



Citizenship & Science The Connecting Axes

The Citizenship and Science Exchange (CaSE) Schools Project

A Report for the Centre for Cross Border Studies and Dublin City University

Charlotte Holland & Peter McKenna, School of Education Studies, DCU

September 2005



The Centre for
Cross Border Studies



EU Programme
for Peace and Reconciliation

CITIZENSHIP AND SCIENCE: THE CONNECTING AXES

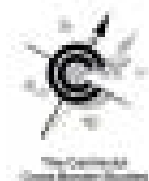
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School of Education Studies, DCU**

September 2005

With contributions by Ms Carmel Mulcahy, School of Education Studies, Dublin City University, Dr. Kevin Williams, Mater Dei Institute of Education, Dublin and Dr Odilla Finlayson, Dublin City University





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Foreword


Science and citizenship are the connecting axes of many of the major issues that face our societies, in both parts of Ireland, and internationally. These issues involve the production and assessment of scientific knowledge and the weighing up, in democratic contexts, of the choices that face us, collectively and individually. They include climate change, stem cell research, hospital "super-bugs", waste management, combined vaccines and narcotic drugs use. In all of these cases, and more, various scientific, political, cultural and other perspectives bear on the subject. On the day that I write this, Irish and British news media are reporting prominently the recreation in a US lab of the 'Spanish flu' virus that killed millions in 1918; scientists disagree, both as scientists and as citizens, how the scientific benefits and the security risks of such a move are balanced.

Science and citizenship (or "science and society", "science and democracy") are more and more frequently coupled in national and international policy debates, research programmes and political initiatives. The European Commission, the International Council for Science, UNESCO, national governments and scientific societies are all, in their different ways, engaged with the challenges of harnessing science for social gain, of making science more responsive to citizen contributions, and of making citizens more aware of scientific developments.

Increasing attention is being paid to the methods for promoting dialogue between scientists and citizens around the promise, potential and pitfalls of, for example, nanotechnology and genetic engineering. Important initiatives are being taken – though not yet adequately integrated into formal science education at third level – to ensure that the next generation of scientists are better equipped to engage with the hopes and fears of the societies of which they are part.

In these contexts, the Citizenship and Science Exchange project was – and remains - very timely and relevant. As the background chapter makes clear, issues of risk assessment, of trust, of responsibility and expertise are prominent in modern, technically advanced societies. Preparing citizens of the future – the awesome responsibility of our schools – must mean that awareness of these big concepts informs teaching in several areas.

This report on CaSE offers some very valuable insights into the ways in which these concepts can be explored, implicitly and explicitly, within related parts of the school curriculum and - perhaps most excitingly – in the connections and cross-overs between them. Although the authors report at one point on some of the difficulties of promoting interdisciplinary exchanges, the reader cannot but be impressed with the wide range of activities the schools undertook that called on various disciplinary domains. There are important learning lessons here for science education at second and third level, at a time when concern is high over the falling number of students pursuing science studies.



Clearly, great imagination went into devising the materials for this project. Equally clearly, the students and teachers in the participating schools invested their own spirit of invention and adventure into the project. The letter-writing, the dramas, the debates, the film screenings, the FairTrade initiatives, the school tours, the lively online exchanges, and the opportunity for two students to be TV reporters for a day, all pay tribute to the skills of the project researchers in stimulating students and teachers, and to the schools for responding.

This project will surely have lingering effects both in the participating schools and in wider curriculum development circles. The report offers plentiful support for extending and expanding the project. Let us hope that the education authorities in Ireland, North and South, can hear the CaSE.

Brian Trench
Dean, School of Communications, Dublin City University and Chair, CaSE Advisory Committee.

Acknowledgements

The authors would like to acknowledge the assistance and support of the following people in the preparation of this research report.

The authors would like to extend their sincere thanks to Ms. Carmel Mulcahy (Citizenship Advisor, Dublin City University), Dr. Odilla Finlayson (Science Advisor, Dublin City University), Ms. Vivien Kelly (Citizenship and Environmental Advisor, Southern Education and Library Board), Ms. Lynda McKee (International Advisor, Western Education and Library Board), Dr. James Logan (Science Advisor, Southern Education and Library Board), Veronica Milligan (Science Advisor, Southern Education and Library Board), Dr. Kevin Williams (Senior Lecturer, Mater Dei Institute Dublin), Mr. Conor Harrison (CSPE Support Service, Curriculum Development Unit, Dublin City VEC) and Ms. Siobhan Greer (Former Chairperson, Irish Science Teachers Association) for their useful comments, direction, suggestions and/ or proof reading, in the preparation of this text. Also to Mr Brian Trench (Dublin City University) for writing the foreword and to Ms. Kate Ennals for doing the project's external evaluