of studies on the nature of engaged reading, they identify the following key teaching/instructional processes: evaluation, teacher involvement, learning and knowledge goals, real-world interactions, autonomy and support for the learner, interesting text, strategy instruction, collaboration, and rewards and praise. They emphasise the importance of coherence between these teaching/instructional processes in improving the motivation of readers. For example, "when real-world interactions are closely aligned with interesting texts, coherence is increased" (p. 416).

2.3 The role of ICTs for students with difficulties in reading and writing

Appraising the role of ICTs (including laptops) in supporting literacy learning for students with dyslexia or other reading and writing difficulties encompasses three questions: what is the role of computers in supporting literacy learning, what is the role of discrete educational software in supporting literacy learning, and what is the value added for literacy learning when mobile learning technologies are available for students?

What is the role of computers in supporting literacy learning?

Expressed in such general terms, it is difficult to offer a clear answer as to the impact of computers on literacy learning. Computers unlike, for example, other tools such as a hammer or screwdriver or school tools such as pen and pencil, have vastly

more degrees of freedom in terms of their possible uses in supporting literacy learning. A more powerful and potentially informative question to ask is: what is the role of discrete educational software in literacy learning? However, given the degrees of freedom inherent to computers in general, there are a number of general observations that pertain to computers as tools. Kumar and Wilson (1997/2000) provide a framework for considering how computers might support the development of literacy for students with learning difficulties. Summarising research on the potential roles of computers for students with disabilities, they note that computers can:

- Individualise the mode of delivery
- Act as expert tutors
- Anchor instruction in authentic learning activities in order to provide a real world context for students' learning
- Integrate given (e.g. science) subject/content area with others
- Reduce cognitive load on working memory
- Motivate students to stay on task (2000, pp. 200-204).

Kamil, Intrator, and Kim (2000) note the numerous potential benefits of existing ICTs for students with special needs and also note that, in the future, new ICT-supported modes of representation are likely to lead to further advances in instruction for students with literacy difficulties. They also note that various technologies have been well documented, over the last three decades, as having motivation enhancing benefits for mainstream and special needs literacy students.

In addition to the list of functions identified by Kumar and Wilson (1997/2000) as well as Kamil et al (2000), it is important to add the potential role computers can play in fostering meta-cognitive skills. Meta-cognitive skills have

become increasingly recognised as important in fostering both writing composition and reading comprehension (Palinscar and Brown, 1984). Essentially meta-cognition involves thinking about thinking and provides students with greater awareness and skill in the strategic deployment of their attention while reading and writing. The *Report of the Task Force on Dyslexia* (2001, p. 87) identified self-regulated learning and study skills, for which the development of meta-cognition is essential, as important foci of intervention at post-primary level.

What is the role of discrete educational software in supporting literacy learning?

> *Discrete educational software programmes are among the most widely available applications of educational technology in schools today. This category of educational technology includes not only integrated learning systems, computer assisted instruction (CAI), and computer-based instruction (CBI) that teachers have used for more than twenty years in classrooms, but also a host of new software programmes designed to teach students core subjects such as reading and mathematics* (Murphy, Penuel, Means, Korbak, Whaley, and Allen, 2002, p. 1).

In the context of literacy teaching there has been a long tradition of using skill development software to provide learning support for students with literacy difficulties. For example, widely used software in participating *Laptops Initiative* schools, such as *Wordshark*, *Units of Sound*, and *Starspell*, fall within the category of skill development software. On the other hand, other software being used by teachers, such as '*Start-to-Finish Books'*, *Issues in English*, and *Wellington Square*, provide a type of learning opportunity more akin to 'anchored instruction' than the focused and targeted skill development software. 'Anchored instruction' here implies an emphasis on engaging students in authentic reading and writing with extended text as the basis for intervention. A third strand of software, relevant to the initiative, can also be identified and is typified by *Kidspiration* (a version of *Inspiration* produced for

children). *Inspiration/Kidspiration* is content free software directed at enhancing students' skills in organising their ideas. As such, it can provide support in developing students' meta-cognitive skills in relation to writing in particular. *Clicker 4* (writing composition software), used in some participating schools, is also consistent with a more meta-cognitively focused software like *Kidspiration*.

Clearly appraising the role and impact of different types of discrete educational software is a complex issue. Research on, for example, skill oriented software based on mastery learning assumptions, rooted in behavioural psychology, has found a "positive association between software use and student achievement" (Murphy, et al, 2002, p. 1). However, Murphy et al (2002) argue, in their major review of educational software, that the impact of more recent multimedia software demands new types of research and evaluation. Grounded in the observation of the potentially different effects of new multimedia technologies on learning, Murphy et al (2002) undertook a major review of such software and arrived at the following three major conclusions:

- The poor overall quality of the current state of effectiveness research is severely restricting the field's ability to learn from the experiences of others and limiting the ability to develop a knowledge base that will inform the work of decision makers, practitioners and designers (p. 2)
- A positive association exists between discrete educational software and achievement in Maths and Reading based on a meta-analytic review of studies that met strict design features including adequate comparison groups and sufficient data reporting to calculate an effect size. The authors warn that "the ability to generalize from these results is limited (p. 2)

- The failure of studies (particularly evaluations undertaken by vendors) to "report effect size and implementation is a major barrier to developing new knowledge in the field" (p. 3).

There are some important caveats to be drawn from Murphy et al.'s (2002) exhaustive review. First, 'let the buyer beware' (*caveat emptor*) in believing the claims made by enthusiastic vendors about 'research-based' findings on the learning effects of literacy software. Second, the conditions of software use, be it 'skill' or 'anchored instruction' focused software, are likely to play a critical role on literacy learning. In this vein, a recognition by teachers that learning is as much a social accomplishment as it is a solo activity, the latter tending to dominate instruction for weaker learners, is likely to lead to very different use of the same software by different teachers (Conway, 2002).

ICTs, literacy and inclusion

A key assumption underpinning the *Laptops Initiative* is that laptops will provide a powerful means in providing learning opportunities for students in mainstream classroom settings. This goal of providing support for students in mainstream settings reflects an important international educational policy trend in terms of educational provision for students with special educational needs (SEN). As the Salamanca Statement noted:

> *Regular schools with this inclusive orientation are the most effective means of combating discriminatory attitude, creating welcoming communities, building an inclusive society, and achieving education for all; moreover, they provide an effective education to the majority of children and improve the efficiency and ultimately the cost-effectiveness of the entire education system* (UNESCO, 1994, p. ix).

Over the last decade around the globe there has been a "growing impetus" towards "full inclusion" (Evans and Lunt, 2002). The Salamanca Statement (UNESCO, 1994) and the emergence of a civil rights perspective on policy

development in special educational needs and disability have fuelled this trend in SEN/disability policy. In the Irish context, recent debates over the *Disability Bill* and the pressure exerted by SEN/disability advocacy groups has been largely inspired by a civil rights perspective (Quinn, 2003). The emphasis on the goal of inclusion in the *Laptops Initiative* rational reflects this "growing impetus" toward inclusion. Whether inclusion means "full inclusion" or "responsible inclusion" is an issue that is being debated vigorously in social and educational policy in many countries (e.g. Evans and Lunt, 2002; Vaughn and Schumm, 1995). In the Irish context, the *Education Act* (1998) and greater awareness of the needs and rights of learners of all types has created an educational context in which schools are increasingly expected to address special educational needs in an inclusive fashion. Projects such as the *Laptops Initiative* can provide some insights, grounded in school and classroom culture and organisational patterns and traditions, about the challenges of promoting inclusion for students with reading difficulties in post-primary schools.

2.4 ICT policy in Irish education

It is important to address the ICT policy context within which the *Laptops Initiative* has been undertaken. Like many developed countries, Ireland is now in its third wave of ICT policy and planning (Conway and Zhao, 2003b). In the case of Irish ICT policy in education, three phases in policy development over the last decade can be identified as follows:

- The initial policy formulation phase encompassing various reports during the early and mid 1990s culminating in *Schools IT 2000* (1997-2000);
- Evaluation of the impact of *Schools IT 2000*, undertaken by the National Policy Advisory and Development Committee (NPADC, 2001) and publication of *Blueprint for the Future of ICT in Irish Education: Three Year*

Strategic Action Plan 2001 to 2003 (DES, 2001).

- The expectation of a third policy document guiding ICT integration in education.

The initiation of the *Laptops Initiative*, thus, can be seen as having been undertaken midway through the first phase identified above. In this regard, like the NCTE-managed, *Schools IT 2000* programme of innovative pilot projects in schools which were known as Schools Integration Projects (SIPs), the *Laptops Initiative* represents an ambitious and creative attempt to integrate information and communication technologies into the everyday school curriculum.

Schools IT 2000

During the mid-1990s numerous policy documents in Ireland (NITEC/DCU, 1992; IBEC, 1996; Forbairt, 1996; INTO, 1996; Information Society Ireland, 1997) and elsewhere (European Commission, 1994 and 1995; U.S. Department of Education, 1996) did a very good job convincing us that ICTs ought to be integrated into schools (Conway, 2000; Zhao and Conway, 2001). The central message of these policy documents was quite clear. They claimed that technology has done great things for education and the new Information and Communication Technologies will become even more powerful, but lamented the fact that schools and students were not using new technologies to improve learning because they neither have computers nor were adequately prepared to use the various technologies (Conway, 2000). Like ICT policy documents elsewhere (Zhao and Conway, 2001), *Schools IT 2000* is a significant artifact in understanding what was and is driving the impetus to put ICTs into Irish schools, since it provides a concentration of ideas underpinning the massive investment of resources.

Schools IT 2000 was published in November 1997 by the Department of Education (DES, 1997). The 39-page document detailed a three-pronged approach to ICT integration in the form of interlinked initiatives: the Technology Integration Initiative (TII), the Teaching Skills Initiative (TSI), and the Schools Support Initiative (SSI, of which the aforementioned SIP was a part). The interdependent nature of these initiatives is stressed throughout the document in the hope that *Schools IT 2000* would be undertaken as a national partnership involving education, business, and other partners in the educational process facilitated by the National Centre for Technology in Education (NCTE). The opening salvo in *Schools IT 2000* makes clear the primary rationale underpinning the policy document: "Ireland lags significantly behind its European partners in the integration of information and communication technologies into first and second level education. The need to integrate technology into teaching and learning right across the curriculum is a major national challenge that must be met in the interests of Ireland's future economic wellbeing". (*Schools IT 2000*, Summary, 1.0)

Schools IT 2000 offered five reasons for integrating ICTs into schools. These were identified as social, economic, vocational, pedagogic, and catalytic. In the context of the *Laptops Initiative*, *Schools IT 2000* can be viewed as providing a rationale for the integration of ICT in classrooms in order to benefit all students regardless of their geographic location, age, educational status, or intellectual capacity. However, *Schools IT 2000* did not specify particular curricular benefits and desirable learning outcomes for students with either dyslexia or other reading and writing difficulties. Nevertheless, the *Laptops Initiative* can be seen as continuous with *Schools IT 2000* in the sense that *Schools IT 2000* advanced the notion that ICTs could help bridge the divides in Irish education and society.

The Impact of *Schools IT 2000*: NPADC report and recommendations to the Minister for Education and Science

Schools IT 2000 is the key policy and practice context within which to understand and appraise the impact of the *Laptops Initiative*. In November 1998 the Minister for Education and Science launched a National Policy Advisory and Development Committee (NPADC) in order to provide a vision and strategy in the development of a national ICT policy for schools. The NPADC terms of reference were as follows:

- To advise the Minister for Education and Science on ICT development and needs in Irish education
- To investigate future policy direction in the light of *Schools IT 2000* and to make recommendations on how best to use advances in technology for the benefit of Irish education
- To liaise, *inter alia*, with the Department of Education and Science, the DES's ICT coordination unit, the Board of Management of the NCTE and the industry advisory group in the formulation of ICT policy advice for the Minister for Education and Science.

In 1999, the NPADC made a decision to carry out a national representative survey on the impact of some aspects of the *Schools IT 2000* on both primary and post-primary education. In many respects, the NPADC report presents a positive picture of ICT developments since the initiation of the *Schools IT 2000* agenda in 1997. The NPADC chairperson summarised the most significant positive developments as follows:

- The survey findings show that there has been a significant increase in the

number of multimedia computers in schools

- That all schools and the majority of students have access to the Internet
- The use of ICT and software by teachers and principals has increased dramatically
- The number of teacher training places initially proposed has been surpassed
- That many ICT support mechanisms have been established
- The public/private partnerships have worked for the benefit of schools. (NPADC, 2000, p. iii)

In addition to these general findings, a number of other issues and concerns, important in understanding the school ICT context within which the *Laptops Initiative* was initiated, are noteworthy. These issues can be addressed under the various headings identified in the NPADC report: infrastructure, use of ICT and software, ICT training, support mechanisms, School Integration Project, ScoilNet, factors that discourage the use of ICT, recommendations to the Minister for Education and Science, Boards of Management, education centres, and conclusions.

Infrastructure

The report noted that Ireland is on a par with EU countries both in terms of increasing the number of computers in our schools and in significantly increasing access to the Internet for teachers and pupils. Post-primary schools have an average of 44 computers per school and the majority of schools have a combination of network and stand-alone computers. At post-primary level, the pupil to computer ratio was 10 to 1. This latter figure represents an improvement from the 60 to 1 ratio identified in the 1998 DES/Telecom Eireann survey. Ninety-eight percent of schools were connected to the Internet and 97% of post-primary pupils had access to the Internet.

Use of ICT and software

Perhaps the most interesting and provocative finding, in the context of the *Laptops*

Initiative, was: "The use of ICT for all teachers and pupils has increased dramatically as a result of *Schools IT 2000*" (p. 2). The report notes that, prior to 1997, only 45% of post-primary teachers used ICT but by 1999/2000 this increased to 71%. However, the report also notes that a significant number (24%) of post-primary teachers indicated that they had not increased their use of computers since 1997. Both teachers and principals consistently noted that students exhibited "greater motivation, increase in learning and development of ICT skills" (p. 2). With regard to curriculum content software use, post-primary teachers used such software less frequently than their primary school colleagues.

ICT training

Given the importance of teachers' continuing professional development for the enhancement of teachers' ICT skills, the report noted that 59% of post-primary teachers had attended ICT training since the launch of *Schools IT 2000* in 1997. On the subject of the likelihood of teachers attending ICT training courses, the report noted that teachers who had undergone ICT training prior to the *Schools IT 2000* initiative were consistently more likely to have attended *Schools IT 2000*-driven ICT training. Teachers' satisfaction with all aspects of the ICT courses was high with over three-quarters saying they were satisfied. The majority of teachers agreed that the school, that is their own school and its staff, was the most effective site for the delivery of training. Teachers reported that improvements in their skills were focused on word processing, accessing the Internet, e-mail and basic keyboard skills. A finding of particular importance in the context of the *Laptops Initiative*, is that a "much higher proportion of teachers of engineering and other technology subjects described ICT as in the range between very useful and vital, compared to those teaching science, arts or humanities" (p. 4).

Support mechanisms

There were differences in the nature of the support mechanisms deemed essential by principals and teachers in the advancement of ICTs within schools. Principals put more emphasis on planning and collaboration with colleagues in addition to skill-based training, whereas teachers focused on the need for curriculum/subject based guidelines in addition to skill-based training.

Schools Integration Project

The report noted SIPs were undertaken in 400 primary and post-primary schools - that is -10% of the schools in the country.

Factors that discourage the use of ICT

A finding of particular importance, in understanding the systemic issues which need to be addressed in order to ensure a more comprehensive integration of ICTs in schools, is that both primary and post-primary teachers identify the same constraints on ICT integration. Post-primary teachers noted the lack of time, of equipment and of training.

Recommendations to the Minister for Education and Science

The report notes that recommendations to the Minister for Education and Science from teachers and principals are clear and unambiguous. Teachers and principals alike demanded more training, more funds, and more equipment. At the level of beliefs, the report noted that all involved in schools, that is, the principals and teachers appear to have "increased the ethos of *Schools IT 2000*" (p. 5). As such, teachers and principals were enthusiastic, appear to believe in the potential of the *Schools IT 2000* agenda, and made key recommendations about the necessary resources and support for more comprehensive integration of ICTs in Irish schools.

Education Centres

Directors of the education centres around the country reported that a lack of time, a lack of planning, and a lack of resources were barriers in the provision of ICT training to a greater number of teachers. The majority of directors said that they did not have

any opportunity to influence the design and content of ICT courses. With regard to infrastructure, over half of the directors were not happy with computer infrastructure available in their Education Centre. Over two-thirds of the education centres had an ICT advisor at the time of the survey.

Conclusions and discussion of NPADC report vis-à-vis the *Laptops Initiative*

A number of key findings in the end NPADC report are worth highlighting. First, the report notes that principals viewed ICTs as more important for use as an administrative tool than teachers do as a teaching tool (p. 7). At post-primary level, there were clear differences observed in terms of the attitude of teachers towards ICTs based on their subject matter specialities. Teachers of engineering and technology were much more likely to see the potential of ICTs than teachers of Arts and Humanities. In the context of the *Laptops Initiative*, this finding is important as most of the school level organising teachers involved in the initiative have a background in the Arts and Humanities (Source: March Focus Group, 2003). On the other hand, the *Laptops Initiative* can be seen as a project within which to examine the integration of ICT software into classes taught by Arts and Humanities teachers, and more broadly into the cultures of teaching of those involved in the Arts and Humanities. In the context of the importance put on professional learning for teachers in the NPADC report as a relevant CPD context for teachers and principals involved in the *Laptops Initiative*, the scope and efficacy of current CPD opportunities for teachers in Irish post-primary schools will be addressed.

2.5 Continuing Professional Development and the *Laptops Initiative*

Of particular relevance in framing the CPD context to the *Laptops Initiative* evaluation is a report on CPD undertaken by Sugrue, Devine, Morgan, and Raftery

(2001). Sugrue, Devine, Morgan, and Raftery (2001) were commissioned by the research and development committee of the Department of Education and Science to undertake an evaluation of current CPD for teachers at primary and post-primary levels in Ireland (for a summary see Sugrue, 2002). The study was situated within the context of the international literature on teacher learning/CPD, and in particular framed CPD from the perspective of knowledge needed to undertake the practice of teaching. The research commenced in January 2000 and the report was completed in June 2001. The purpose, according to the authors of the report, was to "provide a comprehensive overview as possible of current policy and practice with a view to identifying key factors for review and improvement of CPD provision" (p. 2).

The authors of the report note that, in a time of rapid social, economic and cultural change, pressure for reform and change in the education system has increased significantly both in Ireland and internationally:

> *…as policy-makers and education needs seek to realign educational and economic goals more precisely in the interests of global competitiveness, the need for a vibrant highly educated, sophisticated, flexible and adaptable teaching force has become a key concern of national governments* (p. 2).

The first chapter of the report encompasses a systematic review of international literature on the different conceptions of teachers' CPD. The authors note that:

> *…a comprehensive approach to policy formulation needs to know and understand how different ways of seeing professional learning have important consequences for the kinds of opportunities and supports that teachers are afforded and that these have significant consequences for capacity building within the system* (p. 2).

The empirical dimension of the evaluation involved a survey of 800 teachers randomly sampled and in-depth interviews with a purposive sample of 30 primary teachers. The authors also drew upon a third data set, namely the evaluations of summer courses for teachers by the primary inspectorate from 1996 to 1999. As the authors note:

> *…a comprehensive picture of current provision is constructed. This picture indicates that there are many features of current provision that are rated very positively by practitioners, but policy appears to lag behind provision. While implementation of teacher learning opportunities has become more systematic and accessible, much of this continues to be ad hoc. Consequently, from a strategic policy perspective, it is not entirely obvious how current provision is intended to increase professional expertise in a more sustainable and systematic manner within the system* (pp. 3-4).

In addition, numerous issues emerged and they can be summarized under 14 different headings. Of these 14 main findings, we highlight eight of which are particularly pertinent to CPD demands of the *Laptops Initiative*.

- The authors noted that there was an emerging sense that teachers can and do take primary responsibility for their professional development.
- Of particular relevance to the *Laptops Initiative* was the finding that distance should not be an impediment to continuing professional development.
- Building upon some of the findings on the positive response to professional development in the area of the teaching of art, the authors argue that CPD should foster a sense of accomplishment rather than inadequacy and involve sharing of practice, cogniscent of the "legendry autonomy" of the Irish teacher as noted in the OECD report of 1991.
- One of the teachers noted, a sentiment echoed by many, that in the context of professional development that they would prefer "getting stuck in rather than being lectured at".
- A predictable sense of discontinuity was evident in provision of CPD. The authors characterise this as a "stop go" approach to in-service provision.
- Despite the reliance upon summer courses for the provision of CPD, the authors note that the same summer courses are poorly positioned to provide quality CPD. Among the reasons cited are the following: teachers are tired (most courses take place in the week after summer holidays commence),

experimentation is ruled out, and there's little or no opportunity for continuing feedback and support intimately connected to teachers' own past and on-going practice.

- The need for an appreciation of and opportunities for professional exchange by visiting other teachers' classrooms and developing teacher networks was emphasized by the teachers surveyed and interviewed by Sugrue et al. This finding is in keeping with a claim by Huberman (1989) that "sustained interactivity" is an essential feature of quality professional development for teachers.
- The final observation of relevance to the *Laptops Initiative,* was that CPD courses for teachers needed to go beyond subject area teaching and include, for example, psychology. In the context of the *Laptops Initiative,* one might interpret the call to address foundational matters in the context of subject matter teaching as an invitation to interrogate the assumptions underpinning various principles, strategies, and activities advocated in subject matter-focused teacher professional development courses. In the case of the *Laptops Initiative,* this might involve addressing the nature of learning for students with learning difficulties, the assumptions and impact of various approaches in provision for students with SEN, and the manner in which different software may or may not facilitate different types of learning for students with dyslexia and other reading and writing difficulties.

The issues identified above portray a professional development landscape in need of considerable reframing, restructuring and re-culturing. A number of the issues and concerns identified in the report by Sugrue, Morgan, Devine and Raftery (2001; see also Sugrue, 2002) are pertinent in understanding the professional development

context within which the *Laptops Initiative* is being implemented. For example, a number of teachers involved in the initiative noted that the proliferation of programs and syllabi over the last number of years have pushed considerable pressure on both the system and school to change (Focus Group Field notes, March, 2003). Sugrue et al (2001) note, in the final paragraph of their report, that:

> *The pace of change and the relentless demands for new programs and pedagogies necessitate fundamental review as the enterprise needs to be scaled up and institutionalized in a variety of ways to make it more strategic and comprehensive while continuing to be sensitive to system and individual needs* (p.127).

The pace of educational change has created a CPD challenge in terms of techologising post-primary literacy education (i.e. including both learning to read and reading to learn) involving the complex interplay of context, teaching methods, design of learning environments, educational materials (including new educational software), and the approaches to assessment and intervention for students with learning difficulties in reading and writing. Of these factors, the relationship between educational software and learning is worthy of discussion given the role it was accorded by teachers, the CPD input on software use during 2002-03, and the appeal of various software programs to students involved in the initiative.

2.6 Evaluating the impact of educational software on learning

Learning from discrete educational software

Research on the influence of the media on learning has been a consistent feature of educational research for almost one hundred years. Thorndike (1912), for example, recommended pictures as a labour saving device in classroom teaching (Clark 1983). As Clark (1983), noted "most of this research is buttressed by a hope that learning will be enhanced with the proper mix of medium, student, subject matter content, and learning task" (p. 445). However, the so called 'proper mix' can not be understood

without taking context into account, as Clark notes. For example, citing the introduction of television in El Salvador, he claims that it was "not the medium that caused change rather the curriculum reform that accompanied the change" (p. 445). Furthermore, in appraising the quality of research examining the impact of computers on learning, Clark notes two research traditions: box score studies and meta-analysis.

Box scores studies were widely used to summarise, in a cumulative fashion, significant findings primarily based on comparisons between different types of media and their impact on different groups of students. Based on this crude box score comparison, he claims that some of the findings that examined the impact of various media versus conventional classroom delivery are often misleading. However, in the 1970s, as a result of the new statistical technology of meta-analysis, a more sophisticated analysis of the impact of computers on classrooms and teaching was possible (Glass, 1976). Clark's observations are particularly important in raising questions about the methodological rigour, validity, reliability and generalisability (external validity), of some widely cited studies on the impact of computers on classroom practice and student learning. Furthermore, in terms of the impact of computers on student learning, a recent comprehensive meta-analytic review of the impact of 'discrete educational software' by Murphy, Penuel et al. (2002), like Clark's (1983), also highlights the lack of rigour in most studies examining the impact of educational software on student achievement and learning.

The somewhat contradictory findings and relatively weak to moderate impact of educational software on classroom learning seems disappointing to strong advocates of ICTs. As Lankshear and Bigum (1999) note:

> *The latest adventure in technologising education, like those that preceded it, proceeds with a blindness to the experiences of earlier efforts. This blindness can otherwise be seen as a kind of self-imposed amnesia, required for adopting each new round of technological fixes presented by the vendors. In*

> *part, this is, because if we drew on previous experiences we would not adopt and purchase. In part, it is the continuing dream of new pedagogical hope arriving with the next round of technological innovation* (p. 446)

Software and classroom contexts

The moderate impact of educational software is in part explained by the role that context plays in reshaping educational software. In an insightful study on this issue of context redefining ICTs and software, Michaels (1990) questioned the causal logic underpinning the introduction of computers into schools by examining the use of microcomputers for writing in 6th grade classrooms. The initial research question was, 'what impact will computers used for writing have on life in classroom, teacher-student interaction, and student literacy?'

> *Education researchers, teachers, and software developers alike are aware of the pressing need to assess the impact of microcomputer technology on student learning. However, in discussions about this new technology, it is generally assumed that a given computer with a particular kind of software will have a specifiable and generalized impact on classrooms, teachers, and students. That is, the computer tends to be thought of and studied as an independent variable, as a controllable and quantifiable agent of change*. (Michaels, 1990, p. 246)

Thus, Michaels convincingly argues that an unstated and unexamined assumption was that by introducing the same computer, the Apple, to each classroom, the writing software program QUAYLE, the same technology would produce similar change into both classrooms. However, this assumption proved to be incorrect. Assumptions that the new technology would be key in reshaping the learning environment in the two rooms was overturned in favour of a hypothesis that the computers themselves were shaped to fit the already established patterns of social organisation:

> *Because the two learning environments differed, the same computers with the same writing software ended up being used differently, and came to serve as different writing tools. For this reason, we have come to think of the computer as the dependent variable, and is itself affected by the classroom context, and then in turn, having an influence on it.* (p. 246)

The author argues that a one-way causation model - either the computer causes a change in the social setting or a social setting causes a change in computer use - is unsatisfactory, and opts for a theory of computers and social settings which views the relationship as mutually constitutive. However, the author titled the article 'The computer as dependent variable' (outcome) in order to bring into question the simplified model and a set of frequently unexamined causal assumptions underlying much of the research on the impact of computers in classrooms. Over the course of the ethnographic study, Michaels developed an analytic construct to understand the relationship between computers and students' written products. She called this construct the 'writing system' by which she meant:

> …*the activities, norms, the rights and obligations for speaking and acting, and uses of technology that influence and constrain students' writing in the classroom. As we use the term, the writing system is the day-to-day practice of a curriculum, shaped largely by the teacher, partly by the students and partly by outside forces that impinge on the classroom.* (p. 247)

Perhaps one of the most interesting observations Michaels makes on the outcomes of this three-year study is that computer entry, or technological innovation, came to be seen as a small component embedded within a larger social system rather than as the major and most important factor of educational change. Furthermore, Michael's notes that if we want to more fully understand the impact of computers on classrooms and curriculum we must see the computer "…as influenced by and influencing the past and context; as a dependent variable and independent variable" (p. 254). In this light, commenting on the role of teachers, Michaels concludes that:

> …*most importantly, teachers need support in becoming critics and evaluators of their own pedagogical goals, of patterns and practices in their own settings, and of the potential of technology in light of their goals and strengths as teachers* (p.254).

In summary, learning from discrete educational software is a complex undertaking. Recent research suggests that such software may have a moderate impact on student achievement. However, the manner and context in which any computer or discrete educational software is used is often the determining factor in whether software, per se, has a positive and measurable impact on student achievement.

2.7 Technology/ICT integration as an educational goal

What is the role of technology in supporting literacy learning in knowledge-based society? Pea makes a distinction between thinking with technology, and thinking about technology. He claims that “thinking with technology is far more important historically and substantively, for it is this sense that technology is an instrument of knowing, reason, culture, and humanity itself” (2000, p. xv). According to Pea, technologies as instruments of thinking, what he terms cognitive technologies, “are at the heart of the human condition” (2000, p. xv). It is in this context that Pea notes that various philosophers and psychologists have argued that humans are "distinctively symbol-making and symbol-using animals" (2000, p. xv). As Pea argues, humans through the construction of 'world-making' symbol systems such as literature, science, mathematics and the arts “create fictional and possible worlds” (p. xv). In this context, fluency and flexibility in the use of symbol-based cognitive technologies, such as reading and writing, are critical in the generation and application of knowledge in various human activities. Furthermore, new information, representation, and communication technologies create the possibility for novel forms of activity, discourse, and reflection. Consequently, the degree to which new ICTs have been integrated into the daily fabric of teaching and learning in classrooms is a logical focus of study. Furthermore, the central role accorded the integration of

technology into the daily fabric of teaching and learning begs the question as to how technology integration is conceptualised.

2.8 A technology/ICT integration framework

One of the main findings of *The Impact of Schools IT 2000* report was that there is considerable scope for greater integration of new ICTs into the day-to-day life of classroom teaching. In drawing attention to the low level of ICT integration into teaching in Irish primary and post-primary schools, the authors of the report concluded that, "teachers need more encouragement to use ICT in teaching and to recognise its value" (p. 7). Consequently, in order to be able to identify stages in ICT integration occurring as part of the *Laptops Initiative* this evaluation draws on a five-phase model of technology integration developed by Sandholtz, Ringstaff and Dwyer (1997). Their model of educational technology integration was developed based on stories of teachers talking about their experiences with new technologies in the implementation of *Apple's Classrooms of Tomorrow* (ACOT) project in the USA. One particular strength of their model is that it grew out of a study examining the complexities of teaching and learning with computers in a large-scale longitudinal study of technology integration across classrooms in urban, suburban and rural settings. Reviewing the extensive cross-site and cross-year data, they developed a five-stage model of technology integration encompassing entry, adoption, adaptation, appropriation, and invention (see Table 2).

The **entry stage** is focused on opening boxes, getting equipment in place, addressing technical concerns, mastering technology basics, and in many respects can be viewed as the preparatory stage. One of the teachers in the *Laptops Initiative* schools captured the essence of this level when he talked about the first few months of the

project as *"the scratching your head phase"* (Case Study Field Notes, May 2003).

The second stage of technology integration, **adoption**, is focused on the integration of ICTs into daily teaching. Typically, the emphasis is on keyboarding skills, software evaluation, learning to use basic applications, the use of computers for a small portion of the lesson (no more than the occasional 15-20 minute block of time), and in many respects can be viewed as an early experimental stage. Thus, while the entry stage may be seen as one of 'getting started', the adoption stage can be seen as one of initial integration moving beyond the "scratching your head phase". A distinctive feature of technology integration at the second stage is that the technology fits into rather than changes existing classroom practices.

The third stage of technology integration, **adaptation**, is characterised by a more purposeful use of ICTs and considerably greater amounts of time being spent with the new technologies in the course of lessons. There is greater regularity in the use of technology and it may be used up to 30 or 40% of the time. Given the combination of more time and clearer purpose in using technology, it is not surprising that the emergence of greater productivity is a key feature at this level of technology integration. Cuban (2001) used this five-stage model in evaluating the integration of computers into elementary and secondary schools in California. Commenting on the adaptation stage, he saw it as a stage:

> *…when most of classroom time is still spent in conventional ways of teaching the students spend about one-fourth or more of their time in using computers for home work and daily work in class"* (2001, p. 53).

The fourth stage of technology integration, **appropriation**, is characterised as much by an attitudinal watershed as by changes in the patterns of teaching and learning in

the classroom. For teachers who reach this stage of technology integration, it was because of their attitude and relationship as well as their personal use, attachments, and vision of how computers might play a role or were playing a role in their classrooms. According to Cuban, "the teacher is fully confident in the use of computers and integrates technology regularly into daily routines" (2001, p. 54).

Table 2 ICT/Technology Integration Framework (Sandholtz et al, 1997)

Stage	**Characteristics of this stage**
ENTRY	Getting hardware and software in place. Set up. Opening boxes. Figuring out how things 'work'
ADOPTION	Keyboarding/typing Integration into existing practice Evaluating software Short duration of time using ICT (15-20 min. of lesson)
ADAPTATION	More time spent (30-40% of day) and productivity a concern i.e. test results
APPROPRIATION	Change in personal attitude and new relationship with ICTs
INVENTION	ICT drives new developments in teaching

The fifth stage of technology integration, **invention**, involves a playfulness and experimentation in pushing out new boundaries in the use of software in order to collaboratively foster new patterns of teaching and learning in classrooms. Collaboration is a key or distinctive feature of this stage. Collaboration here not only refers to teacher collaboration but also to student collaboration. Cuban describes this stage as one where "teachers experiment with new ways of networking students and colleagues and use project-based instruction and interdisciplinary approaches" (2001, p. 54).

The Silicon Valley Study of technology/ICT integration

Cuban (2000), in his now prominently cited research (e.g. Haddad & Draxler, 2002, p. 145; UNESCO, 2003, p. 26) on the scope and nature of technology integration in schools, uses the above five-stage model of technology integration to assess the manner in which computers were integrated into the daily fabric of teaching and learning in early primary school, high school and university classrooms in Silicon Valley, California. In the case of early childhood, Cuban studied seven school sites. Seven of the eleven teachers in the seven sites were at the adoption stage, three were at the adaptation stage, and one was at the appropriation stage. In summarising the findings of his study, Cuban commented as follows:

> *...to fervent advocates of using technology in schools, no revolution has occurred in how the teachers organise or teach in these classrooms. Nor have there been dramatic or substantial changes in how teachers teach or in how the children learn. If anything, the addition of a computer center…means that teachers have adapted the innovation to existing ways of teaching and learning that have dominated education for decades.... if anything, teachers' limited use of computers signalled ambivalence, even their uncertainty over the proper use of technology for children.* (2001, p. 59)

Introducing his intensive study of two California high schools, Cuban criticises findings and claims about the nature of computer use in schools as follows, "what I find in the national data is far too much reliance on self-reports and far less investigation of actual use in local schools" (2001, p. 73). Drawing upon both observation and interview data with 35 teachers and 33 students in these two typical schools, he concluded that:

> *…based on what we saw and what teachers and students reported, we concluded that the integration of computers into a classroom curricula and instruction techniques was minimal. It ranged from entry-level to adoption, with fewer than five of the adaptation level. We note this is only for academic teachers in both schools - excluding those teachers designated to teach computer classes - who effortlessly and continually use technology in their classes, appropriate as it is as part of their weekly work.* (2001, p. 90)

How can we interpret Cuban's study in relation to the *Laptops Initiative*? First, as Cuban noted in the introduction to his book, if there's anywhere in the world one might expect computers to be widely and regularly used in classrooms it is in Silicon Valley, California, since there is no other setting that is so culturally and materially well-disposed to the favourable integration of computers in schools. As such, Silicon Valley can be seen as a school context in which there is abundant access to Information and Communication Technologies, and it thus provides, he claims, a powerful and compelling test case of technology integration.

Second, the fact that his study examined technology integration at primary, secondary, and tertiary levels of the education system helps us to understand the structural and cultural features, often shared across levels of educational establishments that may inhibit, or at the very least, significantly slow down the pace of technology integration. Cuban's position on the actual integration of technologies into classrooms and the future likelihood of technology integration can be conveyed by attention to a number of cleverly titled sections and chapters in his book: 'high-tech. schools, low-tech. learning'; 'maximal access, minimal change'; and, 'new technologies in old universities'.

Third, in a wide-ranging and provocative fifth chapter discussing these somewhat expected outcomes, Cuban evaluates the potency of two different theories that might explain the unexpectedly low levels of technology integration found in his research across three levels of California's education system. The first he identifies as the **slow revolution** explanation, and the second has the **history-and-contexts** explanation. This slow revolution argument explains the lower levels of technology integration in terms of evolution rather than the revolution. Critical of the overblown revolutionary rhetoric of some technology advocates, the slow revolution advocates

see technology integration occurring incrementally over years and decades rather than over weeks and months or even a full school year. From this slow revolution perspective, he notes that it has taken 100 years for plane flight to transform the way in which human beings travel around the world.

The **history-and-contexts** explanation, "emphasises the societal role that schools perform in a democracy, the structures and work educators perform, and the symbolic and actual nature of the technological innovation" (2001. p. 156). In relation to the perceived role of schools in society, Cuban notes that it is political suicide for politicians and school leaders not to want to adopt one of the most powerful symbols of modernity, that is, 'high-tech.' technological infrastructure. Thus, from this perspective:

> …*even with this reluctance that investments in information technologies raise test scores or promote better teaching, most school managers use the rhetoric of technological progress to establish legitimacy with their patrons and the private sector* (2001, p. 159).

In light of Cuban's somewhat sceptical view of the degree of technology integration occurring even in optimal settings, this report turns to studies of laptop use in Ireland and elsewhere. A point worth noting here is that Cuban's as well as Sandholtz's research was undertaken in the context of fixed desktop ICTs rather than mobile learning technologies such as laptops. Furthermore, even though Cuban's research has been meticulously undertaken, contextualised at the school and community levels and reported in considerable detail, nevertheless his research has had a more cross-sectional than longitudinal focus. Sandholtz et al's (1997) ACOT study, however, had a longitudinal focus and this may be particularly important in drawing attention to how technology integration may change over time in particular schools settings. Preliminary evidence from the evaluation of the *Laptops Initiative*

suggests that schools evolve considerably in their use of the laptops even in a relatively short period of time, i.e., in the early phase of project implementation during the 2002-03 school year.

2.9 Laptop initiatives: the appeal of anytime anywhere learning

> *"If we really want to integrate this technology tool into our teachers' work, then laptop computers are the answer"* (Riethmiller, in Walker, 1998, 39)
>
> *"An experiment that allows students to tote their own terminals yields better attitudes and academic gains"* (Stevenson, 1999, p. 18)

Given the hope invested in laptops as a vehicle to foster ICT/technology integration, improved academic engagement and increased academic attainment, it is no surprise that, as Schaumberg notes, "the use of mobile computers has spread worldwide" (2001, p. 1) with numerous laptop initiatives undertaken over the last decade in various education systems. Research and evaluation on the impact of laptop projects has been considerable. The largest scale research and evaluation project was the evaluation of Microsoft's '*Anytime, Anywhere*' learning initiative (Rockman, 1997; 1998; 1999). Other laptop-focused research projects include those undertaken by Fouts and Stuen (1997), Hill and Reeves (1999), Schaumburg (2001), and Stevenson (1999).

The initial appeal in all the initiatives seems to be the potential of laptops to meet the ambitious goal of providing ***personalised anytime anywhere access to ICTs*** for regular and/or special educational students (Clute, 2000; Greaves, 2000; Rockman, 1997; 1998; 1999). One observation that has fuelled the appeal of laptops is that, despite the fact that computer to student ratio may be low in many schools, computers are often located in relatively inaccessible computer labs which inhibit

students' personal daily access and use across curricular areas. Consequently, laptops and other portable ICTs have been heralded as one solution to overcoming the obstacles to access and use that appear to plague even schools with a low computer-to-student ratio.

The most widely publicised laptop research was undertaken in the context of the Microsoft sponsored '*Anytime, Anywhere Learning Programme*' laptop initiative (See Microsoft press release, September 2000 for summary of results URL: http://www.microsoft.com/presspass/press/2000/sept00/LaptopPR.asp). An independent research organisation, Rockman Associates, undertook an evaluation of the laptop project publishing three reports over three years tracing the evolution of the project in US schools across the many different districts nationwide. The programme began initially with 52 schools but involved over 800 schools by year three. The Rockman findings are particularly important in that they were: based upon a developmental series of evaluations over three years, involved an increasingly large number of schools, incorporated matched laptop and non-laptop users comparison groups, and assessed outcomes at cognitive, social-emotional and productivity levels. Among the main findings from the project reports were that:

- Access to technology improves students' writing and encourages collaboration among students.
- Students who use laptops are more involved in their schoolwork.
- Teachers who use laptops used a more constructivist approach to teaching. That is, laptop use fostered more constructivist-compatible teaching methods among teachers.
- Teachers who use laptops felt more empowered in their classrooms.

- Project planning at a school level was important in laptop integration and the ultimate advancement of student learning in the context of the initiative.
- Internet connectivity enhanced student learning while using laptops (also see Owsten, 1997).
- Laptop use enhanced general ICT skills.

A case study of one of the schools (Mott Hall, New York City, Community District 6),– which was a one hundred per cent laptop school encompassing home and school use - reported the following positive outcomes:

- Significant improvements in student achievement and motivation, specifically increased test scores (a 10-point improvement in reading and math and a five-point improvement for English as a Second Language) for students using laptops.
- Higher attendance rate.

Complete findings from the three Rockman reports are available at http://www.microsoft.com/education/aal/research.asp

In addition to the various student outcomes, the 1998 Rockman *Anytime Anywhere* evaluation report identified typical laptop management models each with advantages and disadvantages. The models were as follows:

- **Concentrated** - each student has his or her own laptop for use at home or in school
- **Class set** - a school-purchased classroom set is shared among teachers
- **Dispersed** - in any given classroom, there are students with and without laptops
- **Desktop** - each classroom is permanently assigned a few laptops for students to share

- **Mixed** - some combination of the above models.

A number of laptop projects on a much smaller scale have taken place in Ireland and elsewhere. For example, a number of laptop initiatives have taken place on the island of Ireland over the last five years. In the Irish context, a project that commenced in December 1998, in Shannon (St. Patrick's Comprehensive School), Co. Clare, represented an initial exploration of the potential of mobile technologies. The project involved the use of lightweight portable wordprocessors called Dreamwriters, which were developed by a local company (Irish Times, 1 December, 1998). The school was allocated 30 Dreamwriters and a special trolley called Rol-A-Lab to facilitate transporting the Dreamwriters around the school. At night the word processors are recharged on the trolley, so that during the school day they can be used without any wires or connections. The principal reported that students mainly used the Dreamwriters for project work (*Irish Times*, December, 1, 1998).

In Northern Ireland, then Minister for Education, Martin McGuinness, announced that 6,000 laptops, with 5,200 more to follow, were to be made available to ensure that one in two teachers had a laptop (*Irish Times*, March, 29, 2001).

The US-based *Chelsea Laptop Initiative for Students with Learning Disabilities* (1991-1994) involved three phases. In phase one, 7 students aged 10-11 years, in a self-contained class participated (December 1991). In phase two, an additional group of 9-10 year olds were added in September 1992. In phase three, 14 students aged 15 years and some students entering middle school were included. The project commenced in December 1991 when 8 Toshiba laptops were purchased at US$400 per laptop. Teacher professional development involved an initial orientation to software programmes and computers, and some collaboration between teachers in relation to software and teaching methods. In addition to the teacher orientation,

students were trained in word processing and parents were offered workshops to support home use of laptops. Outcomes from this project varied at each phase. The first phase was generally successful in terms of considerable development in students' reading and writing skills. Consequently, the initiative progressed to a second phase. Like the previous phases, a greater proficiency in reading and writing skills was noted in phase three. In addition, it was reported that students had an ameliorated perception of self as a learner and there was an increase in students' satisfaction with school. Thus, overall, the outcomes of the Chelsea Laptop Initiative were positive. A point also worth noting was that, once initiated, the laptop initiative model became self-propelled. In addition, the project included a student mentoring programme, where those students who had gained a proficiency with laptop computers 'served as facilitators' for others newcomers to the laptops. The authors of a brief report on the project noted that:

> *Reading fluency improved and students who had previously laboured to write two sentences, produced anywhere from half to an entire page with the same amount of time, writing longer sentences, using more mature vocabulary and sentence structure. They quickly learned to use the spell check, dictionary and thesaurus. Written products reveal greater length, clarity and organization.* (p.11)

The UK-based *Cornwallis School Laptop Pilot* (1998-2000) was undertaken in two phases. During year one (1998-99), two mixed-ability year 7 groups, an Advanced GNVQ Information Technology Year 12 group students, and students with SEN were involved. During year two (1999-2000), two mixed-ability year 8 groups, a year 12 and year 13 Advanced GNVQ IT group of students and, similar to the first year of the project, students with SEN were involved. In addition, during this second year, 'mobile clusters' were located in Maths and English classes. A number of issues arose in relation to project management under three headings: laptop

management, problem management and file management. In relation to laptop management, the use of infra-red technology to transfer files from one laptop to another emerged as important. With regard to problem management, two technicians were involved - one mainly assigned to deal with laptop problems. Furthermore, it became essential to set aside spare laptops to substitute for laptops under repair. In terms of file management, two strategies proved useful. First, files saved in the shared area of the network were transferred to laptops. Second, pupils were encouraged to leave CD/DVD drives at home to reduce weight carried. Overall, the outcomes of the Cornwallis Laptop initiative were positive. Among the strengths identified were the following:

- Improvements in students' self-esteem
- Students shared technical and manipulative ideas
- No longer an 'add on' – it has become an integral part of the learning process
- Allows for collaborative thinking and sharing of ideas
- Teachers are prepared to take 'risks'
- Improvements in attitude to learning
- Improvements in motivation

The UK Office for Standards in Education (OfSTED) inspection report on Cornwallis stated:

> …*the school has developed a national focus for the use of small portable, laptop computers. The use of these laptop computers contributes to the development of many key learning skills including literacy and numeracy* (OfSTED 2000).

Schaumberg's (2001) video study of a German laptop initiative focused on evaluating the extent to which the use of laptops changed the amount of independent and collaborative learning in a laptop programme for German high schools. The use of direct observation and video-recording of classroom teaching is a significant

strength of Schaumburg's study. Situating her study within the context of other projects which have found that teaching with laptops results in more student-centered teaching, more often than not (e.g. Fouts & Stuen, 1997; Rockman, 1998; 1999; Stevenson, 1999), Schaumburg undertook a study examining 45 lessons (24 with and 21 without laptop use) that where videotaped over the course of two and a half years. The main findings in Schaumburg's study were as follows:

- The amount of independent work undertaken by students increased significantly
- There were no differences in the amount of other forms of teaching, such as teamwork, pair work, lectures and teacher-guided discussions.

As Schaumburg notes, overall

> …*the results show that the major change in the laptop classroom is an increase in individual work. Students work more often independently, which according to many teachers, results in a higher degree of activation than in traditional lessons. In contrast to other evaluations mentioned earlier, this study could not unequivocally confirm that using laptops led to more collaborative classroom activities* (p. 1).

Summary

Laptop initiatives have been undertaken in a number of countries since the early 1990s, starting with Australia. Despite initial studies being undertaken in Australia, the most prominent study of laptop integration has been the large-scale US-based *Anytime Anywhere* evaluation. Indeed its very title has been adopted as both an advertising mantra and byword among educational professionals and among the public to indicate the potency of mobile learning technologies by very dint of them being mobile. Four such projects have been highlighted in this report: the *Anywhere Anytime Learning Programme* and the *Chelsea Schools Laptop Initiative for Students with Learning Disabilities* in the US, the UK-based *Cornwallis Laptop Project*, and

the video-study of a German laptop initiative. However, it is important to note that, the robustness of the evaluation work undertaken differed substantially across the four projects. The *Anytime Anywhere* evaluation, undertaken by Rockman Associates, was more sustained and substantive than the single school focus of the Chelsea, Cornwallis and German evaluations. The German evaluation (Schaumburg 2001) is noteworthy in that it was a video-study and went beyond the typical teacher and student self-reports common in most studies of ICT integration (Cuban, 2001). Cognisant of both the differing contexts and degree of robustness of these four laptop project evaluations, the outcomes have generally been positive, with all projects reporting an improvement in students' work, even if the specific student improvements were different across projects. Typically, students' reading and writing improved as well as their general productivity. In addition, teacher reports suggest that students' self esteem and attitude to school improved. In some instances, students' attendance rates also improved. There is some evidence that student measured achievement improved although this merits further research (e.g. the aforementioned Mott Hall School in the *Anytime Anywhere* evaluation). In the context of the NCTE *Laptops Initiative*, the results of these three laptop initiatives provide some support for the scope and aims laid out in the NCTE's communication with schools about the potential of laptops to meet the learning needs of post-primary students with special educational needs in literacy. Finally, the results of the Rockman year one evaluation (Rockman, et al, 1997), attentive to differences in context and funding, provides a useful benchmark with which to assess developments in the *Laptops Initiative*.

There have been no published evaluations or available studies of laptop projects in Irish schools to date (other than reports on one of the Schools Integration

Projects involving laptops - SIP053 - see www.sip.ie for details). However, this report reviews one particularly relevant study in the context of the *Laptops Initiative*, namely the evaluation of the SOLAS SIP project.

A case study of ICT integration in Irish second-level schools

A number of projects undertaken in the context of the introduction of systems technology into Irish schools, under the *Schools IT 2000* programme, can shed light on the capacity of the system to integrate laptops. Of these projects, the SOLAS SIP project provides a number of lessons in understanding the development of the *Laptops Initiative*. Supported as part of the Schools Integration Project (SIP) of *Schools IT 2000* Initiative, the SOLAS SIP project sought to introduce a variety of assistive technologies to support students with disability. And an evaluation of this project, undertaken by O'Mahony (2000), identified five components of the innovation model. The five components were as follows. First, the project made a functional difference to those in schools. Second understanding and interacting with the school context was viewed as essential. Third, teachers' knowledge, or what others have called 'personal practical knowledge', was seen as critical in the decision-making processes undertaken to integrate the systems technologies. Fourth, the evaluation identified the need to enact policy frameworks and policy implementation strategies to follow on the policy principles set out in *Schools IT 2000*. Fifth, flexible monitoring and support at a local level was deemed essential in project development. In conclusion, the SOLAS SIP evaluation identified "important learning contributed by the project to the contextual requirements, constraints and opportunities of introducing AT [Assistive Technology] into Irish mainstream educational settings" (p. 3). The evaluation noted that the findings "should be of considerable interest both to

educational policy-making in general and the *Schools IT 2000* initiative in particular" (p. 3). The SOLAS SIP findings, like Cuban's research on technology integration, draw our attention to issues of local school culture and organisation as well as the history of teaching practices in specific sites as critical in supporting or inhibiting technology integration for students with special needs. However, Cuban's work puts more emphasis on the common structural, organisational and cultural arrangements that schools share rather than the idiosyncrasies of individual local school cultures.

2.10 Students with literacy learning difficulties: policy context

Literacy as a policy priority in Irish education: 1990 to the present

Over the last decade literacy has become a policy priority at a number of levels in Irish education. This development has been precipitated by a number of studies and events that bring literacy, broadly defined, to a new level in Irish education. First, following the widely publicised results of the International Adult Literacy Survey (IALS) in the early 1990s which indicated that between 1/5 and 1/4 of adults were functionally illiterate, there has been widespread concern in both education and media circles about the need to improve the teaching of literacy at all levels in the education system. Second, despite the significant developments in Irish education during the last three decades, Learning Support Guidelines published in 2000 by the DES noted that results of national and international studies of reading achievement among Irish students at primary level have indicated "that reading standards at primary level have not improved significantly during this time (i.e. since the 1980s)" (DES, p. 7). Third, participation by Ireland in the OECD-PISA international comparative studies of literacy indicates the extent of attention to literacy as a basic skill to be achieved by all students is important in order to promote economic and social prosperity.

Fourth, the recent *Report of the Task Force on Dyslexia*, jointly undertaken by the Department of Education Science and the Department of Education Northern Ireland, drew particular attention to the educational needs of students with specific reading disability or dyslexia (Sayles, 2003). As a consequence of the Task Force Report on Dyslexia, the Department of Education and Science has undertaken to produce a video/DVD titled *Understanding dyslexia: challenges and opportunities* (Sayles, 2003). This 33 minute video/DVD is in response to one of the short term recommendations in dyslexia report: "the Department of Education and Science should ensure that information and advice are readily available…through the development of appropriate printed and electronic materials and through the distribution of such materials through schools" (Recommendation # 1, DES, 2001, p. 108).

Finally, following on from the *Special Education Review Committee* (SERC) report (1993), there has been a considerable increase in the funding of special education, some of which has been directed at improving literacy, a decrease in pupil-teacher ratio in special schools, improved provision for pupils with disabilities in mainstream schools, and an overall improvement in the degree of recognition of a range of learning disabilities including both general and specific learning difficulties in language and literacy (DES, 2001).

In the context of literacy at post-primary level, the OECD-PISA studies have brought particular attention to bear on the achievements of Irish 15 year olds in three assessment domains: reading literacy, mathematics literacy and scientific literacy. In contrast with the relatively poor results among adults, PISA results in reading literacy have indicated that Irish 15 year olds are ranked 5th among OECD countries. However, the study also indicated that about 10% of the 15 year olds performed at a

very level low-level of literacy - that is either below level one (3.1%) or at level two (7.9%) (Shiel, Cosgrove, Sofroniou, and Kelly, 2001). Despite using somewhat different definitions of literacy and the adoption of important measurement decisions which have influenced the nature of the results found in various studies, widespread media attention accorded the results of these national and international comparative studies has given literacy a high degree of visibility on the Irish educational landscape.

Literacy and educational disadvantage

Over the last thirty years in the Irish education system, the Department of Education has used "literacy problems and the percentage of students leaving school without any formal qualifications to evaluate school performance" (Boldt et al, 1998, p. 15). As such, the percentage of students with the literacy problems has come to be seen as a proxy measure of educational disadvantage. Boldt et al (1998) identify three strands in national policy in relation to addressing educational disadvantage:

- Developing partnerships and coordinating government services
- Targeting and restructuring resources and provision within the formal school system
- Addressing the problem of early school leaving and the needs of early school leavers.

Summarising the thrust of the policy initiatives, Boldt et al. (1998) noted that:

> *…these policies should be seen within wider policy concerns to increase the competitiveness of the Irish economy, in part by raising national education standards. It should be noted that there are no policy initiatives to clarify the precise meaning of education disadvantage nor to explain its prevalence* (p. 11).

Boldt et al. quoted the following from Coolahan's (1994) summary report on the National Education Convention (1994), in relation to provision of services at post-

primary level:

> *…a commitment to a wide range of interventions and additional resources, as well as substantial changes in curriculum and examinations, in an attempt to enrich and widen the range of educational opportunities for students were not well served by the current curriculum and examination system* (p. 107).

Boldt et al. drew attention to statistics on the percentage of students who leave school each year after the Junior Cycle, noting that despite the decreasing percentage of early school leavers over the last 15 years, nevertheless the fact that 15 percent - or 13,000 students - leave the system without starting Senior Cycle remains a persistent problem (p. 13). In terms of the *Laptops Initiative*, Boldt et al.'s study draws our attention to the central role of educational disadvantage in Irish educational policy over the last few decades and the manner in which literacy levels have been used as a barometer of educational success/failure. As such, the *Laptops Initiative*, can be seen as growing out of this tradition of attending to literacy as a critical component in the amelioration of educational disadvantage in post-primary schools by enriching and widening "the range of educational opportunities for students not well served by the current curriculum" (Coolahan, 1994).

2.11 Conclusion

This chapter has situated the *Laptops Initiative* in a number of wider contexts. The subsequent chapters draw upon and return to these frameworks and issues. In particular, this report draws attention to the complexity of technology/ICT integration for students with dyslexia and other reading and writing difficulties. It is important to set the ambitious goal of the *Laptops Initiative* in context, as it is simultaneously trying to address how students with dyslexia and other reading and writing difficulties can be supported in mainstream teaching (the **mainstreaming/inclusion goal**) AND explore how schools can integrate ICTs into the daily fabric of teaching and learning

(the **technology integration goal**). As such, the *Laptops Initiative* can contribute to the growing knowledge base on the inclusive uses of ICTs for students with literacy difficulties.

Chapter III Findings

3.0 Introduction

This chapter presents the evaluation findings on the early stages of the *Laptops Initiative* in three sections. Section one provides an overview of the *Laptops Initiative* drawing upon and combining the March 2003 survey completed by 24 of the 31 teachers designated as school level organisers (Teacher Survey March 2003 = TSM03); selected data from School Reports (SRJ03) completed by the school level organisers in each school in June 2003 (18 responses); and the September School Survey 2003 (SSS03) completed by 26 school principals and/or school project organisers documenting the initiative's progress as of the end of September 2003. The September 2003 School Survey data can provide baseline data for future reporting on the project during 2003-05. The second section provides a more in-depth portrayal of the *Laptops Initiative* based on case studies of four selected schools with a particular focus on the nature and scope of technology integration as outlined in Chapter Two. The four case study schools were selected based on discussions with the project coordinator (Interview # 1 with project coordinator, February 2003), analysis of the Teacher Survey (March 2003), and conversations with the same teachers during focus group meetings (Teacher Focus Group Meetings, March 2003). In addition each school case study includes an overview of the school's use of various software packages in planning for the needs of students with dyslexia and other reading and writing difficulties. The case study schools are not identified in this report; pseudonyms are used in place of actual school names. The third section summarises the student cases and includes vignettes to illustrate students' engagement with and views of the project. Again, pseudonyms are used in place of students' real names.

3.1 Overall development of the project across schools

To support the integrated evaluation of the *Laptops Initiative*, this section of the report provides an overview of the participating schools. This overview is also meant to orient the reader to how the four case study schools fit into the wider set of participating schools. As such, this section notes similarities and differences between schools as well as overarching observations on the ***early development*** of the project across participating schools during the 2002-03 school year and up to the end of September 2003.

Laptops Initiative summary data

This section provides overview summary data on the *Laptops Initiative*. As such, some of the figures cited provide a barometer against which the project might be compared to, for example, some of the benchmark findings from the NPADC Report to the Minister for Education and Science (2001) on the impact of *Schools IT 2000*. Caution is needed when considering and interpreting the following summary data as one cannot assume that the respondents were fully informed on all matters under query (e.g., in relation to number of computers in the school).

How many schools are participating in the project and how are they distributed geographically? Thirty-one schools are participating in the project representing a wide geographical distribution. Of the participating schools, based on their own response to the Teacher Survey March 2003 (TSM03) and School Survey September 2003 (SSS03), seventeen are city-based, nine are in towns and five are in a rural area.

The participating schools are as follows:

- Bailieborough Community School, Co. Cavan.
- Boherbue Comprehensive School, Co. Cork.
- Causeway Comprehensive School, Co. Kerry.
- Coláiste Dhúlaigh, Coolock, Dublin.

- Coláiste Eoin, Finglas West, Dublin.
- Gairm Scoil Mhuire, Thurles, Co. Tipperary.
- Greenhills College, Greenhills, Dublin.
- Kilrush Community School, Co. Clare.
- Killinarden Community School, Dublin.
- Larkin Community College, Cathal Brugha St., Dublin.
- Meán Scoil Ioseph, Foxford, Ballina, Co. Mayo.
- Moyne Community School, Co. Longford.
- Our Lady's Secondary School, Castleblaney, Co. Monaghan.
- Presentation Secondary School, Limerick.
- Pobalscoil Neasain, Baldoyle, Dublin.
- Riversdale Community College, Blanchardstown, Dublin.
- St Aidan's Community School, Tallaght, Dublin.
- St Dominic's Secondary School, Ballyfermot, Dublin.
- St David's CBS, Artane, Dublin.
- St Declan's College, Cabra, Dublin.
- St Kevin's Community College, Clondalkin, Dublin.
- St Kilian's Community School, Bray, Co. Wicklow.
- St Brigid's Vocational School, Loughrea, Co. Galway.
- St Columba's College, Stranolar, Co. Donegal.
- St. Enda's School, Galway.
- St Paul's Community College, Waterford.
- Wexford Vocational College, Co. Wexford.
- St Oliver's Community College, Rathmullen, Drogheda, Co. Louth.
- St. Brendan's Community School, Birr, Co. Offaly.
- Terence MacSwiney Community College, Knocknaheeney, Cork.
- Ursuline Secondary School, Blackrock, Cork.

How many single-sex schools are participating in the initiative? There are six single-sex schools (3 boys and 3 girls) and twenty-five co-educational schools involved in the initiative.

When did schools start using the laptops? Based on responses to the September School Survey 2003 (SSS03, n= 26), 12 schools (46%) had started between Spring 2001 and the end of Spring 2002. The remainder, except for one school (Autumn 2003), started during the 2002-03 school year (50%).

How many students are participating in the *Laptops Initiative*? Based on data from SSS03 (n=26), there are 840 students (mean of 33 per school) involved in the initiative. Extrapolating these figures for thirty-one schools, there are approximately 1,025 students involved in the initiative.

How many students with dyslexia compared to students with other reading and writing difficulties are participating in the initiative? Of the 840 students participating in the initiative in 26 schools (September 2003 School Survey), 180 had been assessed with dyslexia. As such, 21% of students were assessed with dyslexia whereas 79% of participating students had either not been assessed or have other reading and writing difficulties.

In the context of participating students, what is the ratio of male to female students? Leaving aside the six single-sex schools involved in the project, a notable finding is that boys outnumber girls approximately four to one in terms of their participation in the initiative. In two of the co-educational schools, only boys were participating in the initiative. In all of the other schools, the boys to girls ratio was between 2:1 and 5:1, except for one where the boys to girls ratio was 1:1. In thirteen of the twenty-one co-educational schools that provided data in September 2003, the ratio of boys to girls was 4:1 or higher. An important question emerging from this finding is the extent to which the initiative might provide insights into the interplay between gender, ICTs and support for learning difficulties in literacy.

How many non-laptop teaching computers do schools use for teaching? There was wide variability in the number of non-laptop computers available for teaching in participating schools (SSS03, n=26). One school only had 7 other computers available for teaching, whereas three other schools each had 82, 100 and 122 respectively.

What is the relationship between the number of non-laptop computers available for teaching and school enrolment? While there is considerable variability in school size (15 schools have 250-500 students and 16 have more than 500 students) there is no relationship between the number of non-laptop computers

available for teaching and school enrolment (r=-0.03, p=0.87). Based on SSS03, eleven schools have computer to student ratio of less than 1:10; ten schools have computer to student ratio of greater than 1:10 and less than 1:20, and five schools have a computer to student ratio of greater than 1:20 and less than 1:35. One school had a computer to student ratio of 1:70. Based on a census survey of schools, Mulkeen (2003) reported that the number of students per computer in disadvantaged schools was 1:11 in 2000 (n=175 schools).

How many laptops did schools purchase? 70% of the schools bought between 20 and 30 laptops with the number of laptops increasing in approximate proportion to the funding provided to each school as part of the initiative. As such, there was little variability in the number of laptops purchased across participating schools. However, one school bought forty laptops, two bought fifteen, four other schools bought ten, thirty-two and thirty four respectively. In addition to purchasing laptops, six schools bought one desktop computer and three others bought more than one desktop computer.

In terms of the type of laptop bought, 25 of the 26 schools responding to the September 2003 survey bought PCs and three schools bought MACS (one bought 15, one bought 25 and one bought 6). As such, two of the three schools that bought MACS also bought one or more PCs.

How many schools use 'fixed' model of laptop management? In the course of his visits to schools, the project coordinator began to use the three descriptors – **fixed**, **floating** and **fostered** – intended as a helpful way to describe each school's management/deployment model. These three terms were used in the Spring 2003 newsletter to schools and attributed to one of the teachers who had started to use these

terms as a way to understand and characterise the various possible laptop deployment options. These terms can be explained as follows:

Fixed Model:

Laptops are 'fixed' in one location. Typical locations may be learning-support rooms, libraries and dedicated 'laptop rooms'. Patterns of deployment may vary within such fixed locations and range from a 'laptop room', duplicating a conventional 'computer room', to a library location facilitating the flexible use of laptops by multiple individuals/groups in varying ways. There may also be wide variations of use within a learning support room.

Floating Model

A number of laptops are mobile for use by varying groups in differing locations in the school. Typical 'floating' patterns are:

- a small number of laptops are available for a teacher and/or student(s) on a variable-needs basis, most often used for supporting students who are receiving learning support on a 'withdrawal' basis:
- A larger number of laptops are available for use by groups with a literacy dimension e.g. banded classes, Leaving Certificate Applied classes (LCA) and Junior Certificate Schools Programme (JCSP).

Mobility is most efficiently achieved by use of a trolley, which also acts as storage, security and a charging station. It may also carry other useful peripherals, such as a printer, scanner and projector.

Fostered Model

A laptop is made available to an individual student and is dedicated for use solely by that student. Variations include use of the dedicated laptop all of the time, i.e. at home

and at school; use of the laptop at home for a set period; and use of the laptop in school for particular subjects.

Based on eighteen School Reports completed in June 2003, all eighteen schools use the **fixed** (one room desktop model) as the primary and dominant mode for managing the laptops during 2002-03. Five of these eighteen schools also used the **floating** model, and five also adopted a **fostered** model. Two of these eighteen schools were using a combination of fixed, floating and fostered, but the fixed model was the primary model for deployment of the laptops.

How many schools purchased a lapsafe trolley? Lapsafe trolleys provide security, recharging facility and mobility for about twenty to thirty laptops. Based on September School Survey 2003, six schools had purchased lapsafe trolleys.

How many schools have installed a wireless system? Six schools have installed a wireless system.

How many schools have one or more teachers who have taken or are taking the NCTE's *ICT and Special Needs: Learning Support* course? Based on September School Survey, eighteen schools had one or more teachers who have taken or are currently undertaking the NCTE's ICT and Special Needs Learning Support course.

In how many schools have one or more students taken laptops home? Based on SSS03, one or more students in eleven schools have taken laptops home. Typically, the opportunity to take a laptop home occurs in the case of 2-3 selected students rather than a broader programme involving the majority of students participating in the initiative.

How much time each week do students use laptops? In general, it appears that students tend to use the laptops for a small number of hours/lessons per week. For

example, combining the findings presented in Tables 3 and 4, it appears that schools typically provide students with access to the laptops for 3-5 hours or 2-3 lessons hours per week (Source: March, 2003 Focus Group, n=24). 8 out of 24 (33.3%) schools have 2 lessons per week with the laptops. 6 out of 24 (25%) schools have 3 lessons per week. 2 out of 24 (8.3%) schools have 1 lesson per week.

Table 3 Lessons per week with Laptop (March 2003, n=24)

	Frequency	Percent
1 lesson	2	8.3
2 lessons	8	33.3
3 lessons	6	25.0
More than 3 lessons	8	33.3
TOTAL	**24**	**100.0**

Table 4 Number of hours per week students use Laptops (March 2003, n=24)

	Frequency	Percent
1-3 hours	15	62.5
4-5 hours	5	20.8
6-10 hours	1	4.2
10-15 hours	1	4.2
Missing data	2	8.3
TOTAL	**24**	**100.0**

What project-wide supports has the NCTE organised as part of the Laptops Initiative? The NCTE put a range of supports in place, as follows:

- Schools were issued with hardware specifications and purchasing guidelines, (Spring 2001).
- Schools were issued with a project framework including goals and objectives, together with additional information and planning templates, such as extensive

software guidelines and case studies of related initiatives to get them started (May 2002).

- A meeting of principals was held and the initiative was formally launched in Autumn 2002.
- A two-day planning workshop for school level organisers was held in October 2002.
- Schools were provided with teacher release time to assist in the co-ordination and running of the project.
- A dedicated project co-ordinator was appointed to provide support to all schools (September 2002).
- Schools were encouraged to avail of NCTE training courses on ICT which are available through their local education centres, especially the *ICT and Special Needs Learning Support* course (the design of which took into account the needs of the *Laptops Initiative).*
- Regional workshops for school level organisers in were held in March 2003.
- A project newsletter was initiated in Spring 2003.
- A second meeting of school principals was held in May 2003
- The national network of ICT advisors was available to provide support to participating schools at a local level and the full range of NCTE's usual supports to schools were also available.

Common observations across schools

Common observations raised across schools are discussed under the following headings:

- The slow pace in starting up the project

- The value of both the input of various NCTE staff and the NCTE's project coordinator
- Teachers' impressions of the project
- Supports in project implementation
- Obstacles to project implementation
- The positive nature of the project in terms of its impact on students typically alienated and disaffected from literacy and learning
- The relatively small portion of the school week during which each participating student uses a laptop
- The need for further teacher professional development and teacher-to-teacher contact to support the project
- The dominance of the 'fixed' model of laptop management
- The prominence of laptop security
- The importance of teachers' technical skill in using laptops/ICTs

The slow pace of the project start up

- **FINDING**: In general, schools viewed the project start up as less structured than they would have preferred. However, schools responded in different ways to the detailed general information provided by NCTE during 2001 and Spring 2002.

Based on interviews with teachers in the focus group and individual interviews with most of the case study participants (see Appendices 1A and 1B), there was a general perception that the schools would have liked more structured support during 2001/2, in the form of start up project meetings, the ready availability of a project coordinator, and opportunities to share ideas and issues related to project development, as later occurred during the 2002-03 school year. As such, from the perspective of most of teachers involved, the project did not "start", despite phone calls, letters, disbursement

of funds and significant information dissemination by the NCTE, until there were formal project meetings between the NCTE and schools in Autumn 2002. However, it should be noted that these teachers may not have had any involvement in the initiative until they were designated by the school principal to attend the first planning workshop in Autumn 2002.

Schools valued the input of the NCTE staff and project coordinator

- **FINDING:** In general, schools valued and appreciated the input of the NCTE at the separate meetings held for teachers and principals both in Autumn 2002 and Spring 2003.

Teachers and principals were generally positive about the usefulness of the meetings (see Table 5 for the teachers' views). For example, 77% of principals thought that the meetings for principals hosted by the NCTE provided sufficient support for the on-going development of the initiative, and approximately 55% of teachers who attended the March 2003 Focus Group thought that the Autumn 2002 meeting provided sufficient support. However, in each case approximately one fifth of respondents disagreed that the meetings provided sufficient support.

Table 5 What are your overall impressions of the *Laptops Initiative* to date? (March 2003)

Strengths	Obstacles	Strengths + Obstacles
7 teachers	**7 teachers**	**10 teachers**
'An excellent initiative'… 'Very innovative' 'Very well funded' 'Excellent for project work – raised self esteem…' 'Well structured and organised.'	'Lack of computer skills.' 'Difficulty implementing software.' 'A lot of time goes into setting things up' 'Technical problems-student skills, my skills'	'An excellent initiative but timescale too short' 'It is quite good but I am worried about the software usage and pupils usage of laptop'. 'Confusing at first'.

Teachers' impressions of the initiative

- **FINDING**: Teachers viewed the project in a very positive light, increasingly so as the project developed, and also identified key strengths and obstacles in its implementation.

When asked about their general impressions of the *Laptops Initiative,* teachers' comments can be categorised under three headings: strengths, obstacles and a combination of strengths and obstacles. In addition some teachers noted how the project had progressed over time with general improvement as the time passed. Overall, teachers focused on the project's strengths. However, ten school organisers held mixed opinions on the initiative. In terms of its strengths, the idea of providing laptops for children with learning difficulties was lauded and regarded as being a 'great idea'.

Supports in project implementation identified

- **FINDING:** The allocation of 'preparatory space' and institutional/school support were the two most important types of support in project implementation according to school level organisers.

The most important supports in the project to date can be categorised under four main headings: institutional/school support, 'preparatory space', networking, and funding. Of these, 'preparatory space' and institutional support were seen as most important. Almost all teachers noted the importance of factors that provided opportunities for teacher-to-teacher networking, school level support i.e. planning time, demonstrations of software, and access to relevant information (20 teachers).

There was considerable consensus in relation to teachers' views of the factors that had helped the *Laptops Initiative* to date (see Table 6). Twenty school level

organisers believed the 'preparatory space' was an important factor that had aided the implementation of the initiative. Of these, the availability of information and training days were seen as playing an important role. Eleven teachers stated that the presence of a network of other teachers with whom they could consult and share ideas would be valuable. Nine teachers believed the support of the principal in the school was a key factor in the success of the initiative in their school. In addition, for example, eight noted that the *Laptops Initiative* was well-funded and considered this to be a positive feature of the project.

Table 6 What factors, if any have helped the project to date? (March 2003)

Institutional Support	**Preparatory Space** (Time, Planning, Demo, Info)	**Network** (Other teachers in project)	**Previous Experience**	**Funding**	**Initial Buzz**
10 teachers	**20 teachers**	**11 teachers**	**1 teacher**	**8 teachers**	**6 teachers**
'Staff co-operation' 'The support of principal' 'Teacher enthusiasm in school' 'Principals attitude is very helpful' 'Principal in my school 'into' ICT'	'Training at in-service' 'Planning day in October' 'Training and support which has been provided' 'The workshops are very beneficial'	'Meetings with other teachers' 'Ability to communicate with others on project, and the sharing of ideas and resources' 'It is great to meet and share experiences'	'Having experience already using ICT'	'The money is there to support it' 'Good funding' 'The availability of money. This is not a problem'	'Student enthusiasm' 'Teacher enthusiasm for project' 'Resource teacher involved and enthusiastic'

Obstacles to project implementation identified

- **FINDING:** The three main obstacles to project implementation, according to school organisers, were: lack of initial support, teachers' own lack of ICT skills, and lack of in-school co-ordination.

The most prominent hindrances or constraints revolved around the lack of school level coordination (9 teachers), their own lack of requisite ICT skills (11 teachers), and either the lack of, or slowness of the project related professional development (10 teachers) (see Table 7). Ten school level organisers said that they thought there was, at least initially, a lack of preparation and support for this initiative. Nine school organisers maintained there was a lack of co-ordination in their own school in the early stage of the project. For example, according to the project coordinator, several teachers commented on a breakdown in communication between principals, ICT staff and teacher organisers around budgeting and planning.

Table 7 What factors, if any, have hindered the project to date?

Time	Lack of preparation & support	Teacher workload	Resources (Hardware/ Software)
7 teachers	**10 teachers**	**3 teachers**	**4 teachers**
'Planning and decision making - no time' 'Accessing and installing software takes a lot of time'	'Poor communication at the start' 'Not enough planning meetings' 'Initially, no information, lack of support, lack of training for teachers' 'Delay in organising training'	'Teachers already feel overworked besides taking on other workloads' 'The large workload of schools'	'Difficulties with software' 'Limitations with regard to evaluating software, hardware.'

Lack of IT support/ Skill (Teacher /student)	Lack of co-ordination in school	Student behavioural problems
11 teachers	**9 teachers**	**2 teachers**
'Lack of knowledge - on my part' 'My skills - technical troubleshooting' 'Students being unfamiliar with computer and keyboard' 'Lack of experience with IT'	'Not enough planning time in school' 'Purchases made before I was appointed co-coordinator of the project' 'My principal "landed me with it" with no real notion what was involved'	'The increasing discipline problems of students' 'Behavioural issues related to particular students'

Not surprisingly, time was an important concern for a significant number of teachers. The predominant concern being the time it took to choose and install software. The idea of 'progress over time' featured in a number of answers. Thus, teachers noted that, with time, obstacles could be overcome and the initiative would be less daunting. As one teacher commented:

> *...as it progressed questions were answered and on the whole the initiative seemed worthwhile. It is beneficial to both teachers and students and has received a positive response and is progressively moving forward.*

Positive impact of initiative on students

- **FINDING**: In general, students responded positively to the use of laptops for reading and writing. Furthermore, the laptops played a critical role in enhancing participating students' attitude to learning.

Data from both the March Teacher Survey 2003 and the School Survey September 2003 (completed by principals) concur on the positive response from students as a result of being involved in using the laptops (see Tables 8 and 9).

Table 8 Teachers' views on pupils' response to ICTs and Laptops (March 2003)

Response to: Please indicate your evaluation of **pupils' response** to the following aspects of the *Laptops Initiative*

	Very positive **Freq (%)**	Positive **Freq (%)**	Mixed **Freq (%)**	Negative **Freq (%)**	Very negative **Freq (%)**	**Does not apply**	*Do not know*
ICTs	11 (45.8)	5 (20.8)	4 (16.7)	-	-	-	4 (16.7)
Using a laptop	13 (54.2)	8 (33.3)	3 (12.5)	-	-	-	-
Software they use with the laptop	2 (8.3)	12 (50.0)	7 (29.2)	-	-	-	3 (12.5)
Taking the laptop home	3 (12.5)	2 (8.3)	14 (58.3)	-	-	-	5 (20.8)
Using the laptops as part of their regular classes	2 (8.3)	6 (25.0)	1 (4.2)	-	-	11 (45.8)	4 (16.7)
Using laptops to read	6 (25.0)	10 (41.7)	5 (20.8)	-	-	2 (8.3)	1 (4.2)
Using laptops to write	5 (20.8)	9 (37.5)	4 (16.7)	-	-	3 (12.5)	3 (12.5)
Students motivation to learn with laptops	13 (54.2)	9 (37.5)	2 (8.3)	-	-	-	-
Students' perceptions of being in school	4 (16.7)	5 (20.8)	11 (45.8)	3 (12.5)	1 (4.2)	-	-

Consistent with findings from the Rockman reports on the *Anytime Anywhere Learning Programme* (1997; 1998; 1999) and the Cornwallis and Chelsea school case laptop evaluation studies, the NCTE *Laptops Initiative* teachers reported that students' motivation was enhanced and that they reacted positively to using laptops in reading and writing assignments. Comparing teachers' perceptions of students' motivation with laptops and their general perception of being in school, it appears that the laptops provide students with a more positive context for being in school. This finding, while solely based on teacher and principal self-report, nevertheless is important and merits further study as many of the students involved in the *Laptops*

Initiative might be at risk for early school leaving given their low levels of academic achievement.

Table 9 Principals' views on pupils' response to ICTs and Laptops (Sept. 2003)

Response to: Please indicate your evaluation of **pupils' response** to the following aspects of the *Laptops Initiative*

	Very positive **Freq (%)**	Positive **Freq (%)**	Mixed **Freq (%)**	Negative **Freq (%)**	Very negative **Freq (%)**	**Does not apply**	*Do not know*
ICTs (n=22)	8 (36.4)	8 (36.4)	4 (16.7)	-	-	-	6 (27.3)
Using a laptop (n=26)	15 (57.7)	9 (34.6)	2 (7.7)	-	-	-	-
Software they use with the laptop	7 (26.9)	15 (57.7)	4 (15.4)	-	-	-	-
Taking the laptop home	4 (16.7)	2 (8.3)	4 (16.7)	-	-	14(43.8)	-
Using the laptops as part of their regular classes (n=25)	4 (16.0)	6 (24.0)	3 (12.0)	1 (3.1)	-	10(40.0)	1 (4.0)
Using laptops to read	4 (15.0)	15 (57.7)	3 (11.5)	-	-	3(11.5)	1 (3.8)
Using laptops to write	8 (30.8)	8 (30.8)	9 (34.6)	-	-	1 (3.8)	-
Students motivation to learn with laptops	8 (30.8)	15 (57.7)	3 (11.5)	-	-	-	-

Laptops used for a relatively small portion of the school week

- **FINDING:** Evidence from both the survey and the school case studies suggests that the laptops are being used for a significant amount of time each week but that there are a number of hours each day when the laptops are not being used.

This finding reiterates in a slightly different way a point made elsewhere, namely that students using the laptops in an integrated fashion - whereby the laptops become a personal tool to be used across all/most subject areas - in the case of only a few individual students in a small number of schools. In one of the case study schools, one student uses his laptop in most of his lessons. This same student also told us how

another student in his class who had been allocated a laptop did not want to use his laptop, other than when he was taken out for learning support lessons, because he was "being slagged" by his peers. Thus, integrating the laptops into mainstream teaching involves addressing not only curricular and management issues but also students' attitudes to what may be seen as differential or preferential treatment of students with special educational needs.

The need for further teacher-to-teacher CPD

- **FINDING**: In general, teachers and principals were eager that further professional development and more on-going contact between participating project teachers and principals be provided.

Teachers and principals viewed the existing provision of professional development positively and were positive about future need for on-going contact between participating project teachers and principals. This was evident from a variety of data, including positive feedback on the possibility of developing a virtual learning environment to support the project (March Focus Group Survey 2003), the positive response by teachers to the newsletter sent to schools by the project coordinator, and the willingness of teachers to share their work by contributing to the newsletter about various strategies employed in their own school to enact the *Laptops Initiative*.

The dominance of 'fixed' model of laptop management

- **FINDING:** The 'fixed' model of laptop management predominated in schools. That is, they found that the 'fixed' model satisfied a variety of security, logistical and pedagogical concerns when laptops were located in one room rather than moved from classroom to classroom or brought home by students.

Data from case studies, school reports and the focus group meeting with teachers suggest that the 'fixed' model (or, using the language of the Rockman Reports, a one room 'desktop model') of laptop deployment was optimal for schools in the early phase of the initiative. The deployment of laptops to one secure room satisfied a number of concerns teachers had about laptop use. Most prominent among these concerns was that the laptops would be more likely to be stolen if they were used in a 'floating' or 'fostered' fashion. Other concerns related to the logistical aspects of moving the laptops (in the absence of a suitable trolley) and the time constraints involved in locating, moving and setting up the laptops and the ultimate impact of such obstacles on the limited amount of time available for actual classroom teaching within the confines of a 35 or 40 minute lesson period.

Furthermore, a project 'Interim Review' conducted by the NCTE in February 2003 identified the 'fixed model' as the potential early phase of a "possible emerging sequence of development" (project documentation). This model, it was speculated, provided an initial "comfort zone" in learning support situations during teachers' early learning phase, with the further models emerging in tandem with the growth of teachers' confidence and competence.

The prominence of laptop security

- **FINDING**: Laptop security was a concern across schools although schools reacted differently to this concern.

Laptop security was a concern for almost all the principals and teachers and was also the most significant impediment to students bringing the laptops home (see Tables 10 and 11). Most principals (84%, n=26) and teachers (83.3%, n=24) either agreed, or strongly agreed that laptop security was a concern in their school. A large proportion of principals (73.9%, n=26) and teachers (66.7%, n=24) strongly agreed that laptop

security is the primary reason that children are not allowed to take their laptops home. One case study school mentioned that they had discussed asking parents to escort students with laptops as they heard this had happened with one school in Harlem, New York, USA. A minority of teachers (4 out of 24) and principals (4 of 26) either disagreed, or strongly disagreed that security is a concern in their school. However, noted later in the context of the school case studies, the particular meaning schools attach to the term 'security' may differ from school to school.

Table 10 Teachers' views on laptop security, taking laptops home, technical support and software cost (March 2003)

	Strongly disagree **Freq (%)**	Disagree **Freq (%)**	Agree **Freq (%)**	Strongly agree **Freq (%)**	Does not apply **Freq (%)**
Laptop security is a concern in our school	2 (8.3)	2 (8.3)	5 (20.8)	15 (62.5)	-
Laptop security is the primary reason why we do not allow students to take their laptops home	-	3 (12.5)	5 (20.8)	16 (66.7)	-
My own level of technical skill hinders my capacity to use laptops effectively	5 (20.8)	6 (25.0)	8 (33.3)	5 (20.8)	-
I need more technical support in using laptops	2 (8.3)	1 (4.2)	13 (54.2)	8 (33.3)	-
Cost of software limits the number of students who can simultaneously use the same material	-	-	17 (70.8)	7 (29.2)	-

Table 11 Principals' views on laptop security, taking laptops home and software cost (September, 2003)

	Strongly disagree **Freq (%)**	Disagree **Freq (%)**	Agree **Freq (%)**	Strongly agree **Freq (%)**	Does not apply **Freq (%)**
Laptop security is a concern in our school	1 (4.0)	3 (12.0)	5(20.0)	16 (64.0)	-
Laptop security is the primary reason why we do not allow students to take their laptops home	1(4.3)	5(21.7)	5 (21.7)	12 (52.2)	-
I need more technical support in using laptops	1 (4)	3(12.0)	9(36.0)	12 (48.0)	-
Cost of software limits the number of students who can simultaneously use the same material	1(3.8)	1 (3.8)	9 (34.6)	12 (46.2)	-

Importance of teachers' technical skills in using laptops/ICTs

- **FINDING**: According to teachers, the enhancement of their own level of technical skill in using laptops would benefit the implementation of the initiative.

Most teachers agreed that their own level of technical skill hindered their capacity to use laptops effectively (see Table 11).

Critical role of technical support to date in initiative developments

- **FINDING**: Teachers and principals agreed that technical support was essential to implementation of the *Laptops Initiative*.

This issue was raised by teachers (Focus Group, March 2003), by principals (School Survey, September 2003), and by schools in their School Reports (June 2003). A comment typical of those made noted that

> *"The major problem without question is the day-to-day maintenance of the computers – **WE NEED ACCESS TO A COMPUTER TECHNICIAN**! More often than not, when a teacher commences class in the computer room, there is a problem with a number of the computers. While teachers have a certain degree of knowledge about the basic workings of the computers, they are not competent enough to rectify faults"* (School Report, June 2003).

Two points can be inferred from comments made by project participants in relation to technical support. First, teachers have a basic 'know-how' which can resolve some technical problems. Second, there is a range of technical problems beyond the scope of teachers (due to some combination of lack of time, resources or knowledge), such as network installation, wireless facility setup, and general repair of ICTs. As such, technical support can be viewed as a two-tiered support structure involving both an in-school and an extra-school dimension. In relation to the in-school aspect, two case

study schools had developed a 'technical support corps' among students interested in ICTs. One case study school had also developed a relationship with former students now working in the IT sector.

- **FINDING**: Schools had different technical support needs and resources

Schools appeared to have very different needs and resources in relation to technical support. For example, schools' technical support needs depended on the vision of laptop use being implemented, the degree to which they had cultivated or had access to some level of in-school technical support (from teachers and/or students), and ease of access to technical support in the local community. One case study school had good in-school technical support from both teachers and students, easy access to local support in meeting its vision of wireless use of the laptops. Another case study school had limited in-school technical support and spoke of on-going difficulties in getting timely technical support.

3.2 School case studies: overview

Four case study schools were selected and are identified with the following pseudonyms: Greenfield, Newport, Oldtown and Westtown. They were selected on the basis of project coordinator observations and the evaluator's discussion with teachers during the focus group meetings in Blackrock and Portlaoise Education Centres in March 2003. Case studies were selected in order to provide insights on the *Laptops Initiative's* development in different contexts. Among the considerations in selecting schools were: the school's level of development with regard to ICTs in general, their "buy in" to the *Laptops Initiative*, the start up date of the initiative in the school, and the initial information on school's progress during the early stages of the project. The case studies involved the following data collection:

- *May 2003 School Visit*: One day visit to each school in May 2003. During the one - day visit in May, the evaluation team met with the principal, school organiser and the school's technology/IT teacher supporting the project. In Greenfield and Newport the evaluation team observed a lesson taught to participating students using the laptops and a conducted a 40-minute focus group interview with 8-10 students participating in the initiative.
- *September 2003 School Visit*: Half-day visit to three of the four case study schools in September 2003. This visit consisted of interviews with the principal, school organiser and school IT teacher supporting the project.

In the case of both Oldtown and Westtown, it was not possible to observe a lesson or meet with participating students, as the teachers were uncomfortable with the idea of observers in their classrooms. However, one lesson was observed and videotaped in both Newport and Greenfield during the May 2003 visit. The September visit to Oldtown had to be cancelled due to a scheduling conflict and it was not possible to reschedule this visit. In addition to visiting Westtown in May and September 2003, a visit was made to the school in February 2003 as part of the orientation phase of the evaluation.

Two out of the four case studies schools were located in cities (Oldtown and Greenfield). Of the other two schools, one was in a rural setting (Westtown) and one school was located in a large country town (Newport). Two of the schools had between 250-500 students (Oldtown and Westtown). Oldtown's enrolment had declined significantly in recent years from over 800 to just under 400 students at present as the community matured and the age profile of the community changed. Two of the four schools had more than 500 students (Greenfield and Newport – with 1,000 + in the latter).

As of May 2003, in the case study schools students using the laptops were 1st and 2nd years mainly, with a small number of 5th and 6th year students also involved in the *Laptops Initiative* (see Table 12). There were no cases where Transition Year, 3rd year or Leaving Certificate students were using laptops. In the case study schools, none of the school level teacher organisers were alone in organising the initiative in their respective school. Oldtown and Greenfield both had five other teachers involved in the organisation of the *Laptops Initiative*, and the latter had five additional teachers interested in the initiative. Westtown had eight other teachers involved in the laptop project. Newport School had three other teachers. Three out of the four schools did not allow laptops to be taken home. Selected students in Newport were permitted to take a laptop home only during holiday periods to complete project work. All four case study schools provided substitute cover for the project's school level teacher organiser/coordinator.

Both Greenfield and Newport school were technologically advanced with a wireless vision; the latter was notably futuristic in its outlook. Oldtown, in particular, adopted a multi-prong approach to the technology integration. Oldtown, for example, used AlphaSmarts (mainly for students with general learning difficulties in literacy) in conjunction with laptops (mainly for individual students with specific learning difficulties). In addition, desktops computers were used as a resource for all students, either for use with specific software programmes and/or uploading work from the AlphaSmarts utilising a USB connection cable. Westtown School was notably remote from towns and cities with education support centres, and the teachers commented on how difficult it was to access CPD. The ICT infrastructure in the four case study schools was varied. For example, the computer to teacher ratio prior to the *Laptops Initiative* varied considerably. Furthermore, the impact of the *Laptops Initiative*

funding changed the computer to student ratio markedly across the schools. For example, the change in computer to student ratio in both Westtown (was 1:5 and now 1:4) and Oldtown (was 1:5 and now 1:4) was similar.

Table 12 Students using laptops in case study schools (May 2003)

	Oldtown	**Greenfield**	**Newport**	**Westtown**
Years	2nd year group 5th & 6th Year individual students 5TH year group	1st & 2nd year group –Writing Individual teaching for students with dyslexia using software 5th year group LCA	2nd year selected individuals 1st & 2nd year groups	Selected individuals 1st & 2nd year groups

Table 13 ICT infrastructure in case study schools (Sept. 2003)

	Oldtown	Westtown	Greenfield	Newport
Enrolment (approx.)	300	420	560	1000
No. laptops purchased	15	21	41	30
No. other teaching computers	65	82	60	27
Type of other teaching computers [PC or MAC]	40PCs + 25 Macs	82 PC	60PC	27PC
Lapsafe trolley	No	No	Yes	Yes
Wireless	No	No	Yes	Yes
Computer to student ratio without laptops	1:5	1:5	1:9	1:37
Current computer to student ratio with laptops	1:4 (approx)	1:4 (approx)	1:5.5	1:17

However, Newport (was 1:37 and now 1:17) and Greenfield (1:9 and now 1:5.5) had considerably fewer computers per student than the two other case study schools. Consequently, the purchase of laptops as part of the *Laptops Initiative* had a different impact on computer to student ratio across the four schools (Table 13). Despite the lower number of computers to students in both Newport and Greenfield both schools have purchased a lapsafe trolley and have installed a wireless network.

Each case study is organised using a common framework encompassing a description of:

- Community profile and project start up in the school
- Role of national context at local level
- Approaches used in providing learning support
- Models of laptop management
- Student profiles
- Profile of instructional and learning activities
- Profile of software use
- Achievements
- Teacher beliefs/attitude

3.2.1 Greenfield

Project start up

This school is like many schools in growing Irish towns and cities in that it is built on a 'greenfield' site and is surrounded by various amenities that contribute to the development of a new community, including a few shops, church, garage and some sports facilities. Greenfield School was built in the 1970s. In contrast with, for example, the 1950s three-story school building in Oldtown, Greenfield's single story building makes access and movement easy for students and teachers alike. The

school has developed close links with the local community and is attentive to and proud of how past pupils have found employment in local industries. The school, like Newport, had a busy bus station atmosphere typical of a school with relatively high enrolment.

The principal of the school took up his position in September 2002 and as such was not in the school when the *Laptops Initiative* commenced. He noted that he has had considerable involvement with ICTs in the past, at both school and national levels. In terms of getting the project off the ground in his first year as a principal, he emphasised that he viewed the initiative as curriculum rather than ICT driven. From this basic position, he described how he identified a teacher who would organise the project with an emphasis on curriculum integration of ICTs rather than a technologically driven project where the curriculum was seen as an afterthought. According to the principal, mainstreaming laptops was being discussed during Autumn 2002.

After the initial visit to Greenfield, it was noted that there was a clear coordinated plan in place in terms of the implementation of the *Laptops Initiative*, the school had presented a plan to parents about the *Laptops Initiative*, and the school level organiser was undertaking a Masters Degree using action research to understand curriculum change in the context of school culture. Furthermore, the school level organiser noted that the principal was very keen on ICTs and was quite involved (rather than over involved) in the initiative. According to the school level organiser, one important decision the principal influenced was the purchase of Apple Mac laptops (i.e. iBooks), even though the school is PC-based. Furthermore, he noted that the project was being implemented as part of the broader school planning, especially

in the areas of ICT and literacy for SEN students. For example, in October 2003 the school held a one-day workshop for staff on literacy across the curriculum.

The school level organiser, who is also a learning support teacher, provided a detailed description of the project start up in the school. Key points in her description of note are the active role played by the principal, the sense of shared decision-making and the different uses made of the laptops depending on whether students had general literacy learning difficulties or had been assessed with dyslexia.

> *T1: First of all, the project, it all really began for us in this school last September* [referring to Sept. 2002]*. The principal asked me to co-ordinate the project in this school and he ordered the laptops. He ordered 16 Apple laptops . . .for the junior end of the school. So then I sat down with the principal and we looked at an implementation model for the laptops and we decided that we would have a three strand approach. The first one would be working with children with general learning difficulties and we would have three classes in Junior Cycle and we introduced the laptops in English class for those because it was a literacy project and we didn't want it to go into Maths or Science just yet. We wanted to have it specifically for what we were asked to do; to specifically improve literacy. So we put the laptops on there, that was strand one. Strand two was students with specific learning difficulties who tended to be in top end classes. So we banded the students, so band one are children with general difficulties. They got the laptops and then children with specific learning difficulties they would probably be in larger classes. Children with dyslexia particularly. So we asked another learning support teacher to take…I think she has four students altogether, taking them two at a time and do a programme to aid them with their dyslexia using software. For the third strand of the project we decided to put laptops into the LCA class because they too have literacy difficulties, in particular, with regard to the task work in LCA which is examined here in the school three times a year. That was our plan for using the department of education laptops.*
>
> *R: So you had the planning meeting January or February or was it earlier?*
>
> *T1: We had it earlier, around early October. . . The laptops hadn't arrived. We had all our plans in place because we didn't have laptops and then they arrived and we implemented the plan.*
>
> *R: So some groups started using the laptops a while ago. Others, like* [the group named] *1S, just started about a month ago?*
>
> *T1: Well it started…I started with 2U and 1L. that's two class groups and remember I said we have three class groups in Junior Cycle. Full classes with general learning difficulties. The third group were in Junior Cert. so we didn't start the laptops with them because they were too close to their Junior Cert.*

exams. 1S are what we call a middle band class so their teacher just asked me what we were doing with the laptops and could her class get involved. So I looked at my timetable and I was able to give her one class period a week where I come in and I did the same process approach to writing with them that I was doing with my own class but not in as much detail because I only had one class period with her and it was my programme and my vision and sometimes it's really hard to implement that somewhere else unless someone completely accepts it and believes in it too. It's hard to move from your own classroom to someone else's classroom with a project that you are doing. It sometimes doesn't transfer satisfactorily. In this case I believe it is transferring pretty well but you might have even noticed that the group that you met earlier had more steps in the process covered than…you could see the gaps that I am there for one class period and then I am running around doing all of my other jobs in the school. They are getting a taste of it but I believe that they are not fully engaged in the entire process.

National context at the school level

The principal was involved in the early stages of the *Laptops Initiative* management and has a very comprehensive approach to the role that could be played by technology with regard to the curriculum implementation. He places the emphasis firmly on the curriculum rather than on technology for technology's sake.

"I don't see technology as being separate from the curriculum. I see it as an additional intervention, another point of access… Well, if it's not curriculum driven forget about it. You are putting a square peg in a round hole. That's my sincerest view or vision".

Like Newport, he anticipates that the *Laptops Initiative* might have an impact on the local community.

"…what we hope next year is that this will feed into the community. Ultimately the laptops will be used in this – I am saying to myself that they are here to be used. Ultimately the students are the first priority".

The school's project organiser put little emphasis on the national context of the initiative but is much more focused on the details of her "boys", individual case details and school level improvements and developments in the organisation of the initiative. She views the initiative as very successful to date and one that is having tangible benefits for students. She also sees it as providing the opportunity for the

confluence of a number of strands in her own biography, specifically in terms of her interests in relation to literacy for struggling readers and writers, school change initiatives and a curriculum driven view of ICT integration. Her focus is very much on the literacy side of the project rather than the technology.

> *"So it's fitting in…it came together for me as a teacher all my bits along and I thought I really like that process approach to writing and I was doing it but I didn't have access to publishing and that was the bad thing because we didn't have computers for the children".*

Approaches used

Greenfield implements several types of models including withdrawal, in class support and whole class use of laptops in designated location (multi-media library). Students have not yet taken laptops home and they are using a fixed model for laptop use within one room though they did install a wireless system in May 2003. They operate an integrated in-class support system as there is a heavy emphasis on the shared learning experience.

> *"…a lot of schools take children out for withdrawal…teaching on their own…we changed that around by putting more personnel into the room so that the children can learn together… we would really be coming from… the idea that people learn from one another."*

Both the principal and school organiser are united on much of the policy, aims and projected goals of the project. Neither of them is besotted with technology, seeing it instead as a tool to be integrated into existing fabric of school and classroom management. It is not seen as a challenge to the school but another tool to facilitate learning.

> *"…it would generate interest but not to the extent that the children are stigmatised or regarded as special by anyone. It's not as if you carry them around in your pocket all day".*

The principal tried to facilitate teacher training when the laptops arrived with little success. He has created an in-house technical support team for the *Laptops Initiative*

by involving the students already in the school who have familiarity with computers to assist in the management of the programme. This approach was also used by Newport to provide on-going technical support for the *Laptops Initiative* but has had not used to date by either Westtown or Oldtown.

Models of Management

The principal favours a model based on mobility. He clearly liked the library facility ('fixed') as a focal point for the *Laptops Initiative* and said that he valued their use in this visible context as it gave a profile to both the participants and the *Laptops Initiative*. Different teachers in the school used different approaches although school organiser's formative influence on the initiative is readily apparent:

> *"I know that we have different systems, this is just mine* [speaking about her whole class group in the multi-media library]. *And I know that the senior students…and we have one to one tuition with children with dyslexia and that teacher takes individual students with the laptop work. It would be completely different from this but you would probably be interested in that"*.

Laptops have not been taken out of the classroom setting as of yet though it is hoped for in the long term that students will bring them home.

> *"I mean, it would be great if they could bring it home and work at home but we are not at that stage yet and we'd hope to get there by saying one night go home and add to this and no, I should chance that but I just like doing things right and doing them a step at a time and I will get there to allowing materials home maybe even allowing the laptops home. It's growth and development. We are only beginning laptop work"*.

We observed two students using laptops in a withdrawal setting. Both students had been assessed with dyslexia and were using the laptops for the development of discrete reading skills. Thus, like most schools as evident in School Reports (June 2003), Greenfield used laptops in a variety of ways. As noted earlier, while the 'fixed' model of laptop deployment was dominant, the use of the 'fixed' model in Greenfield took on a particular meaning in this situation when a whole class group came to the multi-media library and had extra personnel involved in supporting their engagement

with the writing process. The school organiser explained the school's overall approach to the *Laptops Initiative* in the context of providing different support for different groups of students:

> *T1: So she does that work and with the laptop co-ordinator…we sat down and thought what are going to do with all the laptops and I said - split it up, for general learning difficulties we'll work all together and we'll use the process approach to writing and we'll use the laptops for publishing to begin with, for specific learning difficulties we get the children working on one to one using software and for the LCA students we'll use the laptops for task presentation. Are you familiar with Tasks, Leaving Cert. Applied? Yes. I would say that the Leaving Cert. Applied have a different bank of laptops and they haven't been accessed yet. They are still in the boxes. Now that is nothing…I am the co-ordinator but another teacher was given some time off for technical work. I don't know…they had to set up a room and review security.* [Lagged start] *When I went ahead and did it all quickly. I said I would just get this done and get it up and running and I know that the Leaving Cert. Applied students, while they come down and use these sometimes there is another bank of laptops that will be set up. There has been some difficulty around securing a room and getting a base for them. I suppose we are lucky, they are all on a trolley and they are safe…*
>
> *R: That's the lap safe trolley…how long have you got that?*
>
> *T1: We purchased it in January [2003]…We just lock it up and put it in the store and no one could steal it…*
>
> *R: If you don't put it in the store someone could just roll it out…?*
>
> *T1: You could take it away but we lock it up every night…I will say the children are very good about the laptops. They treat them with great respect. They don't bash them or thump them or anything…*
>
> *R2: I saw that they took a lot of care with them when they put them away…they lined up and…*
>
> *T1: Yes - they have to put it into its docking unit. It's good in teaching. It's good to have laptops here. It's really made a big difference to me and the work that I do but I think with teachers you've got to just keep up on top and you've got to know what you are doing. If you don't …like if I met a colleague now and she wasn't too engaged with what I am talking I will just say I will leave that person alone. You might have to first of all get them on board. You need to look at teaching somewhat differently and not stand up at the top of the class and deliver a lesson…I don't do that so much…*

Student profiles

Student case studies were developed based on a short survey completed by teachers (see Appendix 2D). Students using the laptops comprised of the following as of May 2003:

1. 1st & 2nd year group –Writing
2. Individual teaching for students with dyslexia using software
3. 5th year group
4. LCA

Classes selected for involvement in this initiative were perceived to be difficult. Parent involvement was low and there was one Traveller child in the class with broken attendance record. Table 14 illustrates a typical profile of a student involved in the initiative, that is, a student with general reading difficulties rather than with specific reading difficulties, i.e. dyslexia.

Table 14 Profile of case study students (Greenfield)

Name	Gerard	Martin
Assessment	General learning difficulties	General learning difficulties
Learning Support	Yes	Yes
Resource Teacher	Yes - In class support. (Setting - 2 teachers & 10 pupils)	Yes - Special class (10 boys)
Needs	Reading, writing, and speaking. Literacy & numeracy.	Writing narrative story. Continuing reading programme.
Strengths	Very good at practical work especially Art & Metalwork.	Reading is improving but severe difficulties in writing and finds spelling, very challenging.
Role of Laptop	Enhance confidence Presentation of work.	Writing program. Reading Program.
Outcome (according to teacher)	Excellent progress	Excellent progress

Greenfield expanded its *Laptops Initiative* activities in September 2003 when 3rd year students became involved. Of the four case study schools, Greenfield had

considerable more students involved and was using the laptops for more lesson periods than any of the other three case study schools (30 lessons approx.) compared to 10-15 lessons in other schools.

Instructional and Learning Activities

Greenfield like the other case study schools used a variety of instructional activities including reading skill activities for some students assessed with dyslexia (withdrawal) and whole class approach to providing learning support for students with general reading and writing difficulties. Of the four case study schools, Greenfield was most distinctive for its use of a process approach to writing, whereby the laptops were used for the penultimate and final stages of this process, that is, for writing the final polished draft and publishing (printing using infra-red connection to the printer). As this was the only significant mention of a process approach to writing, we provide some detail about its enactment as a potential model for other schools. The report provides a detailed portrayal of the writing process in this site, as an example of 'good practice', and this contains some insights for the broader issue of literacy teaching, including approaches to teaching reading.

Some overarching beliefs about the provision of learning support underpinned the approach taken to implementing the process approach to writing. As the school level organiser noted, personnel in class had been increased to support the use of technology in the classroom and learning support teachers are pooling time and resources to support each other.

"*I think working with technology you need a lot of hands on board in the class*". Teachers lead activities by example and share small items of personal interest to engage with children.

"…the teacher models the story. So I'll say now I am going to write a story but I'll never pick anything too dramatic and then they would give me words and phrases for my story and I would compose that in front of them so that's like teacher modelling and they are engaged with that and they will say that if she can do that over something so simple then I can do that".

Table 15 Instructional and learning activities for participating students

Year	Total number of students	No. of male students	No. of students assessed with dyslexia	No. of class periods per week	No. of teachers involved	Type of teacher**	Please specify type of teaching/learning activities for which laptops are **primarily** used ***
1st	13	9	1	2	2	SCT LST	RSk 1 Group WRT
2nd	33	30	1	4	2	SCT LST	RSk 2 Groups WRT
3rd	20	20	0	4	3	SCT LST	RSk 2 Groups WRT
TY							
5th	29	23	1	10+	6	S/CT	WRT RSK
6th	32	8	0	10+	6	S/CT	WRT RSK
Total	127	90	3	30+			

**

LST = Learning support teacher
RsT = Resource Teacher
GCT = Guidance and Counselling Teacher
S/CT = Subject area/Classroom teacher

***

RSk = Development of reading skills using specialised software e.g., Wordshark, Starspell and/or other similar programmes
RBk = Reading adapted books e.g. Don Johnson 'Start-to-Finish Books'; Kurzweil and/or using similar software
WRT = Writing using regular word processing software (e.g. MS Word) or specialised software for teaching writing (e.g. Clicker 4)

Learning to be a writer: strategies and identity

In the course of the school case studies, we observed classroom teaching in two of the schools (Greenfield and Newport). In Greenfield, we observed students engaged in learning to write stories using a process approach. In Newport we observed the class engaged in using Kidspiration – a concept mapping and planning

application – to assist them in organising their ideas in writing informational text. In the following section, a description of a process approach to writing in which laptops played an important role is provided. This section draws upon interview data from both the school level organiser and some of the participating students. In the context of the role of ICTs in meeting the needs of students with learning difficulties, the learning support teacher frames her use of the laptops within a curricular approach to ICTs. That is, the teacher's planning was guided by how laptops might play a role in meeting important curricular goals and objectives. In the following conversation, the researcher spoke with one of the twelve second-year students in the class. The class held in the school's multi-media/library room and was a bright, spacious and well-organised setting with glass 'walls' between two sides of the room and the school corridor. Students had the option of working, when at the appropriate phase of writing, with one of a dozen available iBooks, or four PCs located together close to the librarian.

R: How are you doing? What are you writing?

St: [Mumbled response from student…]

R: You were in Australia? When are you going?

St: Saving up…

R: You haven't a date…you are saving up…. So how do you write stories in this class?

St: First, we do it out rough and then in a hardback, and then on the laptop…

R: So you do soft back, hardback and laptop and then how do you start writing a story…you just walk in?

The reference to softback, hardback and laptop was a practical way for the teacher to convey to students that they were expected to write at least three drafts of their

writing: a first draft in a softback copybook, a redrafted version in their hardback notebook, and final polished copy to be created on the laptop.

> *St1: You do your plan first…*
>
> *R: How do you do that?*
>
> *St1: You just do out your plans…*
>
> *R: You do it by yourself?*
>
> *St1: Ya, but sometimes I do it with the class…*
>
> *R: Depends on the story…do you all write the same story titles or do you come up with your own ones?*
>
> *St1: Sometimes it's the same and then others not…*

This interchange between the researcher and one student in Greenfield demonstrates the student's understanding of writing as a planned, phased, and social process. It is planned in the sense that each student is expected to put down on paper what they might write about in a socially supported fashion. Writing is conveyed as a phased undertaking in that students understand the different phases by virtue of a different type of material/tool being used for each: a sheet of paper for rough work plan, a soft back copybook for the first draft, a hardback copybook for the revised draft and the laptop for the final polished and publishable draft. Writing is conveyed as social in that students are supported by peers and the teacher at three points in particular: generating ideas in the planning stage, editing their work as they move between the soft and hard back copybooks, and finally an audience to listen to their finished product. This approach is consistent with a process approach to writing. In the next section, the process approach to writing is described and the role of ICTs, in the context of the *Laptops Initiative*, in providing important supports in implementing a process approach to writing is noted.

'Writing as a process' has been an important line of research and practice in literacy over the last twenty years (Mayer, 1998). A process approach to writing is often distinguished from a product approach to writing. In a product approach to writing, students typically view and engage in writing as a "knowledge dumping" exercise (Bereiter and Scardamelia, 1987). Students who view writing as a process, just like the student quoted above, view writing as a planned, phased and also frequently as a social process. During the 1970s and early 1980s, considerable research in cognitive psychology focused on understanding the thought processes of writers. Hayes and Flowers' (1980) classic study described the thought processes of skilled writers. One component of their work involved using think-aloud protocols with writers as they were writing, or immediately after, as a means of tracking the writer's decision-making processes. After numerous studies they settled on a three-phase model of writing involving planning, translating and reviewing. Planning involved searching one's memory in order to generate ideas, organise these ideas and then setting goals as a lead into actual writing. The second translation phase involved composing text according to the plan. The third phase involved re-reading and editing the written text just composed. For example, in one study Hayes and Flowers presented a think-aloud protocol involving 458 statements from one writer. These statements were then categorised as falling into one of the three phases planning, translating or reviewing. Furthermore, in the early stages of writing, 80% of thoughts involved generating ideas, whereas later, 80% of students' thought processes involved translating. While the process was not linear, nevertheless writers clearly engaged in very different thought processes at various points in the task of composing a particular text. In the following sections, students' descriptions of their thought processes as writers, supported by the *Laptops Initiative*, demonstrates the extent to which they

have internalised cognitive strategies for writing and the way in which access to computers, in this case laptops, provided added support for their composition for text. In particular, students emphasised how access to a computer allowed them to correct their work, saved them time if they made errors and very importantly allowed them to print a neat and polished final copy of, as one student noted, his "own stuff".

Clearly, the adoption of a process approach to writing is not dependent on access to laptops. What was the added value of having laptops and other computers in the context of the 'writing system' (Michaels, 1990) developed in the classroom? In the following series of interchanges between the evaluator/researcher and various students, a number of important issues emerge in relation to writing with computers/laptops: laptops are embedded in the writing system developed by the teacher, students' identities as writers and their sense of writing for and sharing their work with different audiences (teacher, peers, and family members – parents and brothers and sisters), and the role of the *Laptops Initiative* in helping some students view their school experience as enjoyable and worthwhile. In the first interchange, the second student (Student 2) also talks about the planned, phased and social process of writing as well as speaking about the value-added dimension through use of the laptop.

In the following transcriptions of conversations with students, the following conventions are used: R = researcher, St = student, students' actions are indicated in bold italics within square brackets e.g. ***[student reads]***, and the researcher's interpretations or comments are indicated in bold, capitalised, and within square brackets to the right of the page, e.g. **[Researcher comments]**

R: So how do you write a story in this class? How do you start off?

St2: We start with our soft back…

R: What's the first thing you do?

St2: We just have to sort out what we are going to write about and then we talk about our ideas and then we do a plan …should be around here ***[searching on table for plan]***

R: Do you all write on same topics?

*St2: No different ideas…****[flicking and showing process]…****here I talked about…here's the plan…do you want to read that?……..: I can show you some of my stories…*

R: Can you? And what difference does the laptop make?

St2: Better than the writing….

R: Is it? Why is it?

St2: A computer like…you go to any other school you wouldn't get that…

R: Wouldn't you?

St2: No. We are special… must be

……..

R: This is your story…do you want to read it to me?

St2: **[Holding and reading his printed story]**
Staying back in first year. When I came into Greenfield I met new friends and new teachers. Then I thought there's something very hard and then at the end of the year the class tutor called me out of my English class and asked me if I would think about staying back in first year. I said no straight away. I went home and told my mother and father. They just said it's your choice and my father said I hope you make the right choice. A day or two later I went to the class tutor, Miss Murphy, and told her that I agreed to stay back in first year. When I first came into first year I thought that it was good because of the break between each class from doing about six or seven laps of the school. The when I came to first year I found it was easy because I had already the work done before. My maths and English reading were improving a lot by the day. In my metal work class my teacher made me his right hand man. The best thing about staying back in first year was during the year Miss Murphy asked us would we like laptops and we would do our writing programme here. If I had been in third year I would not have been using the laptops. Come to think of it I am really glad I stayed back in first year. **[Laptops as a motivation for learning]**

R: …when did you write that?

St: When did I write it? A while ago…

PC: A while ago…I like the story…it has a good beginning and middle and it's about your own life in school so…why do you say you would like to use the laptops…

St2: If I had been in third year I would not have been using the laptops…

R: So what difference does it make to have the laptops?

St: If you were in third year you would just be sitting down in the class. You'd have to write stories…you wouldn't be using the laptop.

R: Wouldn't you be writing with the laptop, no?

St: In third year…if I'd been in third year I wouldn't have been able to use it. Then you'd have nothing to look forward to…when I am writing a story I think that I will write it on the laptop next…

PC: Have you shared the stories with anybody else?

St2: Ya, a few of my friends…teachers… **[Writing for an audience & developing an identity as a writer]**

R: What do they think?

St2: They thought it was good, really good…

R: and did you show them when you had written on the laptop or did you print them out…?

St2: I printed it out….

R: You brought it home?

St2: Ya, I have a few copies…the teacher has a copy, I have a few at home…
[Printing multiple copies for an audience]

R: Best sellers?!

St2: (laughter)

Reviewing this student's comments about writing presents the laptops as a small part of a larger writing system that involves teacher, peer and family support as he develops an identity as a writer. Furthermore, the availability of the laptops became, at least for this student, a very valuable and motivating dimension of his school

experience even though he had stayed back in first year: "*If I had been in third year I would not have been using the laptops. Come to think of it I am really glad I stayed back in first year*". In the light of research which has repeatedly demonstrated how students with learning difficulties often have very poor understanding of both the thought strategies necessary for both reading comprehension and writing composition, students descriptions of how they understand and engage in writing are particularly noteworthy.

The availability of both specific software applications provides an important support for students. A third student explains how he uses Microsoft Word in his story writing:

R: So what's it like using Word …that's what you are using here isn't it?

St3: Ya.

R: What's it like?

St3: It's easier than writing it…

R: Why is it that easier?

St3: Because if you make a mistake all you do is press two buttons and it's gone…

R: Why is that handy? Do you not like having to rub things out?

St3: Rubbing out makes marks. It's easier on this, it comes out nice and clean like.
[Aesthetic appeal of computer printed text over handwriting]

R: You like that? See these stories you have here do you have copies of these on your laptop? Lotto?? Who has read them?

St3: No one…

R: Anybody else? Did you print them out?

St3: No, not yet. I have only the one story on laptop. I took one of the other two as I have to do them all again.

R: Why are you doing them again?

St3: I am after getting other ideas

R: Ya? So you can come back and work on the other ones…

St3: Ya, stop on this one and go to a different one and finish that and put it on disc.

R: Your teacher was telling me that an author came in to talk to you…

St3: Ya ya, John Murphy… **[A local author as a role model]**

PC: Who?

St3: John, I think his name was.

R: And what did you learn from him?

St3: He gave us loads of ideas and that…

R: What kind of ideas did you get from him?

St3: He was saying…we sat around a table and we gave each other ideas. He was saying that you are writing for a programme…

R: His autograph is on your book…

St3: Ya it's on everyone's…

R: That's very impressive…very good. What kind of things does he do? What kind of tricks does he have?

St3: Don't really remember…

R: What kinds of tricks? What do good authors do?

St3: Stop and think…
[Writing as a deliberate planned process]

R: Do they write in one go?

St3: He was saying that he could write with his eyes closed…he'd be thinking in his head and he'd be writing…it took him two years to write about six hundred pages and then it took a few months to write about…

R: So he goes in bursts, it's slow and then fast….that's very interesting. So when he told you that what did you think about learning to write?

St: I just thought I would like to be like him…
[Developing an identity as a writer]

R: Why?

St: Just that it would be easier on the laptop…he gave us ideas and the programmes were great

R: So why would it be good to be like him?

St: I don't know…I suppose owning your own laptop and having your own stuff…
[Writing as having something of one's own – something to say "your own stuff"]

R: Why do you like having the laptop?
St3: It's easier to write, better ideas, it prints out nice and clean than in the hard back…

R: I suppose you mentioned that you can go back

St3: You can stop and go back to things you done before that….

R: I'd love to get one of your stories from the soft back, to hardback and to the laptop. You can tell me which story you like best that you want to give to me …could you do that? That would be great? Do you mind that?

St3: No, not at all. **[Comfortable sharing work]**

R: That would be great. Chat to you at the end…I don't have time now to read them all. I must chat to the others but I'll come back to you at the end. Thanks.

This long interchange between the researcher and a third student in this class again demonstrates the use of the laptops within a broader writing system, that is, as noted by Michaels (1990):

> *…the activities, norms, the rights and obligations for speaking and acting, and uses of technology that influence and constrained students' writing in the classroom. As we use the term, the writing system is the day-to-day practice of a curriculum, shaped largely by the teacher apart by the students and partly by outside forces that impinge on the classroom.*

Among the key aspects of the writing system developed by the teacher were: promotion of a 'vision' of writing as a personal, strategic and prolonged process, use of a local author as a role model, use of laptops/PCs and fostering students' sense of writing for different audiences. So what was the value added contribution in using the

laptops/PCs? A crucial point here, however, is that while much of what occurred could have been undertaken without laptops or PCs, the availability of laptops adds an important dimension for students. For example, students said that laptop computers helped them correct their work, prepare, print and present a polished finished product, and store their work. Writing with a sense of voice was clearly valued in the classroom as was the role of students in supporting each other's writing as demonstrated in the following interchange:

R: So what stories have you written this year?

St4: Only written them here …

R: Lotto…have you won it?

St4: No…I only wrote three in my hard back.

R: So you are going to win the lotto and go to Australia…big plans? Which stories do you like best of the ones you have written?

St4: The lotto one…I won money in it…

R: How much did you win?

St4: I didn't decide that yet…
[Sense of voice – 'I' of the author]

R: Suppose you make spelling mistakes what happens…?

St4: You go back…

R: But how do you know you make a spelling mistake?

St4: You go up to spell check…

R: Will it do it for you? Do you ever use it?

St4: A lot but there's already spelling mistakes fixed in this.

R: So it's in pretty good shape already. So how do you fix your spellings from the soft copy to the hard copy…

St4: You get a teacher to come over, she looks at the story and she corrects all mistakes and then you write it into the hard copy.

R: And would one of your friends help you to correct your mistakes sometimes as well?

St4: Ya.

R: They do…? They help you? Do you read their stories?

St4: Ya.

R: Would you notice their mistakes?

St4: I would ya, sometimes.

R: And what would you do?

St4: I would just tell them what is the right way.
[Teacher and peer editing]

R: How did you start writing this story?

St5: I just started planning, making plans for it, we do author's corner, you know marking off mistakes and if you have a mistake they'll tell you how to make it better…

R: Who will tell you how to make it better?

*St5: All of us…***[Writing as a member of a community of writers]**

R: So if you have your rough copy you'll share it with, say, James. James will read it and will he talk to you then?

*St5: Ya about how to make it better***. [Conveys sense of planning – not just dumping information. an end product that has scaffolded]**

R: What's that like? Do you mind? Is he a tough reader?

St5: Ya.

R: He is but you don't mind him helping you out?

St5: No.

R: Very good and what happens then after Author's Corner?

St5: You sit down and you do your writing in your hard copy…we start publishing after that. You write in this first and you get all your mistakes, writing properly and all that…

R: What's the difference? This looks very good as it is, the script, handwriting looks very nice. What's the difference going from that to that?

St5: It's a lot more fun using the laptop then it is writing.

R: Why is it more fun?

St:5 Because you are using the computer and she gives you time to mess around on the computer if you are finished your writing…

R: Messing?

St: Not messing…more time to do stuff…painting and that.
[Laptop as reward and opportunity to learn other applications]

R: Painting? Very good. So you are learning more about the computer through that. So how many stories have you now?

St5: Three.

R: Three on this and you have others somewhere else?

St5: I have only four in that (copy)…

R: What happens when that is done? Do you have the chance to share them with anybody?

St5: We all look at each other's stories and…

R: Do you print them out or look at them on the computers?

St5: We save them on the computers and then we print them as well if we want to bring them home.

At the end of the writing lesson in which the above conversations with students took place the teacher repeatedly directed students to save their work before the end of class. However, students were so engaged in writing their stories on the laptops that she needed to insist that she needed a break and that they should save their work and finish for the moment. As she noticed the students paying little attention to the direction to save their work she commented

> *"I don't think anyone is listening. This sometimes happens which I think is very interesting when I say a few minutes before the end to save because the minute we hear the bell we are all programmed to run in school when we hear the bell but they don't actually stop. This is usual…I say stop and they don't because they are enjoying it. They love it….Now boys you will have to save*

now…I know you want the break, I need a break as well. Save in 'Documents'".

Software

Data on teachers' use of, and impressions about software in the four case study schools was gathered using a brief survey which teachers completed during the school visit in June 2003 (see Appendix 2C).

Table 16 Software use in Greenfield (Spring 2003)

Name of Software	How I see it meeting students' needs	Questions/comments I have about the software are…
1.Starspell	Suitable for all ages. Each word put in a context sentence to aid recall. Contains printable word sheets.	Has record keeping facilities and you can include your own word lists.
2. Units of sound	Linguistics-based on audio-visual reading programme. Each "page" focuses on a particular unit of sound.	Teacher can check student progress by reading the material covered using the pupil book.
3. Issues in English	Designed specifically for teenagers & adults with literacy problems. Contains 8 suitable topics. Has a range of exercises: Close tests, spelling, and comprehension.	
4. Inspiration	Students found this software too difficult.	

The school organiser uses Apple Works and had not yet investigated ready-made programmes (May 2003). However, another teacher who withdraws students with dyslexia uses Wordshark and Starspell. The school level organiser said that she had not undertaken in-service about the potential uses of software for students with dyslexia or other reading and writing difficulties. Many teachers noted the importance of two factors in particular in relation to software. First, software that

provided feedback to the teacher on student progress was seen as important in determining students' overall progress. Second, a number of teachers in this and other schools (March Focus Group Interview) noted that software that allowed the teacher to customise exercises (e.g. Starspell) for students, was preferable to software that did not provide such a facility.

Achievements and Attitudes

The school organiser claims that, as a result of using the laptops, students' attendance had improved and that parent interest and involvement had also improved. The principal also said that he had observed significant improvements in both the behaviour and attitude of students involved in the initiative.

> *"Their behaviour tends to be better in those classes where the laptops are out. The laptops also have a side long effect in that 2L who were marked for involvement in this project – they were very troublesome, they had terrible behavioural problems, constant behavioural problems like kicking the chairs off them"*.

A certain pride was observed amongst students with many commenting that they share their stories now where they previously did not. The school organiser claimed that "*they see writing now in a different way*". As noted above, the principal knows the "troublesome students" and has taken great effort to ensure that they be included in the project. Over the course of our two visits, we noted how he frequently commented on the progress of students involved in the initiative and how he often added small details about students' growth to illustrate these comments. Similarly the school organiser was clear about the significant impact the opportunities created by the *Laptops Initiative* had created for students who were often poorly motivated about school and learning

> *You have to remember with the level that these boys are at…well not so much with those boys …that class we call our band two...I couldn't stress how*

limited they are…they can barely read and as for writing…I have examples of their work in my bag here from before this project from last October. So, I am not talking about two years ago. And I'll give you that example and you will see how through all this development and learning and really as the two other researchers were saying earlier, talking and thinking is so important before they write anything. They say sure we have nothing to write about and now they have so much to write about that they can't stop and also because I have an in-class support teacher or I am in-class support for Mary. We do…like the teacher models the story. So, I'll say now I am going to write a story but I'll never pick anything too dramatic and then they would give me words and phrases for my story and I would compose that in front of them so that's like teacher modelling and they are engaged with that and they will say that if she can do that over something so simple then I can do that.

R: So it's not about the day you saved the world?

T1: Oh no!

R: It's something more ordinary.

T1: It's usually…my story that I would model for a class would be roughly simple and they say but that's not a story and then I make it a story and they just can't believe it and then sometimes I can broaden that and say all writing is about stuff…I believe that this active learning together learning in a group and sharing experiences and then of course writing about them, talking and thinking…it's like a language course that you are engaging with the whole person and they have a greater sense of themselves. That if you are doing drill and practice, I think you might be improving maybe handwriting, perhaps thinking processes but it is very individualistic and I also see a great need for children with learning difficulties learning together and learning from one another.

Considering of this teacher interpreted and supported students' writing provides a vivid example of 'good practice' in relation to the creation of a 'writing system' (Michaels, 1990) where writing is in the words of Calkins "*lifework rather than deskwork"* (1996). As such, the teacher, supported by the *Laptops Initiative* but inspired by a process approach to writing, was providing an important space within school for the development of students' writing skills and the development of students' sense of themselves as a person with a story to tell. It also clearly illustrates the importance of understanding the use of laptops within a curriculum context or broader 'writing system':

R: Something that struck me about the boy that said that "that really matters" to you telling that story about his own soccer team, how did they pick up on the language…that is quite sophisticated to be able to say "that matters". Where did that language come from? Was that something you modelled?

T1: I remember feeling very delighted when that boy said that and I looked at the in-class support teacher and she smiled at me and for us it was a great moment. We wondered. We didn't know where it came from…and we said what do you mean? And he said, well he wrote about something that really mattered in his life and I liked hearing it. After that we found one or two more of them said well if he can do it, I can do it and there writing did become more personal. We didn't make that up. I don't know where the line came from. He said it because he just got that feeling that this story was more personal than the one he had heard before. Then they write something on a little yellow piece of sticky paper and put it on their copy and they go back and edit and include or discard, if they choose, we don't make them. It's advice.

R: It's optional. It's advice but it's not an order.

T1: Some boy said, "look, your story ended fast" and then he went back and he thought and he said I want it to end like that so I am not changing it. One boy advised him to put something else in at the end and now for those boys that is fantastic to be able to do that. To be able to think, almost, that's very clever thinking to be able to advise someone else and we like that idea of them helping one another with the technology too. They know…they don't know more than I do, but they know, they are pretty handy and they pick stuff up themselves. With the laptops you know they'll explore their uses.

Teacher beliefs

The school organiser is a strong supporter of an in-class and socially supported approach to special needs education (rather than an individual withdrawal approach) and exercised strong class management and measured pace of teaching in her classroom in such a setting. However, she also recognised limits on what may be possible with particular groups of students and time constraints in any given term of school year:

"This is the obvious thing but you can't do everything in one term with children with learning difficulties and if you do it's pushing"

In summary, both the principal and school organisers' beliefs about the project are as follows. Both agree on:

1. A curriculum based approach
2. Not being intimidated by technology or its security implications
3. Seeing technology as having a time and a place. It must not be overdone, "*the great thing about technology is that it can be turned off*" (Principal, May, 2003)

ICT/Technology integration in Greenfield

Based on Sandholtz et al's (1997) ICT/technology integration framework, Greenfield had moved comfortably through the entry phase of technology integration by May 2003. Overall, Greenfield showed signs of being at both the adoption and adaptation phases of technology integration primarily because the laptops were being used within existing practices and for relatively small portions of the lesson/day/week, and used in both focused and productive teaching and learning activities.

3.2.2 Newport

Project start up

This school is located in a thriving satellite town with much commercial building work in progress and a recently constructed by-pass and motorway. The school itself is located in a residential neighbourhood with a large green area, sports grounds and car park. The window to the visitors' waiting room is decorated with Halloween images. The corridors of the school are covered with photographs, trophies, framed student work and projects. This school appears student focused with strong community connections. There are strong links between teachers, parents and the local primary schools. Early identification of students with learning difficulties is facilitated by cooperation between primary, secondary level and the local adult literacy programme based at the school. There is no streaming process at this school, all students are assessed by AH4 IQ tests. Students are drawn from a range of

backgrounds, both social and cultural, and there are a significant number of non-national students in the school.

Built in 1980, student enrolment peaked at 1200 and now stands at circa 1100. While student enrolment is today in a gentle decline, teacher numbers are at a steady increase. Offices and staff room were busy and lived in with notice boards informing staff of any developments concerning students.

This school employs three full time learning support teachers and draws upon other resources to support literacy including the Community Literacy programme, existing ICT initiatives and post-graduate student technical support. A strong sense of shared mission is apparent among the learning support teachers and principal. There appeared to be a strong consensus and comfortable communication between the teachers and principal in relation to the *Laptops Initiative*. Teachers appeared confident in what they were doing as part of the initiative and said that, once they received the funds, they were eager to start using the laptops given the school's prior involvement in ICT initiatives. The principal is very enthusiastic about the initiative, frequently spoke of the importance of new ideas and views his school as doing well in the context of the development of schools generally within the *Laptops Initiative*. The staff involved in the *Laptops Initiative* were confident of their work to date, and felt considerable independence in relation to decisions made in connection with the initiative.

After our initial visit in May 2003, it was clear that this school had been working ahead independently on the *Laptops Initiative* for some time. Many of the concerns raised in the other schools about the role of ICT in SEN were not raised here. Indeed, there was a general sense of being at ease with how ICTs might serve students with SEN. SEN provision is by small groups and ICT is widely used. As of Autumn 2002,

the laptops were being used in whole class groups, especially those doing the Junior Certificate Schools Programme (JCSP), and for individual pupils. There are a number of factors that make this an interesting case:

- The school commenced the *Laptops Initiative* immediately after receiving funding in December 2000. The principal attributed the school's comfort and confidence in getting started early as due to their involvement in previous ICT projects and the presence of teachers who are both competent and enthusiastic in terms of the use ICTs in teaching. For example, in terms of prior involvement in ICT initiatives, the school started using ICT for SEN in 1997 when it received funding from Co-operation North for a separate project.
- It developed an SEN and ICT structure – five teachers now fully involved in SEN.
- The school has a Linux-based wireless network and had a full time technician for a time. As of Spring 2003, two former students, now working locally, provide technical assistance as needed.
- The school has wider community involvement with an adult dyslexia groups, and school retention programme among other groups.
- The principal and staff are notably futuristic in their thinking about ICT and education.

During Autumn 2002, the school had adopted a 'two strand' approach – one teacher was using laptops with the full JCSP class and the school organiser was using them with pupils who had "signs of dyslexia" on a withdrawal basis. In Autumn 2002, the project coordinator noted that the principal "feels that the next stage of development must be in developing systems in the school – assessment of pupils, selling it to staff, training etc".

National context at school level

In general, there is a considerable awareness of the issues raised by the initiative across schools involved in the project. The principal and teachers are modest about their achievements and seemed surprised by the comparison between them and other participants, although they are confident:

> "*I suppose I felt compared to other people we were going fairly well. I thought we had a focus in what we were trying to do. We had targeted students. We were now doing serious assessments and also that we had delivered the message to the staff that this was a serious issue".*

The learning support team in the school is referred to as a department and in this way it is apparent that there is a heightened awareness of literacy issues. They spent the money quickly for fear that "they might want it back". This school is accustomed to receiving grants of various kinds given their location and willingness to engage in innovative projects.

Approaches used by school

This school is already very comfortable with technology and is using this project to integrate technology further into their teaching plans. In this way they can be said to have moved swiftly through the entry phase (Sandholtz et al, 1997) as they have a healthy technical support department and had considerable experiences with other ICT projects prior to the commencement of the *Laptops Initiative.* They then progressed rapidly to adoption and adaptation though as a unit they have not really moved any further into appropriation or innovation though their infrastructure is very advanced and innovative in style, programming and management. Certain teachers would be securely in the appropriation mode of integration, conceptually making technology their own but these teachers would have limited ability to actualise their views through day to day usage by students. As one of the teachers in the school

commenting on students' use of the laptops noted, students had developed a mode of engagement with the laptops focused on learning:

> "*They identified with these machines and they are friends. They are not hostile...You can sense they are getting something out of this and they are not asking where are the games. They are not looking for distractions…".*

Teachers are very much involved in software evaluation and keyboard skills teaching while also discussing with ease such problems as server capacity and in house designed computer programmes. The school is, as one teacher noted, "…future orientated and…has its feet on the ground and you really need both. You need to know where your feet are and you need to know where the next step is".

By September 2003, the school had students from 1st, 2nd and 3rd year involved in the *Laptops Initiative*. As noted by the principal:

> *The figures are roughly ten in first year, eight in second year, and I think it's six in third year. Now we're just going to have to, we have the capacity to increase the number of students involved. Now they are talking about spending more time individually with the students . . . one class period up to two class periods so that they're coming to them twice a week.*

The principal also stressed the programmatic nature of the school's learning support and how there was support for the *Laptops Initiative* from both senior management and the schools IT department.

> *…I have three people now involved and in terms of dealing directly with dyslexia there is another three, obviously resource teachers who are aware what is going on. I think that's enough. The information to the staff. We've gone a long way down the road in terms of….the learning support teacher has written up information on dyslexia for the staff. Staff are being brought up to speeds slowly but I think she's done it well and the information is going across. There is serious intervention going on here, and work with the students. In terms of the senior management in the school, or the year heads, are very well informed now at this point and feel good about it. Something is being done in that area. IT has to become a strong department in the school. I don't think we can turn back now and if for instance we didn't have the support from the NCTE or wherever we'd still have to come up with some solution be it to move into the school labs, the computer labs and work through that. Now we can't go back now. It's too important to us.*

Models of Management

The school management teams are clearly defined and divisions and tasks do not overlap. There is a learning support department, technical support and the school organiser. Participating teachers roles are clearly defined and tasks are equally shared. Laptops are stored in a lapsafe in a secure location in the school and there is no anxiety around this. Laptops are charged at night and they become mobile when required throughout the school though the technical support department needs to be notified in advance of any access point unlocking which may be required. The server is not capable of supporting the demand which has been created. As the principal noted:

> "*He told me two years ago the server was enough to keep us going for ten years but…Just so many things have been added. Its enormous, it's increasing every day*".

The school has its own website and this is updated regularly, every student has an email address and private directory.

Of the four case study schools, Newport, had the best developed strategy for promoting a 'fostered' model of laptop management. And unlike the high degree of concern about security issues in other schools, Newport appeared to have involved parents in such a manner that students could take laptops home regularly.

> *Principal: So there's a follow up. Some of the students are taking the laptops home.*
>
> *Researcher: Yeah the two learning support teachers mentioned that.*
>
> *P: So, that's not an issue now regarding security problems.*
>
> *R: But you developed a letter did you?*
>
> *P: We did, yeah, and I suppose correspondence between, some structures set up between the home. But it isn't an issue, security. And* [the letter] *is just a line or two saying 'taking the laptop on this date - will return it'…Over the breaks . . . these students had them over summer to work on them. Sorry I should have mentioned the four students were assessed in June and the parents were in here. That was part of the programme.*

R: That was the end of June?

P: Yes, and as a result of that the parents asked could they have the laptops to start working ahead and that was very good. That's what it should be about anyhow. Its not just the teachers push but the parents…Now the fact that we have the actual dyslexia group, the outside group here is obviously giving us an impetus, a push as well. And of course…obviously there's is a lot of benefit to be gotten there...

As noted by the principal, parents have become involved in supporting students with learning difficulties. The school's links with parents are further supported by the existence and collaboration with a community literacy and dyslexia group. During our second visit in September 2003, the developments that had been made in the project since our May visit involved: installation of software over the summer, some students taking laptops home for the summer, and fostering parent involvement in the *Laptops Initiative*. As one teacher noted:

T2: We bought software . . .Over the summer it was installed and we had a small problem with network cards.

R: Yes, you mentioned that

T2: They were just a bit dodgy. It was easy to replace. So we changed network cards to a stronger one that inserts completely. It doesn't protrude. It sticks in. So we just got them. Some of the students have been identified for use of the support. So they have been assessed. So we're meeting their parents tonight.

R: So they'll use the laptops when they're withdrawn?

P: Yes.

R:… some students take the laptop with them. They've fostered a culture of taking them home.

T2: Yes, they take them home for the midterm breaks and some of them took them home for the whole summer. The resource timetable is only kicking in next Monday. Three full teachers are doing remedial/resource.

The use of laptops, according to teachers in Newport, needs to be viewed within the context of students' whole experience of school and examination preparation. As noted by one of the learning support teachers, students participating in the *Laptops*

Initiative would need far superior typing skills if they were to use laptops in an examination setting. The lack of continuity between using laptops for teaching and learning and not being able to use them for examinations was an issue a number of principals stressed at the May 2003 meeting in Dublin.

> *T2: I suppose the big issue is using the laptops in exams and whether to use the laptops in exams. I suppose we feel that's not appropriate yet. Typing skills would not be up to precision. They will need some concession in exams in terms of software we can get. We're recommending a scribe for at least two of them…and readers for maybe all of them.*
>
> *R: They will write and someone will read it off.*
>
> *T2: Someone will read the exam for them.*
>
> *T1: We were thinking of using Kurzweil* [software] *as the reader in the exam.*
>
> *T2: We have a couple of students who have spare time so they are going to start scanning things for us.*

Profile of case study students

Students using the laptops in this school are comprised of (see Table 17 for profile of two students):

1. 2nd year selected individuals (O)
2. 1st & 2nd year groups (O)

Teachers have observed increased motivation, quality of engagement and productivity, although the aims of the literacy programme which is firmly established in the school may be equally as responsible for these as any technological innovation.

Table 17 Case study student profiles (Newport)

Name	Joe	Tracey
Assessment	Dyslexia	General learning difficulties
Learning Support	Yes - 4 x 40min sessions per week	No
Resource Teacher	No	Yes - 4 x 40 min sessions per week
Needs	Organisational Skills Increased self-esteem	Greater confidence Very poor spelling ability Poor sentence formation
Strengths	Visual learner Good verbal vocabulary	Good organisational skills Keen to learn
Role of Laptop	Cut/Paste options, Spellchecker, K-W-L Chart	
Outcomes	Organisation Essay composition Successfully completed essays	Enjoys access to spell checker

The teachers noted that ICTs have long been present on a day-to-day basis in the school, and consequently it is difficult to identify the specific consequences of the *Laptops Initiative*.

Personal support tool for student

Students use laptops as a complete class or in withdrawal teaching. Students are sent alone to collect laptops and a few students have taken laptops home at holiday time. However, improving students' keyboard skills have delayed the use of laptops in examinations though it is being considered for students taking exams next year.

Instructional and learning activities

The school timetable was being altered to accommodate double class periods so that maximum use could be made of laptops. The literacy programme easily facilitates laptop use for essay writing and KWL charts (KWL is an instructional technique for helping students identify what they **K**now, what they **W**ant to learn and what they have **L**earned). The keyboard is used as a teaching tool for identifying letters and improving both spelling and students' presentation of their written work.

Table 18 Instructional and learning activities for participating students

Year	Total no. of students	No. of male students	No. of students assessed with dyslexia	No. of class periods per week	No. of teachers involved	Type of teacher**	Please specify type of teaching/learning activities for which laptops are **primarily** used ***
1st	10	9	6	6	1	LST	All
2nd	8	6	7	4	1	RsT	All
3rd	6	5	6	4	2	RsT S/CT	All
TY							
5th							
6th							
Total	24	20	19	14	4		

**

LST = Learning support teacher
RsT = Resource Teacher
GCT = Guidance and Counselling Teacher
S/CT = Subject area/Classroom teacher

***

RSk = Development of reading skills using specialized software e.g., Wordshark, Starspell and/or other similar programmes
RBk = Reading adapted books e.g. Don Johnson 'Start-to-Finish Books'; Kurzweil and/or using similar software
WRT = Writing using regular word processing software (e.g. MS Word) or specialized software for teaching writing (e.g. Clicker 4)

Software

While the school is dealing with advanced infrastructure problems, it is also still dealing with adoption issues such as software analysis. The teachers suggested the schools should be allocated a "continual software budget" so that analysis could continue throughout the duration of the *Laptops Initiative*. Teachers have also requested further contact with initiative participants so that knowledge can be shared and exchanged freely. The school organiser had participated in software focused workshops hosted by the NCTE, and noted that she wanted more guidance in using *Inspiration*, a piece of software to help with essay planning and the fostering of study skills.

Table 19 Existing software use (Spring 2003)

Name of Software	How I see it meeting students' needs	Questions/comments I have about the software are…
1.Wordshark	Multi-sensory approach to spelling and reading	Excellent/Essential
2. Texthelp – various titles	Makes all content accessible	Excellent but requires time to master toolbar
3. Don Johnson: Start to Finish Books	Interactive Books	Allows students to engage in the reading process. Helps with vocabulary development. Supports reluctant readers
4. Mavis Beacon	Helps improve typing skills	Essential to complete assignment efficiently
5.Kurzweil 3000	Excellent for accessing core texts at school	Important software to facilitate laptop usage in the classroom.

Achievements and Attitudes

This school is very positively disposed to the initiative and is simultaneously dealing with entry and adoption style problems while also rebuilding its own server and designing new technologies. It is caught between finding its feet and reaching for the sky at the same time. However it has actualised some real change for students and may be the one of the first schools to allow the laptops to leave the school building. The "importance of personal beliefs to instructional evolution" is clearly borne out in this school (Sandholtz et al, p. 257).

Teacher beliefs

Teachers are very strongly supportive of the initiative and attempt to facilitate its integration.

> *"We didn't come in with set rules. We made our rules as we went along and we knew we'd have to adapt".*

It is seen as a positive presence in the lives of sometimes disadvantaged and struggling students. The phrase 'difficult student' was never mentioned.

> *"It* [the laptop] *doesn't give out to them. They can make the mistake twenty times and correct it twenty times. I think that's very important".*

The principal noted that the school's attitude to students with various learning difficulties had become more positive over the previous ten years due to a variety of factors including efforts by school management to develop a more inclusive approach to addressing students' learning needs (for example, some teachers mentioned the importance of multiple intelligences as a way of approaching student assessment), the opportunity to become involved in various curriculum and ICT innovations (started using computers as part of a Cooperation North Project in 1997), sufficient access to technical support for ICTs to make computer usage viable for teachers and students alike, and the development of a team work approach to the provision of learning support.

The principal claimed that the message of the importance of literacy had been communicated to all teachers at this stage, and also remarked that derogatory terms used ten or fifteen years previously to describe students were no longer in use within the school. The school's IT specialist was a gatekeeper of both the server and hardware though he had less involvement in software and could see few if any limits to the potential for technology in education. Conceptually, he was a designer and futuristic in his understanding of ICTs in education.

ICT/Technology Integration in Newport

Newport was probably one of the first schools in the *Laptops Initiative* to purchase laptops and proceed with implementing the initiative. The school's general comfort in proceeding with the initiative was probably due to the schools participation on other ICT projects, prior to the *Laptops Initiative*, which more than likely built up a capacity for change in relation to ICTs as well as a technical support structure in the school. Consequently, Newport moved swiftly through the entry phase of technology

integration – more swiftly than any of the other case study schools. While the initial use of the laptops revolved around reading skill software, that is Wordshark, some teachers were using the laptops to teach students self-organisation (e.g. using Inspiration software) and support student research using the WWW. The school's concerns about increasing students' time with laptops in school and promoting a 'fostered' model suggests that the school was grappling with adaptation level issues, that is, considering how to increase students' use of the laptops in meeting learning goals.

3.2.3 Oldtown

Project start up

Oldtown is situated in an aging second generation community in a major urban area. The school's enrolment numbers have dropped significantly over the last two decades from a high of almost a thousand to the current enrolment of 290. The part empty building conveys a sense of space in the large dispersed three-story school complex. Compared to, for example, Greenfield and its burgeoning surrounding community, Oldtown has a quieter and less urgent air about it.

The early development of the initiative was hindered to some extent by on-going changes in school management, difficulty with changing personnel, concerns about how best to spend the *Laptops Initiative* funds, and a high level concern about laptop security. For example, both teachers and students noted the issue of laptop security (Field Notes, May 2003). In addition, the school level organiser noted that they had "*great difficulty*" finding a secure method of laptop use short of "*locking laptops to the ground*" given the security concerns. However, after some initial consultation with the project coordinator in Autumn 2003 involving attention to the development of a basic project framework, in-school supports and reasonable

timescale, the school began to make significant progress. The acting principal had discussed the initiative within the school and the deputy principal, a trained learning support teacher, was taking on the role of school organiser. Both spoke of the *Laptops Initiative* as a means of meeting *"special needs of any description"* (Field Notes, May 2003). According to the principal, three teachers also attended a course on software during Autumn 2002 and the principal, who was trying to build a teacher base for the project, was appreciative of NCTE support. Despite the apparent unfavourable context, the project made significant progress. In Autumn 2002, 30 lightweight portable word processors (AlphaSmarts), at a cost of 2,758 Euros, were purchased and seven pupils began using these fulltime in mainstream classes and two were taking them home. (AlphaSmarts are small enough for students to use at their own desks and portable enough to move from classroom to classroom. AlphaSmarts can be stored and recharged on a special cart. Each cart typically holds 30 AlphaSmart keyboards, enough for an entire class). Oldtown used the AlphaSmarts to word process, and word-processed documents were then downloaded to a desktop computer in the computer room. Keyboarding classes took place at lunchtime (funded by School Completion Programme) and pupils were "awarded" AlphaSmarts when they reached a certain level of competency. Initially, the *Laptops Initiative* did not seem to fit easily in this school due to oft cited staffing pressures and changes, and possibly also due to perceived security concerns in relation to the laptops.

In terms of SEN and ICT, a number of issues are worth noting in terms of the school's starting point. There were three approaches to SEN: team teaching in mainstream classes, withdrawal of small groups or individuals (taken by teachers who were interested and/or trained), and the learning support teacher was available to take individuals or group as needed (but this was no longer possible once she became

deputy principal). ICT infrastructure in the school is not well developed – there was, as of Autumn 2002/Spring 2003, little ICT expertise among the staff and ICT equipment was old. These factors presented some difficulty for the initial implementation of the initiative. An interesting case emerged in this school and provided the best example of mainstreaming the laptops across subject areas. Seán, a 5th year student assessed with dyslexia, carried his laptop around the school from lesson to lesson. For example, Seán's maths and physics teacher had installed software programmes for Physics on Seán's laptop. These programmes illustrated experiments in a step-by-step fashion. Seán was very pleased to show the evaluation team his laptop but also told us about another 5th year student who has been using a laptop but had stopped because his friends started *"slagging him"* because he had something they did not have (Field Notes, May 2003).

National context at the school level

Although this school was, according to the principal and deputy principal going through big changes, they were developing their ICT infrastructure. They noted that there were mixed reactions to the *Laptops Initiative* in the beginning but that it was gaining support and making progress. Initially, senior staff in the school viewed the project as "daunting" and time consuming. Laptops were viewed as a security risk within the school and to individual students. Both the principal and deputy principal put strong emphasis on serious security and safety issues. The sum of money received for the *Laptops Initiative* from DES was clearly surprising and said they "didn't know what to do with it" in the beginning. They noted that they found the visit of the project coordinator very helpful in gaining a better sense of local ownership for the *Laptops Initiative*. Given the perception that they may have been progressing somewhat more slowly than other schools in the *Laptops Initiative* both the principal

and deputy principal stressed the constraints under which they felt the *Laptops Initiative* was operating.

Approaches used by schools

The ICT infrastructure in this school is comparatively underdeveloped although it has a special needs education record given its high intake of students needing additional educational support (number suggested was 26). This school has implemented mainstream team teaching and withdrawal of small groups and individuals. The school organiser found that, once she became deputy principal, the amount of time she had available to teach had been greatly reduced and this impeded the development of the initiative. She also noted that teachers were not opposed to the use of ICTs in their classrooms as long as the student was independent and required no assistance during the class. This school is between the entry and adoption phases of integration given relatively moderate levels of interest amongst general teacher population. The school organiser/deputy principal has facilitated the integration of AlphaSmarts within the classroom and in the home. The use of AlphaSmarts is an interesting departure and may provide a model for other schools.

Models of Management

As mentioned earlier, the school initially purchased 30 AlphaSmarts and is using these rather than full specification laptops as the mobile learning technology of choice ('floating' model). It also purchased a number of desktops (fixed model) which are used in conjunction with the AlphaSmarts. At this stage, laptops are not generally used by students involved in the *Laptops Initiative* for everyday use in different subject areas. Only two students, James and Sean, have day-to-day access to laptops

(one of which was stolen). There is a large technology resource room on the third floor of the building which is kept under lock and key unless supervised. The choice of this room has significant consequences for the project in that its distance and inaccessibility other than by stairs prohibits any use of, for example, laptop trolleys as occurred in two of the three other case study schools.

Student profiles

Table 20 Profile of case study students (Oldtown)

Name	Sean	Paul
Assessment	Dyslexia	Dyslexia
Learning Support	Yes – 1 lesson per week	No
Resource Teacher	No	No (Not possible as he is now completing LCA)
Needs	1.Spelling & reading 2.Use of technology as an aid	1.Spelling & reading 2.Handwriting
Strengths	No behavioural difficulties Eager to use anything to assist learning Has coped well with his dyslexia Achieved Junior Certificate Completed transition year	Completed Junior Certificate with support of tape recorder and reader Final year LCA Positive attitude & motivation. No behavioural difficulties Friendly, co-operative Visual perception above average
Role of Laptop	Confidence building Assist in layout work Assist spelling and writing Read package on computer will assist his reading	Confidence building Produce work neatly & correctly
Outcomes	Using laptop with confidence to assist writing & spelling	Keen to finish his Leaving Cert Has more control over his difficulties Can type well

Students are largely enthusiastic about technology, especially Sean and John (see Table 20). Not many students have computers in their homes although one in particular is very comfortable with installation of hardware and announced with pride that he is the "techie" at home. As mentioned before there is a very high level of special educational needs in this school and, although this programme does little to address general students' needs given the security threat, the needs of selected students are nurtured.

Personal support tool for student

Two students were using laptops day to day around the school although this was problematic as the security status meant that laptops had to be returned to the office regularly. Three out of five were eventually stolen from this office and the principal was reluctant to redistribute laptops except for one to a visually impaired student who must use the laptop (on the advice of the learning support teacher and the student's visiting teacher).

Instructional and Learning Activities

Table 21 Instructional and learning activities for participating students

Year	Total number of students	No. of male students	No. of students assessed with dyslexia	No. of class periods per week	No. of teachers involved	Type of teacher **	Please specify type of teaching/learning activities for which laptops are **primarily** used ***
1st	1	1	1	2	1	RsT	Reading, Spelling, Writing, RSk
2nd	14	6	1	6	2	LST S/CT	Reading, Spelling RSk, Writing
3rd	6	6	2	4/All	All	S/CT S/CT	Reading, Writing, Spelling RSk
TY							
5th							
6th	2	2	2	5/All	1/all	RsT S/CT	Reading, writing, Spelling RSk
Total	23	15	6				

**
LST = Learning support teacher
RsT = Resource Teacher
GCT = Guidance and Counselling Teacher
S/CT = Subject area/Classroom teacher
***
RSk = Development of reading skills using specialized software e.g., Wordshark, Starspell and/or other similar programmes
RBk = Reading adapted books e.g. Don Johnson 'Start-to-Finish Books'; Kurzweil and/or using similar software
WRT =Writing using regular word processing software (e.g. MS Word) or specialized software for teaching writing (e.g. Clicker 4)

Teaching style has not changed dramatically to facilitate technology in the classroom. AlphaSmarts are permitted as long as they do not require supervision by teachers. Some students use basic software programmes such as WordShark and NumberShark

on desktop computers located in the computer room. This approach facilitates drill and practice or Computer Assisted Instruction (CAI) use of software.

Software

Approaches to software use are at the early experimental stage with the school organiser/deputy principal investigating software other than the drill and practice titles mentioned above, such as Texthelp: Read and Write etc. The technology support teacher designated to work with students in the learning support room was beginning her involvement in the initiative and was learning about the software programmes installed on individual PCs at the time of our visit to the school in May 2003. In relation to CPD on how best to use software for students with dyslexia or other reading and writing difficulties, some teachers have attended evening and in-service courses in a local education support centre and some others had attended some training as part of the SEN training course for second level teachers in a college of education.

Table 22 Software Review Use (May 2003)

Name of Software	How I see it meeting students' needs	Questions/comments I have about the software are…
1.Issues in English	Reading, writing, spelling and comprehension in one package.	Excellent. Usable from 1st yr to 6th yr. Plenty of stimulating and relevant content & exercises.
2. Wordshark	Linked to Alpha to Omega books. Excellent for bright dyslexic students.	Games are clever and stimulating for students. Accessibility can be difficult – it can take a long time to work out a learning plan for each student.
3. Starspell	Simple to use. Graphics are clear. Spelling tasks within reach of weaker students.	Meeting Needs Suits the younger student or the student with other special educational learning needs.
4. Wellington Square	Facilitates a student reading a novel & using spelling & comprehension skills	Can become monotonous. More variety in lessons needed. Students enjoy its predictability.
5.Inspiration/Kidspiration	Help for dyslexic students to put order to their work	Colourful. Useful as another technique for organizing material, particularly the academic student.

Achievements and Attitudes

Achievements were minimal overall as of Spring 2003, however, technology had changed academic life for at least three students – Eamonn, Joe and Seamus (not their real names). Eamonn and Joe were both taking typing classes and Seamus was using technology to present LCA associated projects. Eamonn was jealous of Joe's typing skills although he himself had developed his own way of using the laptop for his Irish classes. Communication with this school had been problematic due to timetabling pressures and staffing changes. Continuity has been inhibited due to changing staff roles and responsibilities and this has had a very significant impact on school planning. Progress has also been delayed for the same reasons. Like Greenfield, there had been little or no stigma related to association with laptops in general, with the exception of one student as noted earlier. On the contrary, some pupils who have no specific need for a laptop or AlphaSmart have asked for access to them. The deputy principal attributed this to the sheer relief of pupils who saw laptops as a way around their poor handwriting and related reluctance to write.

Even if students had limited opportunities to use the laptops (as was the case in Oldtown except for a small number of students), they nevertheless were enthusiastic about using laptops during our focus group meeting with them during our May visit. As students' comments about laptop use were very similar across schools (Oldtown, Newport and Greenfield were the three schools where we held 30-minute student focus group meeting), we provide an overview of their comments for this case study only. In response to the question: "What do you like about laptops"? Students said that they liked that the laptops or computers because they were able to spellcheck their writing, play computer games, save time while writing, and have access to information. In relation to Texthelp software, one student liked the computer because

it “talks to me”. One student also commented that access to laptops/computers was “saving on pens and the rainforest”! In response to the question: “What is the hardest thing/what do you dislike about laptops?” students said that they disliked ‘logging off, looking for letters on the keyboard (immediate answer from several students), and losing information. An important issue in terms of potential for laptop mobility was that many students noted that laptops were heavy.

Two individual students in Oldtown who were using the laptops in some mainstream classes were very enthusiastic and eager to show us some of their more personal uses of the laptops. For example, Seán showed us how he was using ‘fadas’ in Irish and Vincent was very keen to demonstrate his typing skills. One student, Peter, was notably more confident working on his computer rather than using paper – this is the same student who told us that he was a “techie” in his house. We asked each student to draw how they say themselves with their laptops, and Peter’s drawing showed detail on the wires and grilles of the computer rather than anything else.

Teacher beliefs

There is some scepticism about the *Laptops Initiative* in the school. Teachers are sceptical of benefits, and the laptops were described by one teacher as a “gimmick”. However, there is low emphasis placed on teacher access to technology in this school. There is only one Internet access point in the whole school and this, according to one teacher with whom we spoke, is “guarded” carefully by the IT teacher.

ICT/technology integration at Oldtown

Oldtown was very much in the entry stage of ICT/technology integration. Due to internal restructuring of school management and redeployment of key *Laptops*

Initiative personnel, the project got off to a gradual start. Nevertheless, the school was making interesting progress in terms of the use of AlphaSmarts as a mobile, low cost, high durability tool to support students with learning difficulties. In addition, two 5th year students, both with learning difficulties, were using laptops in their mainstream classes. One of these students had a severe visual impairment and was using the magnification facility on his laptop to read and write. He eagerly and very expertly demonstrated his use of this to the visiting evaluation team. This school's use of the AlphaSmarts and some individual mainstreaming provided diverse insights on the dynamics of the *Laptops Initiative* implementation in school that, according to the school level organiser, *"got off to a slow start"*.

3.2.4 Westtown

Project start up

This school is located in a rural area on the outskirts of a satellite town. Although it has a provincial setting, it is well connected with the local community and external mobile resources, e.g., a visiting bookshop comes to the school and the principal informed us of the designation of the school as an adult and community education centre. There was a strong staff presence in the halls. The staff room is crowded and the principal's office is spotless. An overriding sense of order, discipline and tidiness dominates. School corridors were decorated with pictures, photographs and framed work by and about students, but everything is very orderly. Given the small community, teachers often know parents very well and can intervene directly with them if the need arises.

Following receipt of funding for the Laptops Initiative, the principal made a decision initially, unlike for example Newport, not to proceed with implementation until more extensive NCTE structure and guidance was forthcoming than was initially

available. Once this was made available, the school proceeded immediately with implementation. By Autumn 2002, a school organiser was appointed and a committee was formed which met regularly during 2002-03. As of Autumn 2002 and into Spring 2003, according to the principal, he began to get a sense of how the *Laptops Initiative* might unfold in the school and the purchase of laptops was put in motion. Compared to, for example, Greenfield or Newport, Westtown was at an earlier stage of project implementation at this point.

The main learning support teacher was initially, she said, nervous and hesitant around technology but, she noted in September 2003, that she felt much more comfortable with the laptops having used them herself for a few months with some students. While obvious changes did not occur between our May and September visits, the horizons of possibility have expanded and a new confidence and relaxed attitude has emerged to the school's perception of the laptops. For example, the learning support teacher said that she had been uncomfortable with technology initially (during 2002-03) but was *"playing"* with it by September 2003.

Westtown had a *Laptops Initiative* designated room with twenty-one Dell Inspiron laptops connected to server points. A scanner, printer, and data projector were connected to one of the laptops. The school's IT teacher noted that they were very much focused on discovering the possible uses of software for students with SEN. Like teachers in other schools, teachers in Westtown noted that "students love to see their work printed".

The school's technological infrastructure is considerable and the school has been used as a training centre for local primary teachers. The school provides all students with the opportunity to do the European Computer Driving License (ECDL) as an optional exam. The principal, IT teacher and learning support teachers did not

see wireless technology as a necessary or potential component of the *Laptops Initiative*. There are two core teachers involved in the *Laptops Initiative*, although this number is expected to increase to almost twenty staff having some involvement in the project.

National context at school level

This school is geographically distant from urban centres and training venues, yet it uses its existing resources well. The school organiser of the project had little or no background in ICTs and was appointed because of a teaching background in learning support. Much time was spent at the planning stages, and purchasing and implementation were delayed given the limits imposed by the formation of a committee and lack of teacher familiarity with technology. Teachers here repeatedly stressed the need for national guidelines and project goals (which had, of course, been well clarified at this stage). There was a general sense of caution, at least initially, in relation to the project framework and concern in relation to the potential impact of parents' perceptions on the initiative.

Approaches used by schools

Two approaches are presently being used:

- A dominant withdrawal of small groups and individual students to the "laptop room"
- Use of the laptops by one class group.

Models of Management

The majority of laptops and PCs are protected in a locked room which is being offered to a growing number of teachers for use (fixed model). Some PCs can be used if booked by students at break times in the library. All computers in the school have an internet security tracing system and are locked in fixed positions though the technology support coordinator stressed that with minor programming changes laptops could again become mobile.

Student profiles

Students participating in the project comprised:

- Selected individuals
- 1st & 2nd year groups

The coordinating teacher commented that student attitudes and confidence levels had changed due to the impact of seeing their printed work.

Table 23 Case study students - Westtown

Name	Tim	Simon
Assessment	General learning difficulties	General learning difficulties
Learning Support	Yes	Yes - Receives tuition in basic maths, reading, and writing
Resource Teacher	No - No resource teacher available in school	No
Needs	Reading and writing	Reading and writing Social skills
Strengths	Bright and intelligent Good at practical work	Quiet and obedient
Role of Laptop	Keeps him interested Helps him with reading, writing and spelling	Reading and writing Introducing him to computers and the internet so he can enjoy these after school
Outcomes	Read a part of *Ali the Greatest* and wrote a summary of the two chapters all with the help of the laptop and software	Learning keyboard skills Writing material that looks well and is presented well Looking up web sites

Instructional and Learning Activities

Software packages and writing exercises are being used in technology classes implementing text, clip art and fonts. Only one teacher has introduced technology into his mainstream teaching programme. Overhead projectors and a main server are recent additions to the technology room in this school.

Table 24 Instructional and learning activities for participating students

Year	Total no. of students	No. of male students	No. of students assessed with dyslexia	No. of class periods per week	No. of teachers involved	Type	Please specify type of teaching/learning activities for which laptops are **primarily** used ***
1st	5	3	0	8	All		RSk, RBK, WRT
2nd	5	4	0	12			RSk, RBK, WRT
3rd	2	2	0	5			RSk, RBK, WRT
TY	1	1	0	3			WRT
5th	1	1	0	2			RSk, RBK, WRT
6th	1	1	1	3			WRT
Total	13	12	1				

**

LST = Learning support teacher
RsT = Resource Teacher
GCT = Guidance and Counselling Teacher
S/CT = Subject area/Classroom teacher

***

RSk = Development of reading skills using specialized software e.g., Wordshark, Starspell and/or other similar programmes
RBk = Reading adapted books e.g. Don Johnson 'Start-to-Finish Books'; Kurzweil and/or using similar software
WRT = Writing using regular word processing software (e.g. MS Word) or specialised software for teaching writing (e.g. Clicker 4)

Software

Most of the major software packages are in use including StarSpell, Super Spell, Co-writer, Write Out Loud, Texthelp – Read and Write, Kurzweil, Don Johnston Start to Finish Books and NumberShark. However, software use is still firmly in the adoption phase of implementation as technical concerns abound. This school used a very wide range of software and the school organiser noted that this was in part due to her effort at experimenting with different software packages.

Table 25 Existing software use (May 2003)

Name of Software	How I see it meeting students' needs	Questions/comments I have about the software are…
1.Starspell	Choice of spelling lists, self-correcting, multi-sensory	No sound without CD
2. Co-writer	Multi-sensory Word Prediction Helps students to access necessary words	Helpful for sentence structure
3. Write Out loud	Multi-sensory Word Processor Simple icons	Gives help and satisfaction to students
4. Wordbar	Multi-sensory wordbank	Helpful for composition
5.Start to finish	Multi-sensory Gives access to reading a novel for students who otherwise could not do so	Can be used only with individuals as CD is necessary

In relation to the limited opportunities for in-service due to the rural location of the school, the school organiser commented as follows:

> *"No in-service as we are a long distance from the city where courses are held. We investigated the possibility of having in-house training, but we are unsure about which software to designate as there are many different pieces of software and it would take many hours. Would trainers be familiar with all the different software….We have just bought Kurzweil and Texthelp: Read & Write Gold. I'd like training in these expensive pieces of software. As yet, I know nothing about scanning and I know that scanning is part of these packages".*

This final comment about desirability of having opportunities to learn about scanning is a good example of how various technical issues, and limited opportunities for CPD, resulted in some practical but resolvable constraints on implementation of the *Laptops*

Initiative. Nevertheless, when we returned to the school three months later (May, 2003), the same teacher said she had make considerable progress in becoming both more familiar and more comfortable with various software options for students with dyslexia and other reading and writing difficulties.

Achievements and Attitudes

As already mentioned, the attitude to technology has been somewhat hesitant and cautious. For example, one teacher, although sceptical of the initiative in general (“*it is a gimmick*”), noted that it had contributed to enhance *“the quality of life for* [students with] *certain special needs”*. There was a concern that parents would object to the use of technology for mainstream classes as the implication might be that students had special needs. Time has shown this to be an unfounded concern. However, it did have a significant impact on the initial planning and implementation procedures in this school. Nevertheless, teachers have observed real benefits for students targeted for participation in the *Laptops Initiative*.

Teacher beliefs

The main learning support teacher was initially wary about technology but her confidence in using and thinking about the possibilities of using laptops increased over a few months from our first to our second visit. While nothing concrete or new has occurred in this school in recent months, the horizons of possibility have expanded and a new confidence and relaxed attitude has emerged in the school’s perception of technology. The learning support teacher admits to being nervous of technology but has learned to "play" with it. This new attitude promises an increased sense of playfulness and altered rate of progress in the future.

ICT/technology in Westtown

One of the staff noted that they were at the *"scratching the head phase"* for a long time early on in the *Laptops Initiative*. However, by the time we revisited the school in September both the school organiser and IT teacher viewed the project as having more potential than during our two previous visits. As such, the school had spent some time in the entry stage and was progressing to the adoption and adaptation stages.

3.3 Student case studies

The *Report of the Task Force on Dyslexia* (2001) noted that the NCTE (Phelan and Haughey, 2000) had developed "advice for schools on how to use the grant (referring to £700 grant per learning support/resource teacher post) to meet the needs of students with learning difficulties and learning disabilities." (p. 96). Noting the announcement of the *Laptops Initiative*, the report signaled the role of the *Laptops Initiative*:

> *…the purpose of the initiative, which is being overseen by the NCTE, is to explore ways in which ICTs can assist students with learning difficulties to work independently within mainstream classes* (p. 96).

The Task Force Report then describes a case study of a boy, Tom, who had just transferred to post-primary and with the assistance of a text reader system (scanner and software) was making considerable progress in post-primary school. The report describes his progress as follows:

> *…he read novels that far exceeded his reading age, to read history and geography textbooks to read problem-solving questions in his mathematics textbook, and to read his class textbook in English* (p. 97).

In light of the mainstreaming goal highlighted in the *Report of the Task Force on Dyslexia* and signaled in the *Laptops Initiative* goal and objectives, this report

addresses the variety of ways in which eight case study students learning was being supported in the context of the *Laptops Initiative*.

Eight students, two from each case study school, were selected based on teacher recommendations for inclusion in the evaluation to provide a picture of both the profile of the students involved and of how the project provides learning opportunities for students with different learning difficulties in different contexts. The school organisers in the four case study schools were asked to nominate students typical of those involved in the project. The case study students have been already profiled in each school case study. In the next section, a number of overarching observations are addressed in relation to the case study students.

Consistent with the overall percentage (21%) of students assessed with dyslexia), three of the eight case studies students were assessed as having dyslexia based on a psychological report. The remaining five were considered to have general reading and writing learning difficulties. In terms of gender, of the eight case study students who participated in the study only one female student was nominated. This is not surprising given the higher number of boys than girls who exhibit literacy difficulties in school. It does, however, raise issue about the manner in which the project can provide insights on boys, literacy and technology

There were two cases (Paul in Oldtown and Tracey in Newport) where students were not receiving learning support. Of the other students, there were varying amounts of time allocated to each student. Simon, a student in Westtown School, was given instruction to meet a range of specific needs in reading and writing (like many students involved in the *Laptops Initiativ*e). In Simon's case this also included basic maths.

Three of eight students had a resource teacher allocated to support their learning. In Newport this teaching was given in 4 x 40 min sessions per week. In Greenfield school there were two teachers allocated to ten pupils. In the cases where no resource teaching was made available, either no teacher was available (Westtown), or this was not possible as the pupil was in their final year of LCA (Oldtown). The needs identified were primarily literacy and numeracy. In addition, it was hoped that the use of laptops would increase the students' self-confidence and organisational skills. Individual students possessed disparate strengths. Paul, Sean (Oldtown) and Tracey (Newport) displayed an eagerness to learn and to further their knowledge through the use of assistive technologies.

The laptops were to be used to assist reading and writing. In addition the teacher hoped that the use of laptops would assist with the presentation of work and improve students' overall self-confidence. Thus far, in relation to the eight case study students, laptops have, according to the school organisers in the four case study schools, notably assisted the compilation of essays (Newport), the presentation of work (Westtown), computer literacy (Westtown and Oldtown) and overall academic progression (Oldtown and Greenfield).

3.4 Conclusion

This chapter provided summary data on the *Laptops Initiative*, four case studies and a summary of trends in relation to eight case study students.

The summary data provides some insight into the overall reach of the *Laptops Initiative*. Perhaps the most important point from this summary data is the extent to which a similar pattern of laptop management appears to have been dominant in the project's first year, that is, a **'fixed'** model in which students were withdrawn from their mainstream class to use the laptops for a few hours per week in one central

location where laptops were either stored (Westtown and Oldtown) or typically used (Greenfield and Newport). Furthermore, the instructional/teaching emphasis in these classes tended to be on skill development in reading as evidenced by the nature of the software said they were using as part of the *Laptops Initiative*. Thus, opportunities for students to engage in either comprehension of composition of extended text may have been relatively limited to date in terms of laptop use. Students were uniformly positive about the laptops, cited a variety of reasons including their perception that access to laptops was a high status activity, laptops helped them learn to write, laptops were good fun, laptops were perceived as reward, laptops had enjoyable language games, and laptops helped some students create and present work in a more polished fashion. However, it was not the laptops alone that provided a curriculum-based approach to writing (e.g. Greenfield example), rather it was a conscious decision by teachers to embed laptop use in a curriculum-driven process approach to writing the made possible some of the desirable student outcomes evidenced in this setting in particular.

The four case studies provided insights on some of the school culture and organisational issues that have played a central role in shaping the implementation of the *Laptops Initiative*. Indeed, the central role of school culture and organisational factors in mediating the impact of the initiative has been a common finding across numerous ICT initiatives at all levels of the education system (Cuban, 2001).

Chapter 4 Summary of Findings and Discussion

4.0 Introduction

The director of the NCTE commented in Spring 2003 that:

> *" . . . laptops for teachers and for students remains an issue . . . . Many governments are grappling with whether or not to provide laptops for more mobile use within schools or to give laptops to teachers"* (Interview, Spring 2003)

In this context, the findings from the evaluation of the *Laptops Initiative* may assist in the development of policy in relation to the purchase, deployment and pedagogical uses of laptops and other mobile learning technologies. The director also noted that among the key questions that were of concern to the Minister initiating the project were: Would the laptops be motivational? Would they facilitate learning? How might they address the shortcomings of the disability itself? Among the other important contextual issues relevant to a discussion of the findings is the importance, from the NCTE position, of the project as a curriculum initiative rather than just the study of technology for the sake of technology. In this vein, the director of the NCTE commented as follows:

> *"Technology is just an enabler, so we are not evaluating a technology project."* (Interview, Spring 2003)

In terms of continuity between the *Laptops Initiative* and previous Schools Integration Projects (SIPs), which had formed one of the three pillars of *Schools IT 2000*, the Director noted that the *Laptops Initiative* was

> *"Similar, except that the Laptops Initiative is a much larger project involving 31 schools and £2million worth of ICT equipment. As a result, it provides a more in-depth use of mobile technology"*. (Interview, Spring 2003)

The national context of the project

The project sought to target the literacy needs of second year post-primary students with dyslexia and other reading and writing difficulties in disadvantaged schools. Given the fact that most of the thirty-one participating schools were designated as disadvantaged, this goal was met (Interview with NCTE Director, March 2003). However, schools, in localising the *Laptops Initiative* in order to meet their own learning support needs, as directed by the NCTE, extended the target student group beyond the initial targeted second year cohort. Some teachers and principals expressed surprise at what they viewed as a narrow target student group – to paraphrase a comment made a by numerous teachers – 'where will we get 25 students with dyslexia in 2nd year?' However, as the schools redefined the target group, all were able to use the laptops to provide support for students with general difficulties in reading and writing. In all, approximately just over 1,000 students are involved in the *Laptops Initiative* at the beginning of the 2003/04 school year.

- **FINDING:** Of the approximately 1,000 students participating in the *Laptops Initiative*, 21% have been assessed with dyslexia and the other 79% had either not been assessed or have other reading and writing difficulties.
- **FINDING:** In terms of students involved in the *Laptops Initiative* in participating co-educational schools, boys outnumbered girls, on average, four to one.

The role of the NCTE in relation to providing support for the project evolved over the two years and nine months of early implementation. Initially, the NCTE's support was primarily in the form of information dissemination and guidance on expenditure of funds which had been disbursed by DES to each school (38,000 to just over 100,000 *Euros* depending on school enrollment and on the number of students identified as having dyslexia or other reading/writing difficulties in second year).

During Spring 2002, in line with DES directives, the NCTE's role expanded to one of providing full project development support. The key actions taken by NCTE as a result of this increased support role were the appointment of a project coordinator providing directing support to schools, and the organisation of meetings and workshops for principals and school level organisers. In addition, the NCTE focused on providing both an overview and 'vision' of the project as well as information on and demonstration of relevant educational software. Schools were expected to complete and submit both a project implementation plan (Autumn 2002) and school report (June 2003) plan to the NCTE.

- **FINDING:** The NCTE's role in the *Laptops Initiative* expanded from an initial focus on information dissemination and teacher training provision to one encompassing development and provision of a full project support and coordination structure to assist in the *Laptops Initiative* implementation within each school.
- **FINDING:** NCTE disbursed a sufficient amount of money per school to purchase the recommended number of laptops and necessary software to set up the *Laptops Initiative* in each school.

The national context of the initiative in an international arena

The *Laptops Initiative* as a test case of ICT/Technology Integration

One of the biggest ICT challenges in education currently being addressed in many developed countries around the world is how to enhance the integration of ICTs into mainstream teaching and learning. In this context, the *Laptops Initiative* provides a number of insights into a particular aspect of ICT/technology integration, that is, how mobile learning technologies may enhance technology integration and inclusive provision for students with dyslexia and other reading and writing difficulties. As

such, the project is ambitious in its scope but very pertinent to many of the issues being addressed in the context of ICTs, literacy, special educational needs and schooling, at least in developed countries (UNESCO, 2003).

- **FINDING:** As envisaged at its inception, the *Laptops Initiative* project goal and project objectives are very ambitious in the context of current practice in Irish post-primary schools, in terms of both the hoped for level of ICT/technology integration and modes of learning support provision.

As noted earlier, ICT tends to fit into rather than transform existing educational practices and organisational arrangements in schools. Thus, it is unlikely that the mere availability of laptops will change a school that has not developed inclusive modes of teaching and learning for students with dyslexia and other reading and writing difficulties, at least in the short term during the initial phase of project implementation, based on findings from other studies such as ACOT (Sandholtz et al, 1997). It is far more likely, as is the case to date in this ICT initiative, that the laptops (or any other ICT) come to be used in a fashion that is consistent with on-going arrangements at the structural, cultural and pedagogical levels in school. In this context, it is noteworthy that the *Laptops Initiative* was intended to complement existing provision in the school.

- **FINDING:** Schools adopted the laptops readily and used them in ways consistent with existing organisational and pedagogical practices.

This finding, possibly the most important in the evaluation, draws together a number of prior findings, as noted in Chapter III, and can be summarised in tabular form (see Table 26). The fixed model of ***laptop management*** has been the dominant model in the *Laptops Initiative* to date (see shaded area of Table 26). The **fixed** model puts significant constraints on the mobility and the potential uses of laptops as personal

learning tools and this organisational and structural stage of development, if not progressed, may have significant implications in terms of the potential of the *Laptops Initiative* to create and maintain a more inclusive teaching and learning experience for students with dyslexia and other reading and writing difficulties.

Table 26 Pedagogical dimensions and laptop deployment

Pedagogical Dimension **Laptop Management**	***Mobility***	***Inclusion***	***Personal Learning Tool***	***Technology Integration***
Fixed	Low	Low or High	Low – Moderate	Low - Moderate
Floating	Moderate	Moderate – High	Moderate - High	Low to high
Fostered	High	Moderate - High	High	High

Furthermore, since the deployment of laptops in a fixed location means that students or their mainstream class teachers are unlikely to have opportunities to use the laptops more than three or four times per week, it is likely that schools will remain at the lower two and maybe third levels of Sandholtz's model of technology integration i.e. entry, adoption and adaptation. That is, schools may find it difficult to move beyond adoption and even more difficult to get beyond adaptation (using laptops for about 30-40% of the time) and reach the appropriation and invention phases whereby the ICTs take on a central creative role and are embedded seamlessly into teaching and learning. Given the justifiable appeal of the fixed model to date, the *Laptops Initiative* schools have also by default circumscribed, at least temporarily, the manner in which other important goals outlined in the project might be reached. However, a very important insight from the Sandholtz et al study was that schools could, over time, move to higher levels of technology integration with sufficient support. Sandholtz et al (1997) note that it took schools, even with appropriate levels of

support, three to four years to reach higher levels of technology integration. This insight from Sandholtz is consistent with the view of the *Laptops Initiative* interim review that the extensive use of the fixed model may be just the first stage in a sequence of development, with other models emerging in time.

The above finding overlaps with some of the other dimensions of this summary chapter and where appropriate the report elaborates on the overarching finding of this evaluation above as it pertains to various related issues.

Approaches used by schools

In using the laptops, schools primarily relied on withdrawal of students in meeting the needs of students. Where schools used laptops to provide support for students within mainstream teaching, this was the exception rather than the rule. In a small number of instances in some schools, individual students used laptops as a support for learning across subject areas, that is, reading to learn. As such, the laptops have yet to be used in mainstream settings in any comprehensive fashion. Given that the use of laptops to support students in mainstream settings was identified as a potentially key contribution of the *Laptops Initiative*, there is considerable scope for development in relation to how laptops might be used to promote inclusive experiences for students with learning difficulties in literacy.

- **FINDING:** Schools mainly relied on a withdrawal approach in providing support for students with literacy difficulties.

Schools typically adopted thoughtful, productive and sometimes unique responses to the *Laptops Initiative*. This became clear in reviewing the growth of the initiative over time in different schools. Thus, it is important to note that many schools developed some innovative and potentially useful strategy for the wider project in relation to one in more aspects of the initiative. For example, reviewing the case study schools:

- One school purchased and used portable wordprocessers (AlphaSmarts) to ensure some students had the support of some mobile learning technology
- One school has restructured its first year programme for all students and integrates laptops into a literacy-focused period each morning in which class teachers, learning support teachers, and other available personnel provide support for the development of students' literacy skills
- A few schools had an orientation for parents about the project early in its development during which there was a demonstration of software used by students on laptops
- Integration of the *Laptops Initiative* into existing collaborative links with a local dyslexia group
- Implementation of a process approach to writing using laptops where local authors were invited into the classroom engaging with the students as readers and writers
- Development of strong in-school CPD to support *Laptops Initiative* implementation
- Use of wireless hub with laptops to support students' printing their work
- Creation of student directories on a school network, so students could store their work and retrieve it easily in subsequent lessons.

- **FINDING:** Schools developed numerous innovative and productive strategies to utilise the laptops.

Supports and obstacles

Teachers identified many supports and obstacles. Key supports identified by teachers were:

- Importance of support from the NCTE in developing an overall sense or vision of the project
- In-school support from principal
- Support of the project coordinator
- Significant financial investment in the project
- Students' enthusiasm for the laptops sustained teachers even when organising the use of the laptops became demanding on their time
- Opportunities to see and consider approaches being adopted in other participating schools, that is, teachers, consistent with Sugrue et al (2001), considered the opportunity to network with other teachers about the project as a very important and essential professional learning opportunity.

Teachers also identified some obstacles. The key obstacles identified were:

- Slow project start-up and need for more guidance initially
- Lack of **active support** by leadership (principal and deputy principal) in some schools
- Lack of time to organise and plan how the laptops might be best used
- Security concerns in relation to laptop theft
- Need for development of teachers' own ICT skills
- Lack of time/opportunity to experiment with relevant educational software

Range of laptop management models

Fixed, floating and fostered

As noted earlier, during the course of his visits to schools, the project coordinator began to use the three descriptors 'fixed', 'floating' and 'fostered' to characterise the variety of co-existing laptop management models. These three terms were used in the Spring 2003 newsletter to schools, and attributed to one of the

teachers who had started to use these terms as a way to understand and characterise the various possible laptop deployment options. In response the growing currency of these three descriptors, the evaluator has decided to use these as a way to address the issue of management models in this report. These can be equated, in part, with the descriptors used in the Rockman reports:

- **Concentrated**-each student has his or her own laptop for use at home or in school. This term is consistent with **fostered** model.
- **Class set** -a school-purchased classroom set is shared among teachers. There is no equivalent to this in the descriptors used in the *Laptops Initiative*. However, it is similar to the **fixed** model, whereby one set of laptops is available
- **Dispersed** -in any given classroom, there are students with and without laptops. This is consistent with the **floating** model where students use laptops in conjunction with other students who do not have laptops.
- **Desktop** -each classroom is permanently assigned a few laptops for students to share. There is no equivalent term in the terms adopted by the *Laptops Initiative*
- **Mixed** -some combination of the above models.

<u>Laptops as personal support tool for students</u>

A key desire expressed in the initial publicity about the *Laptops Initiative* was that the laptops would become powerful learning tools for students with literacy difficulties. In some respects this goal has been achieved but in others it has not. A consistent strong theme in feedback from teachers, principals and students themselves was that the laptops were seen as contributing positively to students learning and that students reacted very positively to using the laptops. In this sense, the laptops have been a welcome and productive feature of what participating schools can offer their students and have clearly reached a basic level of use as a personal learning tool within a withdrawal model of learning support/resource teaching provision. However, given the dominant withdrawal approach to supporting students with learning difficulties in literacy and the related and dominant fixed model of laptop deployment there is considerable room to develop more intensive use of the laptops as personal learning tools. As such, while a basic ‘floor’ level has been achieved the ‘ceiling’, the

Laptops Initiative's mainstreaming goal remains a considerable distance from current practice. The interwoven nature of laptop deployment and the pedagogical dimension of personal learning tool are conveyed in Table 27. The key factor constraining laptop use as personal learning tools is the amount of time students have access to laptops. This is due to the fact that withdrawal for learning support typically occurs three to four lessons per week. This puts a constraint and upper limit on more intensive and prolonged use of laptops as a personal learning tool across curricular areas. One could compare the implications of a fixed model with the ***ICTs as personal learning tool image*** portrayed in the *Report of the Task Force on Dyslexia* (p. 97) which gives the example of how ICTs provide powerful learning support for students with dyslexia. Citing the case of Tom (described earlier in this evaluation report), the Task Force noted how Tom's use of a laptop and ancillary technologies across subject areas, (e.g. a software package that would enable him to record information in specialised areas such as science), were coordinated by the school's resource teacher. The personal tool vision of laptop usage portrayed in the *Report of the Task Force on Dyslexia* is consistent with the fostered model. However, in the case of the *Laptops Initiative*, a fixed model of laptop management has dominated, with some significant but more peripheral use of fostered or floating deployment.

Table 27 Laptop deployment and their use as personal learning tools

Pedagogical Dimension	Personal Learning Tool
Laptop Management	
Fixed	Low – Moderate
Floating	Moderate – High
Fostered	High

Models of classroom management and laptop use in mainstream classes

Given the limited use of the laptops within mainstream settings, there are a limited number of issues to be discussed at this stage of the project. Two issues are pertinent: the use of laptops for whole class groups; and peer pressure as an inhibiting factor on laptop use by students with literacy difficulties. Over half of the 16 June 2003 School Reports available at the time of this study said they were using laptops in mainstream settings. It is important to note the appeal of this approach to schools. Typically, intact class groups moved to the classroom in which the laptops were fixed or stationed. Utilising such a strategy promotes a higher degree of inclusion for students with literacy difficulties (Table 28), but overall technology integration remains low or possibly moderate at best, given both the limited and timetabled access to the *"laptop room"* by any one group of students over the course of a school week.

Table 28 Inclusion and laptop deployment

Pedagogical Dimension / Laptop Management	Inclusion	Technology Integration
Fixed	Low or High	Low - Moderate
Floating	Moderate – High	Low to high
Fostered	Moderate – High	High

Participating students and initiative's role in learning support provision

- **FINDING:** Schools went beyond the initial target group of the initiative but remained consistent with spirit of the initiative.

In extending the target student groups beyond second year students and the involvement of large numbers of students in using the laptops in some schools, the participating schools have interpreted the initiative's remit in a broad fashion and in a variety of appropriate ways. The majority of school level organisers were Learning

Support teachers (as envisaged by NCTE and advised to schools accordingly) and this contributed to the initiative's integration within schools' learning support provision. In summary, even though the project has extended beyond its initial target group, that is, second year students, the initiative remained rooted within a learning support framework. In relation to profiling students involved, a number of issues are important: (1) the ratio of boys to girls; approximately one-fifth of students involved in the initiative have been assessed with dyslexia; and (2) and the primary use of the laptops being in the area of skill development in reading.

First, to those familiar with an on-going debate in relation to boys' achievement in education, it is not a surprise that boys outnumbered girls, three or four to one in many of the learning support classes in participating schools. This observation has led many educational commentators to ask the 'What about the boys' question. In the context of literacy, there have been a number of studies of boys and literacy within a broader debate on masculinities in education and society (for a discussion of some aspects of this in an Irish post-primary school context see Mac an Ghaill, Hanafin and Conway, 2004). Some of the issues in relation to the development of literacy among adolescent boys, in particular, might be addressed in the context of the initiative (e.g. Skelton, 2001; Rowan, Knobel, Bigum, and Lankshear, 2002).

Second, the primary use of laptops being in the area of skill development in reading, more than likely, reflects a wider emphasis in learning support on teaching discrete reading skills separate from engagement with extended text. This trend was especially evident in the emphasis teachers put on the importance of using skill-focused software in conjunction with the laptops. One consequence of a focus on using laptops primarily for the development of reading skills is that other important teaching approaches and instructional strategies may be neglected. For example, *The*

Report of the Task Force on Dyslexia states, in relation to effective reading instruction for readers beyond the early stage of learning to read, that:

> *Strategies such as the following should be applied with consistency in a broad range of texts, including informational texts, documents, multiple texts (different texts on the same topic) and electronic texts: activating background knowledge; imaging or visualising texts; identifying word meanings using information about context and word structure; identifying structures found in narrative and informational texts; identifying important information (such as main theme or main idea) in texts; summarising texts; comparing and contrasting ideas in text; monitoring (assessing) one's own comprehension and taking appropriate steps if comprehension breaks down; applying study strategies such as retrieving information; reflecting on the content of texts; evaluating ideas* (p. 95).

In order to optimise support for students with literacy difficulties, future evaluation of the *Laptops Initiative* might attend in more detail to the range of instruction employed by teachers in their use of the laptops within a balanced and comprehensive approach to learning support and mainstream laptop usage. Noting the importance of continuing focus on word-level interventions, the Task Force nevertheless stresses the importance of interventions for adolescent students with dyslexia extending beyond the word level to include self-regulated learning skills, study skills, and note-taking, all of which involve engagement with extended texts (p. 87).

Change in classroom instructional and learning activities

In the absence of baseline data on instructional practices prior to the initiative, the evaluation is somewhat limited in the extent to which it can be determined if instructional and learning activities have changed as a result of the initiative. However, a number of issues are noteworthy: teachers' use of and experimentation with new software; the appeal of the laptops to students who were struggling with the craft of handwriting; and the level of technology integration achieved in schools as a result of the initiative.

First, teachers commented on the time consuming but worthwhile outcomes from time spent experimenting with software. Many teachers commented very positively about the quality of the in-service days and their usefulness in learning about the range of possible software they could use, as well as how the demonstrations and opportunities to use the software helped their understanding of the intricacies of specific software.

Second, in one of the case study schools where students used laptops for significant writing assignments using a process approach, the teacher emphasised the powerful impact of this approach on the students' identity as writers. As such, students are keenly aware of the aesthetic qualities of handwriting and see the presentation of their own work as a matter of personal pride. The absence of opportunities to use computers in presenting written work may act as a powerful inhibiting factor for students with handwriting difficulties - a characteristic often associated with dyslexia (DES, 2001).

Third, as noted earlier, the fixed model of laptop deployment put very significant constraints on the use of laptops. Consequently, the *Laptops Initiative* has had limited, if any impact, on changing existing instructional strategies and approaches to teaching employed in mainstream settings by classroom/subject teachers for participating students.

<u>Impact of the initiative on students' achievements and attitudes to school</u>

- **FINDING:** Students, teachers and principals were generally very positive about the impact of the project on students' literacy learning.

Teachers and principals said that participating students, in general, had a more positive attitude to school due to the *Laptops Initiative*. Students were positive about the laptop project, identifying in particular factors such as ease of use, opportunity to

use computers more regularly and the excitement of being involved in what they viewed as a high status project. Some students noted the social interaction with other students and family members occurring as a result of their involvement in the initiative.

Range and nature of software use

- **FINDING**: Schools tended to use laptops to provide opportunities for students to use reading skill development software

All schools made use of reading skill software for most students involved in the initiative. Some use of 'anchored instruction' software, such as Don Johnson's 'Start-to-Finish Books' was made in many, but not all, schools. A small number of schools used meta-software that can contribute explicitly to the development of meta-cognition, e.g. Kidspiration/Inspiration. Using an appropriate balance of software is inevitably related to the specific learning needs of individual students in the context of their individual learning plans. As such, the reliance on skill development software may be appropriate. However, in the context of the *Report of the Task Force on Dyslexia* recommendation that intervention at post-primary level go beyond the development of skills at the word level, there is a role for exploring the use of software that provides both 'anchored instruction' and support for the development of students' meta-cognitive capacities. In relation to meta-cognition, teachers perceptions of the capacity of students with literacy difficulties to engage in meta-cognitive thinking in reading and writing is important to address as the initiative evolves.

- **FINDING**: Schools focused more on reading than on writing software

In relation to literacy teaching focused on comprehension of extended text or text composition, schools have focused primarily on using the laptops for the development

of reading whole books rather than using the laptops for the development of writing. As the initiative evolves, there is considerable scope to develop a process approach to writing process using regular word processing software (see Greenfield case) as well as the use of writing composition software such as Clicker 4 (see Westtown case).

Chapter 5 Recommendations and conclusion

5.1 Introduction

"*The project is in its infancy"* was one teacher's comment on the School Report sent to the NCTE in June 2003. This comment is a timely reminder of the fact that the project is in the early stages of implementation. In that context, this final chapter provides a number of recommendations in terms of the potential development of the initiative involving its various stakeholders: the DES, the NCTE, school and other relevant bodies such as NEPS and NCCA. In addition to recommendations, issues for consideration are also identified. These are more broadly focused and might form the basis of initiatives by the NCTE or other agencies working collectively to: (a) meet the needs of students with dyslexia or other reading and writing difficulties; (b) enhance ICT integration in Irish post-primary classrooms; and (c) develop more inclusive school cultures at post-primary level. The project goal and objectives provide a very ambitious set of targets for the *Laptops Initiative*. These goals must be seen in the context of both existing practice in relation to ICT integration and inclusion in the wider context of Irish post-primary schooling. For example, in relation to the integration of ICT across the curriculum at primary and secondary level, *The Impact of Schools IT 2000*, report noted that

> …*post-primary principals perceive ICT as being more vital as an administrative tool than teachers do as a teaching tool. Hence, teachers need more encouragement to use ICT in teaching and to recognise its value* (National Policy Advisory and Development Committee, p. 7)

Consequently, attention to this wider context of ICTs in Irish second-level schools is necessary in order to fully appreciate the challenges facing the *Laptops Initiative* and to understand that difficulties in meeting some of these challenges are not necessarily indicative of limitations in the planning and enactment of the initiative itself.

Meeting the ambitious project goal of a laptop-supported inclusive environment for students in the target group remains somewhat distant at present. To date, the dominant fixed or single room model of laptop deployment means that students tend to use laptops for either individual learning support in a dedicated room. In a small number of exceptional cases, students with literacy difficulties use laptops in their regular or mainstream classroom setting.

5.2 System level

System level recommendations

- **RECOMMENDATION 1 –** CONCURRENT APPROACH TO PROJECT ORIENTATION: That initial information about initiatives be undertaken simultaneously with project orientation meeting(s) for relevant schools.
- **RECOMMENDATION 2 –** INTEGRATED SCHOOL LEADERSHIP FOCUS IN INITIAL PLANNING: That the initial project orientation meeting and at least one meeting per year include both the school principal and school organiser.
- **RECOMMENDATION 3 –** SUPPORTING SCHOOLS' USE OF ICTs FOR PROJECT ADMINISTRATION: That schools be supported in their use of ICTs to administer the project (including completion of reports, surveys and other communication with NCTE project personnel)
- **RECOMMENDATION 4 -** TEACHER NETWORKING: Build on existing relationships to foster more frequent and "sustained interaction" (Huberman, 1999) among project teachers and IT technical support teachers in order to foster collegial professionalism (Hargreaves, 2000), including continued support for once per term issue of the project newsletter.

- **RECOMMENDATION 5** - FRAMEWORK OF LAPTOP MANAGEMENT MODELS: Develop documentation for describing and characterising the nature, scope and advantages/disadvantages of various approaches to laptop management in the *Laptops Initiative* schools vis-à-vis ICT/Technology Integration e.g. fixed, floating and fostered models.
- **RECOMMENDATION 6 -** UTILISING TEACHERS' PROFESSIONAL PRACTICAL KNOWLEDGE: Build on the developing expertise among project teachers, by showcasing individual teachers curriculum-driven uses of ICTs e.g. using laptops as part of the writing process.
- **RECOMMENDATION 7 -** ON-GOING PROJECT EVALUATION: In light of project continuation and the demonstrated progression of laptop initiatives over time in other countries (e.g. the aforementioned Rockman studies over three years), plan and budget for the project's continued evaluation in order to track its development over time.
- **RECOMMENDATION 8 –** FOCUS ON THE LEADERSHIP ROLE OF PRINCIPALS IN SUPPORTING ICT INTEGRATION: Develop strategies (e.g. information focused on the role of the principal; case studies from the Schools Integration Project and elsewhere) to provide possible paths of progression for school principals, consistent with School Development Planning, drawing on appropriate models of technology integration (e.g. Sandholtz, et al, 1997).
- **RECOMMENDATION 9 –** INFORMATION ON DYSLEXIA AND OTHER READING AND WRITING DIFFICULTIES: Provide information to schools on the role of ICTs in relation to dyslexia (e.g. forthcoming DES video on dyslexia) *and* general reading and writing difficulties with a focus, in

part, on presentation of information in the form of school, classroom and student level cases.

- **RECOMMENDATION 10 –** PROVISION OF FUNDS FOR DIFFERENTIATED ON-GOING TECHNICAL SUPPORT: Continue to provide annual funds to school in order that they can purchase technical support.

System level issues for consideration

- **ISSUE FOR CONSIDERATION 1 –** GREATER COHERENCE IN CPD POLICY**:** Work toward developing a national policy of continuing professional development (CPD) for teachers and principals as a crucial step in promoting ICT integration in the future.
- **ISSUE FOR CONSIDERATION 2 –** ARCHIVING AND ACCESSING PROJECT 'WISDOM' AND PRACTICES: That the relevant agencies (NEPS, NCCA, and NCTE) work in collaboration to consider the development of 'knowledge asset' software as a means of supporting and archiving projects/initiatives.
- **ISSUE FOR CONSIDERATION 3 –** ROLE OF PRINCIPALS IN FOSTERING SCHOOL CHANGE AND TECHNOLOGICAL INNOVATION: Sustain the principals' discussion group commenced at the May 2003 meeting to foster an inquiry approach to understanding "school factors" (Gleeson, 2002) in the context of educational change and technological innovation.

5.3 School level

- **RECOMMENDATION 11 –** DEVELOPMENT OF *LAPTOPS INITIATIVE* SCHOOL DEVELOPMENT PLAN: Building on the project implementation

plans submitted to NCTE, develop a School Development Plan to support the project's ambitious goal of supporting inclusion via laptops.

- **RECOMMENDATION 12 -** LAPTOPS BEYOND ***FIXED*** CLASSROOM AND SCHOOL WALLS: Initiate discussion with teachers and principals to develop strategies for extending laptop use beyond the confines of the fixed classroom and in-school models of laptop deployment.
- **RECOMMENDATION 13 -** COORDINATION AT SCHOOL LEVEL: In the context of overall project coordination, develop strategies, guidelines and some reporting mechanisms that enhance in-school coordination and coherence around the project goals and objectives e.g. schools to address inclusion with teachers in the context of models of laptop usage.
- **RECOMMENDATION 13A –** MAINSTREAMING THE *LAPTOPS INITIATIVE*: Develop a set of strategies with principals and school level organisers to mainstream use of laptops as a key priority with a view to meeting the *Laptops Initiative* main objective.
- **RECCOMENDATION 14 –** INVOLVING PARENTS: In the context of the initiative, identify and disseminate information on strategies that involve parents in supporting the literacy learning of students struggling with reading and writing (e.g. annual parents' event and/or newsletter in conjunction with the project).
- **RECOMMENDATION 15 –** DEVELOPING WIRELESS AND NETWORK CAPACITIES: Schools to identify the technical support, hardware and other supports needed to develop school's capacity in both the development of wireless and networking infrastructures.

5.4 Classroom level

- **RECOMMENDATION 16 -** FOCUS ON SOCIAL NATURE OF LEARNING: Providing opportunities for students to learn from each other (use of group and pair work, peer editing, group reading e.g. reciprocal teaching) in addition to the more individually focused skill software approaches evident to date (Bean 2000; Conway, 2002).
- **RECOMMENDATION 17 –** MORE EXPLICIT ATTENTION TO CONGITIVE STRATEGY TEACHING AS PART OF THE INITIATIVE: Development of explicit teaching activities and use of software that supports students' development of cognitive strategies for both reading and writing.
- **RECOMMENDATION 18 -** CREATION OF ACTUAL OR VIRTUAL STUDENT PORTFOLIOS: Focus on the development of strategies to archive participating students' work in order to foster self-regulated learning (SRL) among participating students. This might include developing schools' network capacity in order to archive and retrieve student work as the initiative evolves.

Considerable research emanating from motivation theory points to the powerful role that goal setting and self-evaluation can play in fostering self-regulated learning (Pintrich and Schunk, 1996). The presence of an archive of student's work, available to students, for appraisal would, more than likely, lead to the enhancement of SRL. SRL is consistent with the recent identification of self-directed learning as a policy priority in the NCCA's (2003) Senior Cycle Document.

5.5 Conclusion

'Technologising literacy' for students with literacy learning difficulties (Kamil, Intrator, and Kim, 2000) has become a policy focus in numerous developed countries as ICT policies evolve from their initial focus on hardware, getting connected and preparing teachers to use computers toward the integration of ICTs into the daily fabric of teaching and learning in classrooms. Thus, the lessons learned from the early phase of the laptop project can contribute both to this larger general question about technology integration across the curriculum, but also more specifically to questions about how mobile learning technologies can be used to support students with literacy learning difficulties at post-primary level.

This evaluation of the *Laptops Initiative* reflects the ***early development of the project***. In many respects the *Laptops Initiative* could be seen as the SIP of SIPs, (SIP being the acronym for the School Integration Project, one of the three strands in the *Schools IT 2000* initiative). That is, the *Laptops Initiative* provides an opportunity to examine a large-scale school integration pilot project across thirty-one post-primary schools, with a number of supporting conditions such as:

- the freedom given to each school to design and craft the project according to its locally identified needs and strengths,
- funding for substitute teacher cover to support participating teachers,
- an experienced seconded project coordinator supporting the schools, with additional support provided by local ICT advisors,
- NCTE personnel overseeing and providing further expertise to the project,
- involvement of principals in national project meetings,
- in-service days and further training for teachers and principals, and

- a *Laptops Initiative* newsletter designed to support teachers in sharing their *Laptops Initiative*-related teaching practices.

There are a number of very positive developments and overarching observations worth reiterating at this point:

- Teachers, principals, and students alike are generally very positive about the project and see it as having made a worthwhile contribution to literacy learning. They identified significant successes to date, real obstacles to its fuller implementation, as well as areas for future development.
- Over a thousand students have been using the laptops across the thirty-one schools. Students were positive about their laptop-related learning experiences.
- The 2002-03 year marked a turning point during which many teachers and principals moved from being somewhat sceptical about the initiative to being strongly committed to its actual benefits and further potential.
- The *Laptops Initiative* is well rooted in almost all participating schools
- Schools made very significant progress during 2002-03 in purchasing, organising, planning, developing awareness of the project in other schools and distributing the laptops for use across different class and year groups.
- The dominant approach to provision of support for students with learning difficulties in literacy is withdrawal. Consequently, to date, the laptops have fitted into rather than transformed provision for students with dyslexia and other reading and writing difficulties. As such, dominant organisational and cultural patterns tend to exert a significant and powerful assimilationist pressure on innovations such as the *Laptops Initiative*.
- Significantly more boys than girls are involved in the project

- The fixed model of laptop deployment (allocating laptops to one location) has been the dominant model for laptop management to date. However, many schools have also used the floating model (allowing students to bring laptops around the school) and a small number have allowed students to occasionally bring a laptop home, that is, use of the fostered model.

One of the main lessons learned from both the US-based *Anytime, Anywhere* laptop initiative (Rockman, 2001) and the ACOT (Sandholtz et al, 1997) longitudinal studies was that **schools can, over time with appropriate internal and external supports, develop their capacity to integrate ICTs** into the mainstream curriculum. The NCTE *Laptops Initiative*, however, provides yet another challenge in that the target group is students with dyslexia and other reading and writing difficulties. As such, the ambitious and worthy goal of the NCTE *Laptops Initiative* remains a two-fold challenge: the integration of ICTs into the mainstream curriculum and the simultaneous technology-supported inclusion of students with learning difficulties.

References

Adams, M. J. (1990). *Beginning to read: thinking and learning about print*. Cambridge: MIT Press.

Adams, R. D., Victor, M. and Ropper, A. H. (1997). *Principles of Neurology* (6th edition). San Francisco: McGraw Hill, pp. 592-596.

Bean, T. W. (2000). Reading in the content areas: social constructivist dimensions. In M. Kamil, P. B. Mosenthal, P. D. Pearson, and R. Barr. (Eds.), *Handbook of Reading Research*. Mahwah, New Jersey: Lawrence Erlbaum.

Bereiter, C. and Scardamelia, M. (1987). *The psychology of written composition*, New Jersey: Lawrence Erlbaum.

Boldt, S., Devine, B., MacDevitt, D., and Morgan, M. (1998) *Educational Disadvantage and Early School Leaving.* Dublin: Combat Poverty.

British Psychological Society (1999). *Dyslexia, literacy and psychological assessment*, Leicester, UK: BPS.

Bruck, P. A., Stocker, G., Geser, G. & Pointner, A. (1998). Noten für's Notebook: Von der technischen Ausstattungzur pädagogischen Integration. Zweiter Zwischenbericht: Erhebung und Evaluation von Projekten in Österreich an Hand des Notebook-Projektes. Salzburg: Techno-Z FH Forschung und Entwicklung GmbH.

Calkins, L. (1996). *The Art of Teaching Writing*, Portsmouth, NH: Heinemann.

Clark, R. E. (1983) Reconsidering research on learning from media, *Review of Educational Research*, 53, 4, 445-459.

Clute, E. (2000) Laptops for all at Junior High. [On-line]. Available www.post-gazette.com/regionstate/2000924laptops3.asp

Conway, P. F. (2000). Schools Information Technology (IT) 2000: Technological innovation and educational change. Irish Educational Studies, 19, 227-244

Conway, P. F. (2002). Learning in communities of practice: rethinking teaching and learning in disadvantaged contexts, Irish Educational Studies, 22, 3, 61-92.

Conway, P. F. and Zhao, Y. (2003a). From Ludittes to gatekeepers to designers: Images of teachers in political documents. In Y. Zhao (Ed.), *What Teachers Should Know about Technology? Perspectives and Practices.* Greenwich, CT: Information Age Press.

Conway, P. F. and Zhao, Y. (2003b). The global reach of educational technology planning. Paper presented at the International Study Association on Teachers and Teaching (ISATT), Leiden, Netherlands, July.

Coolahan, J. (Ed.) (1994). *Report on the National Education Convention*, Dublin: Stationary Office.

Cuban, L. (2000). *Oversold and underused: Computers in the classroom*. Cambridge: Harvard University Press.

Department of Education (1993). *Report of the Special Education Review Committee*, Dublin: Stationary Office.

Department of Education and Science (1997). *Schools IT 2000.* Dublin: Government Publications.

Department of Education and Science (2000). *Learning Support Guidelines*, Dublin: Stationary Office.

Department of Education and Science (2001). *Report of the Task Force on Dyslexia*, Dublin: Government Publications.

Department of Education and Science (2001). *Blueprint for the Future of ICT in Irish Education: Three Year Strategic Action Plan 2001-2003.* Dublin: Government Publications.

European Commission (1994). *Europe and the Global Information Society: Recommendations to the European Council*, (Bangemann Report). Brusselles: Author. http://www.ispo.cec.be/infosoc/backg/bangeman.html

European Commission (1995). *Teaching and learning: Towards a learning society: White Paper on Education and Training*, Available on-line at: http://europa.eu.int/en/record/white/edu9511/index.htm

Evans, J. and Lunt, I. (2002). Inclusive education: are there limits? European Journal of Special Needs Education, 17, 1, 1-14.

Forbairt. (1996). *Ireland: The digital age, the Internet*. Available on-line at: http://www.nsd.ie/inflitdi.html

Fouts, J. T. and Stuen, C. (1997). Copernicus Project: Learning with laptops: Year 1 evaluation report. ERIC Document ED 416947.

Frey, J., and Fontana, A. (1993). The group interview in social research. In D. Morgan (Ed.), *Successful Focus Groups: Advancing the State of the Art* (pp. 20-34). Newbury Park, CA: Sage.

Frith, U. (1997). Brain, Mind & Behaviour in Dyslexia. In C. Hulme & M. Snowling (eds). *Dyslexia: Biology, Cognition and Intervention*. London: Whurr.

Frith, U. (1999). Paradoxes in the definition of dyslexia. Dyslexia: An International Journal of Research and Practice, 5, 192-214.

Frith, U. (2002a). Resolving the paradoxes in dyslexia. In G. Reid and J. Wearmouth (Eds.) *Dyslexia and literacy*. Chichester West Sussex: John Wiley

Frith, U. (2002b). Culture, the brain and dyslexia. In Hjelmquist, E. and von Euler, C. (Eds.) *Dyslexia and literacy: A tribute to Ingvar Lundberg*. London: Whurr Books.

Galvin, C. (Ed.) (2003) *Sharing Innovative Practice: The NCTE Schools Integration Project, 1997-2000*. Dublin: NCTE / DES.

Gleeson, J. et al. (2002). School Culture and Curriculum Change: The Case of The Leaving Certificate Applied (LCA). Irish Educational Studies, 21, 3, 21-44.

Good, T. and Brophy, J. (2002). *Looking in classrooms*, (7th edition). New York: Harper and Rowe.

Greaves, T. (2000, May) One-to-one computing tools for life (technology information) T.H.E (Technological Horizons in Education); v27, 10, 54

Guthrie, J. T. and Wigfield, A. (2000). Engagement and motivation in reading. In M. Kamil, P. B. Mosenthal, P. D. Pearson, and R. Barr. (Eds.), *Handbook of Reading Research*. Mahwah, New Jersey: Lawrence Erlbaum.

Haddad, W. D. and Draxler, A. (Eds.) (2002). *Technologies for Education: Potential, Parameters and Prospects*, Paris: UNESCO and Academy for Educational Development

Hayes, J. R. and Flowers, L. S. (1980). Identifying the organisation of writing processes. In L. W. Gregg and E. R. Steinberg (Eds.) *Cognitive processes in writing*. Hillsdale: NJ: Erlbaum.

Hargreaves, A. (2000). Four ages of professionalism and professional learning. Teachers and Teaching, 6, 2, 151-182.

Harter, S. (1999). *The construction of the self: A developmental perspective*. New York: Guilford Press.

Hill , J. & Reeves , T. C. (1999). *The impact of portable technologies on teaching and learning: An evaluation proposal.* White Paper. The University of Georgia, Instructional Technology.

Hjelmquist, E. and von Euler, C. (2002). *Dyslexia and literacy: A tribute to Ingvar Lundberg*. London: Whurr Books.

Huberman, M. (1999). The mind in its own place: The influence of sustained interactivity with practitioners on educational researchers, Harvard Educational Review, 69, 3, 289-319.

IBEC (1996). *Social policy in a competitive society*, Dublin: Irish Business and Employers Confederation.

INTO (1996). *Information Technology in Irish Primary Education: Issues and recommendations*, Dublin: Author.

Information Society Ireland (1997). *Information Society Ireland Strategy for Action*, Dublin: Author.

Kamil, M. L., Intrator, S. M., and Kim, H. S. (2000). The effects of other technologies on literacy and literacy learning, In M. Kamil, P. B. Mosenthal, P. D. Pearson, and R. Barr. (Eds.), *Handbook of Reading Research*. Mahwah, New Jersey: Lawrence Erlbaum.

Kelleghan, T. (2000). Reading standards in Ireland. Paper presented at the Reading Association of Ireland conference, Malahide, Co. Dublin.

Kosma, R. (1994) Will media influence learning? Reframing the debate. Educational Technology, Research and Development, 42, 2, 7-19

Krendl, K., and Lieberman, D. (1988). Computers and learning: A review of recent research. Journal of Educational Computing Research, 4, 4, 367-89

Kulik, C. C. and Kulik, J. A. (1991). Effectiveness of computer based instruction: An updated analysis. Computers in Human Behavior, 7, 75-94.

Kumar, D and Wilson, C. L. (1997/2000). Computer technology, science education, and students with learning disabilities. In R. Pea (Ed.). *Technology and Learning* (Jossey-Bass Reader). San Francisco: Jossey-Bass. Originally Kumar, D and Wilson, C. L. (1997/2000). Computer technology, science education, and students with learning disabilities. Journal of Science Education and Technology, 6, 2, 155-160.

Lankshear, C. and Bigum, C. (1998). Digital rhetorics: Literacies and technologies in education. Available on-line at: Http://users.wantree.com.au/~peterh/rhetoric/

Lankshear, C. and Bigum, C. (1999). Literacies and new technologies in school settings. Curriculum Studies, 7, 3, 445-465.

Lewis, M. and Wray, D. (1999). *Literacy in the secondary school*. London: David Fulton Publications.

Lincoln, Y. and Guba, Y. G. (1985). *Naturalistic Inquiry*, Beverly Hills: Sage.

Mac an Ghaill, M., Hanafin, J,, and Conway, P. F. (2004). *Gender politics and Exploring Masculinities in Irish Education: Teachers, materials and the media*. Dublin: National Council for Curriculum and Assessment (NCCA). ISSN: 1649-3362

Mayer, R. (1998). *The Promise of Educational Psychology: Learning in the Content Areas.* Upper Saddle River, NJ: Prentice Hall.

Mertens, D. M. (1998). *Research methods in education and psychology: integrating diversity with qualitative and quantitative approaches*. Thousand Oaks, CA; Sage.

Microsoft Corporation (1999). Anytime, Anywhere Learning: A guide to getting started. [On-line]. Available http://www.microsoft.com/education/k12/aal

Michaels, S. (1990). The computer as a dependent variable, Theory into Practice, 29, 4, 246-255.

Miles, T. R. and Miles, E. (1999). *Dyslexia: One hundred years on*, (2nd edition), Milton Keynes: Open University Press.

Morgan, W. P. (1896). A case study of congenital word blindness, British Medical Journal, 2, 1378.

Mulkeen, A. (2003). The digital divide in Irish schools: Should we be worried? *Irish Educational Studies*, 22, 1, 165-181.

Murphy, R. F., Penuel, W. R., Means, B., Korbak, C., Whaley, A., and Allen, J. E. (2002, April). E-DESK: A review of recent evidence on the effectiveness of discrete educational software. SRI for US Dept. of Education. SRI Project 11063.

National Council for Curriculum and Assessment (2003). Senior Cycle Review, Dublin: NCCA.

National Reading Panel (1999). Progress Report of National Reading Panel Available on-line at: http://www.nationalreadingpanel.org/Publications/interim.htm

National Research Council (2001). *Preventing reading difficulties in young children*. Washington DC: National Academy Press.

National Policy Advisory and Development Committee (2001). *The Impact of Schools IT 2000: Report and recommendations to the Minister for Education and Science*. Dublin: NCTE

Niemi, P and Poskiparta, E. (2002). Shadows over phonological awareness training: resistant learners and dissipating gains. In E. Hjelmquist and C. von Euler (eds) *Dyslexia and literacy: A tribute to Ingvar Lundberg*, London Whurr.

NITEC/DCU (1992). *New Information Technologies in the Irish School System*, Dublin: Author.

Nosek, K. (1995). The Dyslexic Scholar: Helping Your Child Succeed in the School System, Houston, TX: Taylor Trade Publishing

OfSTED, (2000). Inspection Report: The Cornwallis School. Available at http://www.ofsted.gov.uk/reports/118/118874.pdf

Olson, R.K. (2002). Phoneme awareness and reading, from the old to the new millenium. In E. Hjelmquist and C. von Euler (eds), *Dyslexia and literacy: A tribute to Ingvar Lundberg* (pp. 100-116). London: Whurr Publishers.

O'Mahoney, P. (2000). *Evaluation Report of the SOLAS SIP Project*. Unpublished. Available on the web: http://www.enabletech.ie/evaluation_report.html and on www.sip.ie.

Owsten, R. (1997). The World Wide Web: A technology to enhance teaching and learning? Educational Researcher, 26, 2, 27-33

Palinscar, A. S. and Brown, A. L. (1984). Reciprocal teaching of comprehension monitoring and comprehension fostering activities, Cognition and Instruction, 1, 2, 117-175.

Pea, R. (2000). *The Jossey-Bass Reader on Technology and Learning*, San Francisco: Jossey-Bass.

Pennington, B. F. (1991). Diagnosing learning disorders: A neuropsychological framework. New York: Guilford.

Phelan, A. and Haughey, E. (2000). *Information and advice on Special Educational Needs and Information and Communication Technology*, Dublin: National Centre for Technology Education (NCTE).

Piggot, T. D.and Barr, R. (2000). Designing programmatic interventions, In M. Kamil, P. B. Mosenthal, P. D. Pearson, and R. Barr. (Eds.), *Handbook of Reading Research*. Mahwah, New Jersey: Lawrence Erlbaum.

Pintrich, P. and Schunk, D. (1996). *Motivation in Education*, Boston: Houghton Mifflin.

Quinn, G. (2003). Towards Free and Inclusive Societies for People with Disabilities, In G. Quinn and D. Redmond (Eds.) *Disability and Social Policy in Ireland*, Dublin: UCD Press.

Quinn-Patton, M. (1997). *Utilisation-focused evaluation*: *The third century text*, Thousand Oaks: Sage.

Rockman et al. (1997). The laptop research study: First year study of the laptop program [On-line]. Available http://www.microsoft.com/education/k12/aal

Rockman, et. al. (1998). Powerful tools for schooling: Second year study of the laptop program. Rockman, et. al: San Francisco, CA. [Online]. Available: http://www.microsoft.com/education/k12/aal

Rockman et al. (1999). The laptop research study: Third year study of the laptop program [On-line]. Available http://www.microsoft.com/education/k12/aal

Roe, B. D., Stoodt, B. D., and Burns, P. C. (2001). *Secondary school literacy instruction: The Content Areas*. (7th edition). Boston: Houghton Mifflin.

Rowan, L., Knobel, M., Bigum, C., and Lankshear, C. (2002). *Boys, literacies and schooling: the dangerous territories of gender-based literacy reform*, Milton Keynes: Open University Press.

Samuelson, S. (2002). Reading disabilities among very-low-birthweight children: implications for using different exclusionary criteria in defining dyslexia. In

Hjelmquist, E. and von Euler, C. (Eds.). *Dyslexia and literacy: A tribute to Ingvar Lundberg*. London: Whurr Books.

Sandholtz, J, H., Ringstaff, C. Dwyer, C. D. (1997). *Teaching with technology: creating pupil centred classrooms*, New York: Teachers College Press.

Sarason, S. (1991). *The predictable failure of educational reform.* New York: Teachers College Press.

Sayles, A. (2003). Dyslexia. Paper presented the Irish Learning Support Association conference, Drumcondra, Dublin, September.

Schaumburg, H. (2001). The impact of mobile computers in the classroom: Results from an ongoing video study. Center for Media Research, Freie Universitaet Berlin, November. Unpublished report.

Selwyn, N. (2000). Creating a 'connected' community? Teachers' use of an electronic discussion group. Teachers College Record, 102, 4, 750-778.

Shiel, G. (2002). Literacy standards and factors affecting literacy: what national and international assessments tell us. In G. Reid and J. Wearmouth, Dyslexia and literacy: Theory into Practice, Milton Keynes: Open University Press.

Shiel, G., Cosgrove, J., Sofroniou, N., and Kelly, A. (2001). *Ready for life: The Literacy Achievements of Irish 15-year olds with comparative international data*, Dublin: Educational Research Centre.

Skelton, C. (2001). *Schooling the boys: Masculinities and primary education*, Milton Keynes: Open University Press.

Smith, J. (1995). Semi-structured interviewing and qualitative analysis. In Smith et al, (eds.) *Rethinking Methods in Psychology*. Thousand Oaks, CA: Sage..

Snow, C. and Burns, S. (2001). Preface, in National Research Council. *Preventing reading difficulties in young children.* Washington DC: National Academy Press.

Snowling, M. (2000). *Dyslexia*. (2nd edition). Oxford: Blackwell Publications.

Stanovich, K. and Stanovich, (1996). Rethinking the concept of learning disabilities: the demise of the aptitude/achievement discrepancy, In D. R. Olson and N. Torrance (Eds.). *Handbook of Education and Human Development*, Oxford: Blackwell Publications.

Stevenson, K. (1999). Learning by laptop. School Administrator, 56, 4, 18-21.

Sugrue, C. (2002) Irish Teachers' Experience of Professional Learning: Implications for Policy and Practice, *Journal of Inservice Education*, 28, 2, 311-338.

Sugrue, C., Morgan, M., Devine, D., and Raftery, D. (2001). *Policy and practice of professional development for primary and post-primary and teachers in Ireland: A critical analysis.* A report commissioned by the Research and Development Committee of the Department of Education and Science, Unpublished.

Thorndike, E. L. (1912). Education: A first book. New York: Macmillan. Clark, R. (1983).

Torgesen, J. K. and Hecht, S. A. (1996). Preventing and remediating reading disabilities: Instructional variables that a make a difference for special students. In M. Graves, P. van den Broek, and B. M. Taylor (Eds.). *The first R: Every child's right to read*. New York: Teachers College Press.

UNESCO (1994). *The Salamanca Statement and Framework on Special Needs Education*, Paris: UNESCO.

UNESCO (2003). *Education in and for the Information Society* (UNESCO publication for the World Summit on the Information Society: Author - Cynthia Guttman). Paris: UNESCO

U.S. Department of Education (1996). *Getting America's Students Ready for the 21st Century: Meeting the Technology Literacy Challenge*, Washington, DC: U.S. Department of Education

Vaughn, S. and Schumm, L. (1995). Responsible inclusion for students with learning disabilities, Journal of Learning Disabilities, 28, 264-270.

Vellutino, F. R., Scanlon, D. M., and Lyon. G. R. (2000). Differentiating between difficult-to-remediate and readily remediated poor readers: More evidence against the IQ-achievement discrepancy definition of reading disability, Journal of Learning Disability, 33, 223-238.

Wray, D. (2002). Metacognition and literacy. In G. Reid and J. Wearmouth (eds) *Dyslexia and literacy: Theory and Practice*, Chichester: John Wiley and Sons.

Zhao, Y. and Conway, P. F. (2001) "What's in, what's out?": An analysis of state technology plans. Teachers College Record [On-line] www.tcrecord.org

Appendices

APPENDIX 1A - FOCUS GROUP REFLECTION SHEET: MARCH 2003

Please write about your experiences of the *Laptops Initiative*:

a. What is your overall impression of the *Laptops Initiative* to date?

b. What factors, if any, have helped the project to date?

c. What factors, if any, have hindered the project to date?

d. What approaches to teaching are best or key in working with students who have dyslexia or other learning difficulties?

e. Any other comments or suggestions

Thank you for taking the time to complete this reflection sheet
Dr. Paul Conway

APPENDIX 1B - TEACHER QUESTIONNAIRE –MARCH 2003

1a. My school is City Town Rural

1b. The current school enrolment is <250 250-500 >500

1c. My school is Single-sex boys Single-sex girls Co-ed

1d. My school is a designated as educationally disadvantaged? YES NO

2. I am Male Female

3. Please indicate when your school started using laptops in your school as part of the 'Laptops Initiative'

Spring 2001
Autumn 2001
Spring 2002
Autumn 2002
Spring 2003

4. How many students are currently involved in the "Laptops Initiative' in your school?

Less than 5
6-10
11-15
15-20
More than 20
Other (please specify) _____

4. Of these, how many have been formally assessed and categorized as students with dyslexia? _____

5. What **group(s) of students,** in your school, are participating in the 'Laptops Initiative'? (Please circle all that apply)

1st years 2nd years 3rd years Other, please specify_____

6. How many years of teaching experience do you have? _____
Years

7. What are your main teaching subjects?

_____

8. What **qualifications**, if any, do you hold that help you in teaching:

With ICTs?

Students with learning difficulties?

9. What **experience**, if any, do you have that helps you in being part of the 'Laptops Initiative'?

10. For **how many years** have you been teaching with ICTs? _____
Years

11. For how many **lessons each week** are students typically using their 'Laptops Initiative' computers?

1 lesson 2 lessons 3 lessons Other, please state_____

12. Approximately how many hours do students spend over the course of **one school week using their laptops?** _____
Hours

13. I am the **only teacher** in my school involved in the 'Laptops Initiative' at present
YES NO
14. If no, how many **other teachers** in total are involved? _____
15. Students can take a laptop home YES NO

16. Please indicate the extent to which you agree or disagree with the following statements

	Strongly disagree	Disagree	Agree	Strongly agree
Laptop security is a concern in our school	A	B	C	D
Laptop security is the primary reason why we do not allow students to take their laptops home	A	B	C	D
My own level of technical skill hinders my capacity to use laptops effectively	A	B	C	D
I need more technical support in using laptops	A	B	C	D
I need more support on laptop/computer-based teaching strategies	A	B	C	D
I would like more contact with other teachers participating in the "Laptops Initiative'	A	B	C	D
I would be willing to participate in a web-based virtual learning environment as part of 'Laptops Initiative' support	A	B	C	D
The 'Laptops Initiative' introductory seminar in Autumn 2002 provided sufficient support in using the laptops in my teaching	A	B	C	D
Cost of software limits the number of students who can simultaneously use the same material	A	B	C	D

Pupil response

17. Please indicate your evaluation of **pupils' response** to the following aspects of the 'Laptops Initiative'

	Very positive	Positive	Mixed	Negative	Very negative	**Does not apply**	*Do not know*
ICTs	A	B	C	D	E	F	G
Using a laptop	A	B	C	D	E	F	G
Software they use with the laptop	A	B	C	D	E	F	G
Taking the laptop home	A	B	C	D	E	F	G
Using the laptops as part of their regular classes	A	B	C	D	E	F	G
Using laptops to read	A	B	C	D	E	F	G
Using laptops to write	A	B	C	D	E	F	G
Students motivation to learn with laptops	A	B	C	D	E	F	G
Students' perceptions of being in school	A	B	C	D	E	F	G

18. Substitute cover has been provided to facilitate my planning/coordination of the 'Laptops Initiative' in my school YES NO

Comment:

Appendix 1C- Data summary teacher focus group- March 2003

What are your overall impressions of the 'Laptop project' to date?

Strengths	Obstacles	Strengths/Obstacles
7	**7**	**10**
'An excellent initiative'… 'Very innovative' 'Very well funded' 'Excellent for project work – raised self esteem'… 'Well structured and organized.'	'Lack of computer skills.' 'Difficulty implementing software.' 'A lot of time goes into setting things up' 'Technical problems-student skills, my skills'	'An excellent initiative but timescale too short' 'It is quite good but I am worried about the software usage and pupils' usage of laptop'. 'Confusing at first'.

Of the 24 schools, there were equal numbers (7 in each case) of strengths and obstacles. 10 out of 24 schools held mixed opinions on the initiative.

b. What factors, if any have helped the project to date?

Institutional Support	**Preparatory Space** (Time, Planning, Demo, Info)	**Network** (Other teachers in project)	**Previous Experience**	**Funding**	**Initial Buzz**
9	**20**	**11**	**2**	**8**	**6**
'Staff co-operation' 'The support of principal' 'Teacher enthusiasm in school' 'Principals attitude is very helpful'	'Training at in-service' 'Planning day in October' 'Training and support which has been provided' 'The workshops are very beneficial'	'Meetings with other teachers' 'Ability to communicate with others on project, and the sharing of ideas and resources' 'It is great to meet and share experiences'	'Having experience already using ICT' 'Principal in my school 'into' ICT'	'The money is there to support it' 'Good funding' 'The availability of money. This is not a problem'	'Student enthusiasm' 'Teacher enthusiasm for project' 'Resource teacher involved and enthusiastic'

There was an overlap in replies to the factors that had helped the project to date.
20 out of the 24 schools believed the preparatory space was an important factor that had aided the implementation of the initiative. Of these the availability of information and training days were seen as being very important.
11 out of 24 stated that the presence of a network of other teachers with whom they could consult and share ideas was imperative.
9 out of 24 believed the support of the principal in the school was a factor in the success of the initiative in their school.
In addition, for 8 out of 24 the fact that funding was not a concern was an advantageous feature of the initiative.

What factors, if any, have hindered the project to date?

Time	**Lack of preparation & support**	**Teacher workload**	**Resources (Hardware/ Software)**	**Lack of IT support/ Skill (Teacher /student)**
7	**10**	**3**	**4**	**11**
'Planning and decision making-no time' 'Accessing and installing software takes a lot of time'	'Poor communication at the start' 'Not enough planning meetings' 'Initially, no information, lack of support, lack of training for teachers' 'Delay in organizing training'	'Teachers already feel overworked besides taking on other workloads' 'The large workload of schools'	'Difficulties with software' 'Limitations with regard to evaluating software, hardware.'	'Lack of knowledge- on my part' 'My skills- technical troubleshooting' 'Students being unfamiliar with computer and keyboard' 'Lack of experience with IT'

Lack of co-ordination in school	**Student behavioral problems**
9	**2**
'Not enough planning time in school' 'Purchases made before I was appointed co-coordinator of the project' 'My principal "landed me with it" with no real notion what was involved'	'The increasing discipline problems of students' 'Behavioral issues related to particular students'

11 out of 24 teachers maintained that their lack of IT knowledge was a factor which had inhibited the implementation of the project in their school. In this category they also felt there was a lack of sufficient support for their IT concerns.

In 10 out of 24 cases there was a feeling that there was a lack of preparation and support for this initiative.
9 out of 24 schools maintained there was a lack of co-ordination on behalf of their school. Time was an important concern for 7 out of 24 schools. The predominant concern being the time it took to choose and install software.

What approaches to teaching are best or key in working with students who have dyslexia or other learning difficulties?

Multi-sensory	**Security (Non threatening)**	**Positive reinforcement**	**Fun element**	**Personal focused**
7	**7**	**10**	**2**	**20**
'The multi-media approach' 'Interactive storybooks to help with their reading/ comprehension skills'	'Achievable tasks' 'Supportive style' 'Any approach that enhances the pupil's self esteem and self image is beneficial to the pupil'	'Constant reinforcement (work), repeating exercises so that the students are going over words but are not getting bored' 'Constant feedback and praise/ encouragement'	'…relevant and enjoyable' 'Work that they feel is fun which has an underlying educational element which is hidden from them'	'Personal relationship with student' 'Taking each individual need rather than whole group based work' 'Awareness of individual learning styles'

Flexible	**Structured/ Curriculum**
5	**10**
'Openness to change method/ approach' 'Provide innovative approaches in teaching' 'Variety of activities' 'Variety of methodologies within each class to address their range of learning styles'	'Very structured programmes to ensure students know what and why they are doing' 'IT as a resource tool to back up/enforce core subjects/ themes'

In 20 out of 24 cases teachers alluded to the importance of having a person focused approach to teaching. This included an emphasis on being aware of the needs of the individual students as well as the group.
10 out of 24 schools believed positive reinforcement was a significant factor in working with students with dyslexia.

10 out of 24 believed it is imperative to maintain structure through a curriculum based approach to teaching.
Equal numbers (7 out of 10 in each case) felt a multi-sensory and non-threatening approach was an important approach to teaching.

e. Any other comments or suggestions

Specific IT Skills for students (Keyboard)	**IT Skills for Teachers**	**Internal Support & Co-ordination**	**External Support & Co-ordination**	**Personal Capacity**
1	**2**	**8**	**6**	**1**
"Keyboard skill module, recommendations on how to set it up and for how long"	"Lack of knowledge of computers is a drawback for me. I have learned a lot in recent months" "Are they (person/s with responsibility for this initiative in school) trained well enough to get the best out of resources provided?"	"Success/failure of this initiative is very much dependent on attitude of Principal Co-coordinator" "In school training would be very useful" "Post of responsibility for this should be implemented"	"Regular co-coordinators meetings" .."more workshops/days of in-service" "more money and teaching time to be allocated to this project. More to coordinators in each region to help teachers in the schools" "More clear guidelines to both teachers and principals on all aspects"	"You need energy, enthusiasm and patience"

8 out of 24 maintained there was a needed to be a provision for greater internal support and co-ordination on the behalf of their school.
6 out of 10 felt that greater external support and co-ordination would be advantageous for the progression of the initiative.
2 out 24 reiterated their concerns in regard to their lack of IT knowledge or skill.

APPENDIX 1D- TEACHERS' IMPRESSIONS OF THE LAPTOPS INITIATIVE

WHAT IS YOUR OVERALL IMPRESSIONS OF THE 'LAPTOP PROJECT' TO DATE?

"Very good initiative overall, well worth while."

"There isn't enough time between the beginning of the project and the evaluation dates. The department should guarantee continuity of the project for those pupils involved."

"It has been educational. It has increased the amount of time that I have used computers within a class structure."

"Difficulty getting started. Confusion re. software. Confusion re where project was going. Nobody seemed to have clear end in mind."

"An excellent initiative but timescale too short."

"At first, the initiative was confusing for it had no clear guidelines. However as it progressed questions were answered and on the whole the initiative seemed worthwhile. It is beneficial to both teachers and students and has received a positive response and is progressively moving forward."

"Very innovative. Very well funded. Well supported."

"Well organised and supported (good back up service – NCTE). Initially in the dark – nervousness."

"Well organised, a good support network. There seems to be a variety of sources to tap into."

"The technical side and hardware side is huge. It will work well next year when I can set a scheme of work for a class for a year and be involved in the learning support from the beginning."

"Worthwhile – using ICT is motivating teachers and pupils.
Implementation of project in the school took much longer than anticipated.
Very exciting project with lots of interesting outcomes for teachers and students alike."

"Great for some students –[named student] Technical Problems – student skills, my skills. Excellent for project work – raised self esteem. Monitoring. Printing out."

"After a very slow and confusing start I get the impression it is up and running with a wide variety of responses from various schools. My own school has begun to get to

grips with it, but some way to go, especially integrating it into my own work and whole school."

"A lot of time goes into setting things up. You worry that you are achieving little and time is passing."

"Very good, extremely helpful. Mountain at the beginning, not so daunting now, network to help available."

"What are aims/how is it assessed? Seems like a good idea/ what makes it different from using Alpha smarts/Comp."

"Well organized. Pupils loved getting the laptops, it created excitement in the school. Pupils with low self esteem have benefited. Also pupils in 'lower' bands or classes. It is a good project. The pupils are benefiting from accessing the technology."

"Progress has been slow, it takes a lot of time to decide on laptop maker, insurance, software, set-up and training students. Takes time to match student to project."

"It is quite good but I am worried about the software usage and pupils' usage of laptop."

"Lack of computer skills. Difficulty implementing strategy. Knowledge of software. Issues of time. Integrating initiative into current Junior Cert Programme."

"Time consuming in terms of initial set-up and evaluation of appropriate software. Students are delighted with their new technology and motivation has greatly increased.
School very passive towards initiative."

"Confusing at first. Great Idea. Hard to organize for whole class use. Lack of teacher knowledge of IT = fear = will not use = no change in teaching method."

"Very good. Very useful when software is demonstrated and explained.
It would have been excellent if when the funds were given that we would have been shown lists of relevant software as a guideline and hardware.
The last meeting was particularly useful for helping me prepare for the setting up of the laptop programme in our school."

"Well structured and organized. In-service days provided valuable assistance especially visit of Tom Daly to school. Principal and Deputy Principal very co-operative and helpful also IT specialist. Pupils that are involved in the project very enthusiastic and motivated since it commenced."

Appendix 1E- Teachers' views of factors that helped (March 2003)

B. WHAT FACTORS, IF ANY, HAVE HELPED THE PROJECT TO DATE?

"Information day – speaking and meeting with other teachers."

"Staff co-operation. Teachers donating time. The three hours per week is a help but does not meet the requirements. Pupil enthusiasm."

"Introduction to new software and being shown how to implement these programmes into class."

"The support of principal."

"Planning day in Oct. Availability of advisors. Teacher enthusiasm in school. Money. Technical Assistance (availability of)."

"These 'Laptops Initiative' day courses. It gives you the opportunity to speak to others involved in the project and share resources, problems etc."

"Teacher enthusiasm for project. Students' enthusiasm for project. Training and support which has been provided. Good funding."

"In-service days – Tom Daly. More information less pressure on time and results."

"The financial backing. Training at in-service like today."

"The availability of money. This is not a problem."

"Training – software. In-service provided. Having experience already using ICT."

"Student enthusiasm. Project work (Display/Video, Visual etc.) Support of Tom and Principal. School visits. Meetings with other teachers."

"The two days workshop in Marino was good. As is today's. Money! Resource teacher involved and enthusiastic."

"The workshops are very beneficial. It is great to meet and share experiences. The co-coordinator is very approachable and helpful. The students enjoy the computers. Principals attitude is very helpful."

"School attitude- students' attitude – most teachers' attitude."

"Co-ordination. Back up of sales company- with the local ICT co-coordinator. Principal of my school 'into' ICT. JCSP- librarian- available to 'mind' the laptops in my school. Sense of 'community' – all working together on the project."

"Ciaran Folen –ICT advisor- Galway Education Centre has been excellent. Insurance has been very useful."

"Well organized. The money is there to support it. There is a desire to help these students everything else has paid ICTs try something different."

"Present workshop. Information on software. Visit of co-ordinator to school. Principals' attitude to the project. ICT course Dept of Education."

"Workshops have been very beneficial. The ability to communicate with others on the project and the sharing of ideas and resources. Principals attitude very important has been very helpful."

"Workshops – information - at last. Tom calling to school."

"Planning the project has helped give me a clear focus of implementing the project into our school (prepare project plan documentation)."

"In-service very helpful. Visit of Tom Daly to school extremely helpful. Assistance and backup of the different supply companies. Back up and commitment on behalf of Principal and staff in school. Pupil and Parents involvement."

APPENDIX 1F – TEACHERS' VIEWS ON FACTORS THAT HINDERED (MARCH 2003)

C. WHAT FACTORS, IF ANY, HAVE HINDERED THE PROJECT TO DATE?

"Lack of information of any kind. When setting up the programme a lot of work to be done finally in a very short space of time. Reports far too detailed."

"Again, the delay between the time the laptops were bought and the start of the project. Teachers already feel overworked besides taking on other workloads."

"Laptops – have difficulty with a number of laptops – repair. Students being unfamiliar with computer and keyboard. Lack of software."

"Purchases made before I was appointed co-ordinator of the project."

"Not enough planning meetings. Difficulties in setting up infrastructure in school. Difficulties with software. Not enough planning time in school. Delay in organizing training."

"The slow start to the project and the lack of information available at the beginning."

"Time limitations with regard to evaluating software, hardware, planning and devising suitable system for use of laptops. Who is responsible for maintenance etc."

"Initially – no information lack of experience with IT, lack of training for teachers."

"The lack of training for teachers in relation to IT skills (at a school based level). Who is coordinating the initiative."

"The lack of knowledge of software packages and the lack of integration with the curriculum as a whole and the fact that the project in our school is disjointed from the learning support area."

"Time for planning should have been given to one teacher and not to school as principal has not allocated full 3 hours. If time was enough each week I could have moved the project along in the school. Planning and decision making – no time."

"My illness. My skills – technical troubleshooting. Their skills – they can get frustrated. Printing. Monitoring. Classroom management."

"Poor communication at the start. My principal "landed me with it" (called delegation!) with no real notion as to what it involved. It was great getting laptops and some software but it took so long for anything else to happen."

"Accessing and installing software takes a lot of time. The class periods in second level schools are short when you have to start up and close down computers. My knowledge of I.T. is not great."

"Some teachers' attitude, also time, feeling of lack of expertise. And the way the funds were allocated i.e. no funding for structural changes."

"Lack of knowledge – on my part. Purchasing of packages? Behavioural issues related to particular students."

"It is difficult coming to this project as a learning support teacher. Even though they said you didn't need to know much about technology I found my basic lack of skills a hindrance. Also there is a lot of school organization around the laptops."

"As in (a) above, Windows XP very unreliable, eventually got dual book system on laptop i.e. windows 2000/XP windows 2000 much more compatible."

"Lack of support to schools. Lack of teaching time for support teachers. The increasing discipline problem of students. The lack of I.T. training for teachers. The large workload of schools."

"Lack of back up in the initial stages."

"(1)Lack of info. (2)Uncertainty; on part of principal, on my own part. (3)Lack of time – uncertainty with regard to days off; time off etc, to organize project. (4)Lack of I.T. knowledge."

"IT factors. Very, very slow the setting up of the room. The internet (Broadband-still waiting for ESAT to install it)."

"Perhaps a little slow in getting software. Organisation of timetables etc. – time of class periods."

Appendix 1G – Teachers' views of teaching strategies

D. WHAT APPROACHES TO TEACHING ARE BEST OR KEY IN WORKING WITH STUDENTS WHO HAVE DYSLEXIA OR OTHER LEARNING DIFFICULTIES?

"Flexible, child-centred, positive approach needs to be well thought and organized – relevant and enjoyable."

"I think a positive teacher/pupil relationship is key. Any approach that enhances the pupils self esteem and self image is beneficial to the pupil."

"Constant reinforcement (work), repeating exercises so that the students are going over words but are not getting bored e.g. Wordshark or Spellcheck."

"Personal relationship with students. The problem seems to be (getting them) motivated. They work with teachers they like. They become defensive with teachers they don't like."

"Working in new threatening environment. Sometimes small groups or even one to one works best but is not always possible. Having suitable software is essential."

"Taking each individual need rather than whole group based work. Praise and clear teaching aims. Work that they feel is relevant and fun which has an underlying educational element which is hidden from them."

"Very structured programmes to ensure students know what and why they are doing. What is expected of them and what the outcome will be. Variety of methodologies within each class to address their range of learning styles. Constant feedback and praise/encouragement."

"Student centered approach (take them from where they are as opposed to where they should be.) Give them confidence, reassurance. Provide innovative approaches in teaching."

"(1)Small groups. (2)IT as a resource tool to back up/enforce core subjects/themes."

"I have no formal training in this area of special needs education but many of my students in ICT have special needs. The approach I take is as follows: Small amounts of work. So something is achieved. Constant re-enforcement of ideas and tasks. Patience and praise."

"Variety of activities. Well planned lessons – know what you are using – be two steps ahead of the class if possible. Use software for preparing your classes – test how easy it is for you to complete exercises before expecting students to do it. Support from classroom assistant."

"Multisensory. Structured Sequential Approaches that give them control over their learning – can self correct etc. Approaches that motivate and gives them pride in what

they have produced. Raising their self esteem. Small groups. Awareness of individual learning styles."

"The multimedia approach! Small groups and individual tuition. Patience. I.E.P.s."

"Individual or small groups. Supportive style. Boosting confidence. Multi-sensory approach."

"N.B. to focus on the child then look at the difficulty – set achievable goals must experience success and if there are failures – understand why."

"Repetition. One-to-one work. Achievable tasks. Stand-alone tasks."

"Small group- small classes more so than individual work so that the social dimension of teaching and learning is present. Yes, pupils like working with technology if they have learning difficulty but the teacher must know why they are following a particular course of Action. The pupils must also see and be able to build meaning from the activities."

"Small group and individual work i.e. teach students to compensate for their difficulties. The laptops have been useful for certain types of dyslexia students."

"Must show an interest in the pupils. Must understand their behaviour and background. Don't show anger to them. Teach them to be responsible for their actions."

"Working in small groups and in one to one situations with the students. Multi-sensory approach. Constant reinforcement."

"We are using basic re-enforcement software to enhance their word attack skills i.e. (Wordshark/Starspell) and interactive storybooks to help with their reading/comprehension skills. Constant re-enforcement, praise, focusing on specific skills."

"(1) Openness to change method/approach.
(2) Readiness to have a couple of different presentations going on at one time.
(3) Patience.
(4) Recognition of the fact students have learning difficulties/different learning style.
(5) Recognize they have learning difficulty they can still learn."

"Using Texthelp: Read and Write software. Scan in documents from their textbooks, students prefer using laptops then using paper to do their work. Using software for spelling that incorporates games, love working on this. Small groups ideal, large groups suit text help, keep students on same task."

"Very small group or one to one tuition. Constant reinforcement and praise.
Make use of as much computer compatible programmes to suit students. Individual needs. Multi-sensory approach."

APPENDIX 1H - TEACHERS' SUGGESTIONS

E. ANY OTHER COMMENTS OR SUGGESTIONS

"Keyboard skill module, recommendations on how to set it up and for how long".

"Lack of knowledge of computers is a drawback for me. I have learned a lot in recent months"

"In school training would be very useful"

"Regular co-ordinators meetings."

"The success/failure of this initiative is very much dependent on attitude of; Principal & IT Coordinator".

"Also can the person with responsibility for this initiative cope with demands/pressures. Are they trained well enough to get the best out of resources provided?"

"The initiative is a very good one but it needs to filter through the school from the top down and then acted upon with support from within the school (B-Post A-Post ?)"

"'Post of responsibility' for this should be implemented."

"You need energy, enthusiasm and patience. Plenty of time."

"(1)The "three hours" thing sorted out please, for someone already with a fair timetable.
(2) More workshops/days of in-service.
(3) List of software/addresses etc."

"Who gets laptop/insurance?"

"Teacher co-ordinator needs time to co-ordinate these activities."

"More money and teaching time to be allocated to this project. More to coordinators in each region to help to teacher in the schools."

APPENDIX 2A - PRINCIPAL INTERVIEW PROTOCOL (MAY 2003)

1. Can you tell us about the 'Laptop project' to date in the school?
    a. How did project start
    b. Committee
    c. SDP
    d. Selection of students
        i. Dyslexia
        ii. Other reading and writing difficulties
    e. Security
    f. Substitution for project planning + co-ordination
    g. Project vis-à-vis SEN policy + mode of provision
    h. How do you see the project right now?
    i. How would you like to see it develop?
    j. Model of use
        i. Actual
            1. Airport – 'mobile' usage?
        ii. Ideal

2. What have been the key supports in the project so far?
    a. Internal – in school (ICT infrastructure; SEN policies; 'technical support')
    b. External – from outside school
    c. Teacher beliefs

3. What has hindered the project?
    a. Internal
    b. External
    c. Teacher beliefs

4. What supports would you like to see in place
    a. Internal
    b. External
    c. Teacher CPD

5. To date, what do you see as the benefits of the project?
    a. For teachers
    b. For students
        i. Attitudes
        ii. Achievement
    c. Other
6. To what extent have other teachers in the school been part of the project?
    a. Shown interest
    b. Used the laptops
7. How many students are involved in the Laptops Initiative at present?
8. Can you describe the process by which money was spent on Laptops?
9. What supports would you like to see in place in the future?

APPENDIX 2B - TEACHER INTERVIEW PROTOCOL (MAY 2003)

10. Can you tell us about the Laptop project to date in the school?
    a. How did project start
    b. Committee
    c. SDP
    d. Selection of students
        i. Dyslexia
        ii. Other reading and writing difficulties
    e. Security
    f. Substitution for project planning + co-ordination
    g. Project vis-à-vis SEN policy + mode of provision
    h. How do you see the project right now?
        i. Typical lesson
        ii. Software being used….list
    i. How would you like to see it develop?
    j. Model of use
        i. Actual
            1. Airport – 'mobile' usage?
        ii. Ideal
11. What have been the key supports in the project so far?
    a. Internal – in school (ICT infrastructure; SEN policies; 'technical support')
    b. External – from outside school
    c. Teacher beliefs

12. What has hindered the project?
    a. Internal
    b. External
    c. Teacher beliefs

13. What supports would you like to see in place
    a. Internal
    b. External
    c. Teacher CPD

14. To date, what do you see as the benefits of the project?
    a. For teachers
    b. For students
        i. Attitudes
        ii. Achievement
    c. Other
15. To what extent have other teachers in the school been part of the project?
    a. Shown interest
    b. Used the laptops
16. How many students are involved in the Laptops Initiative at present?
17. Can you describe the process by which money was spent on Laptops?
18. What supports would you like to see in place in the future?

APPENDIX 2C - SOFTWARE REVIEW - EXISTING SOFTWARE USE

Please list the different software in order - based on of how frequently you use each - in teaching students as part of the Laptops Initiative. *Then please comment on how you see the software meeting the needs of students with dyslexia or other reading and writing difficulties.*

Name of Software	How I see it meeting students' needs	Questions/comments I have about the software are…
1.		
2.		
3.		
4.		
5.		

What in-service have you received on software for students with dyslexia or other reading and writing difficulties?

Other software

Is there any software you would like to use as part of this initiative but have not done so yet?

YES *NO*

Comment:

APPENDIX 2D - STUDENT CASE STUDIES

Can you please name 2 students who we will focus on as part of our school case studies.

Student 1 – who you see as <u>most interested/engaged</u> in using the Laptops

STUDENT NAME; _____(Circle one) MALE FEMALE
Year in school (circle one): 1st 2nd 3rd TY 5th 6th
Please describe the student under the following headings

- Strengths and attainments

- Priority learning needs

- How you see the 'Laptops Initiative' meeting his/her needs

- His/her overall progress and attainment in the 'Laptops Initiative' to date + example

Reading age = _____ based on _____ test on (date) _____
Chronological age = ____ years _____ months

Has the student been assessed as having dyslexia? YES NO
When?

Does the student receive learning support? YES NO
No. of lesson periods per week
Comment:

Does the student receive resource teacher support? YES NO
No. of lesson periods per week/Nature of support
Comment:

Student 2 – who you see as having the most difficultly learning to read

STUDENT NAME; _____(Circle one) MALE FEMALE
Year in school (circle one): 1st 2nd 3rd TY 5th 6th
Please describe the student under the following headings

- Strengths and attainments

- Priority learning needs

- How you see the 'Laptops Initiative' meeting his/her needs

- His/her overall progress and attainment in the 'Laptops Initiative' to date + example

Reading age = _____ based on _____ test on (date) _____
Chronological age = ____ years _____ months

Has the student been assessed as having dyslexia? YES NO
When?

Does the student receive learning support? YES NO
No. of lesson periods per week
Comment:

Does the student receive resource teacher support? YES NO
No. of lesson periods per week/Nature of support
Comment:

APPENDIX 3 – SCHOOL SURVEY SEPTEMBER 2003

Evaluation of the 'Laptops Initiative'
To be completed by school principal

NAME of SCHOOL: _____
Please complete this survey with regard to your current and planned use of the laptops for school year 2003/04. 'X' the desired response or write as appropriate. Please answer the questions in relation to your school as of Sept. 30th 2003.

1a. My school is City Town Rural

1b. The current school enrolment is _____

1c. My school is Single-sex boys Single-sex girls Co-ed

1d. My school is a designated as educationally disadvantaged? YES NO

2. I am Male Female

3. Please indicate when your school started using laptops in your school as part of the 'Laptops Initiative'
Spring 2001
Autumn 2001
Spring 2002
Autumn 2002
Spring 2003
Autumn 2003

4. How many students are currently (2003/04) involved in the "Laptops Initiative' in your school?
Less than 5
6-10
11-15
15-20
More than 20
Other (please specify) _____

4. Of these, how many have been formally assessed and categorized as students with dyslexia (i.e. based on a psychological assessment)? _____

5a. How many laptops did your school purchase with the 'Laptops Initiative' funds? _____

5b. Of those specified in 5a what type of computer (i.e. PC or Mac)
No. of PC = _____ No. of Macs = _____

5c. How many desktop computers did your school purchase with the 'Laptops Initiative' funds? _____

5d. How many computers in your school are used for teaching/learning (DO NOT include 'Laptops Initiative' laptops or computers used for administration)?

_____

5e. Of those specified in 5d what type of computer (i.e. PC or Mac)

No. of PC = _____ No. of Macs = _____

5f. Has your school purchased a Lapsafe trolley for the 'Laptops Initiative' laptops?

YES NO

If yes, how many Lapsafe trolleys? _____

5g. Use of wireless technology: Has your school installed wireless system for use with 'Laptops Initiative' laptops? YES_____ NO _____

Comment:

6a. What **group(s) of students,** in your school, are participating in the 'Laptops Initiative'? (see below table as indicated ** and ***). If there are two or more groups involved in any year please note this in the final column.

Year	Total number of students	No. of male students	No. of students assessed with dyslexia	No. of class periods per week	No. of teachers involved	Type of teacher**	Please specify type of teaching/learning activities for which laptops are **primarily** used ***
1st year							
2nd year							
3rd year							
TY year							
5th year							
6th year							

**

LST = Learning support teacher

RsT = Resource Teacher
GCT = Guidance and Counselling Teacher
S/CT = Subject area/Classroom teacher

***

RSk = Development of reading skills using specialized software e.g., Wordshark, Starspell and/or other similar programmes
RBk = Reading adapted books e.g. Don Johnson 'Start-to-Finish Books'; Kurzweil and/or using similar software
WRT = Writing using regular word processing software (e.g. MS Word) or specialized software for teaching writing (e.g. Clicker 4)

6b. How many students are receiving learning support teaching in your school?
_____

6c. Of the students involved in use of the 'Laptops Initiative' laptops, how many are identified as qualifying for learning support teaching? _____

6d. Of the teachers identified above (Table for question 6a) as involved in the 'Laptops Initiative', how many have completed **or** are currently taking the National Centre for Technology (NCTE) course 'ICT for Students with Special Educational Needs'? [The course is being taught at local education centers]. If none, please state none. _____

7. Have students brought laptops home as part of the 'Laptops Initiative'?
YES _____ NO _____
Describe:

8. Please indicate the extent to which you agree or disagree with the following statements

	Strongly disagree	Disagree	Agree	Strongly agree
Laptop security is a concern in our school	A	B	C	D
Laptop security is the primary reason why we do not allow students to take their laptops home	A	B	C	D
Our school needs more technical support in using laptops	A	B	C	D
I would like more contact with other principals participating in the 'Laptops Initiative'	A	B	C	D
The 'Laptops Initiative' principal's seminar in May 2003 provided sufficient support in thinking about how to use the laptops in our school	A	B	C	D
Cost of software limits the number of students who can simultaneously use the same material	A	B	C	D

Pupil response

9. Please indicate your evaluation of **pupils' response** to the following aspects of the 'Laptops Initiative'

	Very positive	Positive	Mixed	Negative	Very negative	**Does not apply**	*Do not know*
ICTs	A	B	C	D	E	F	G
Using a laptop	A	B	C	D	E	F	G
Software they use with the laptop	A	B	C	D	E	F	G
Taking the laptop home	A	B	C	D	E	F	G
Using the laptops as part of their regular classes	A	B	C	D	E	F	G
Using laptops to read	A	B	C	D	E	F	G
Using laptops to write	A	B	C	D	E	F	G
Students motivation to learn with laptops	A	B	C	D	E	F	G
Students' perceptions of being in school	A	B	C	D	E	F	G

10. Substitute cover has been used to facilitate my planning/coordination of the 'Laptops Initiative' in the school YES NO

Comment:

11. If you have any other comments or suggestions in relation to the 'Laptops Initiative' please add them here:

Thank you for completing this survey. Please e-mail it or FAX (021-427-0291 Attn: Dr. Paul Conway) on or before Friday 24th of October 2003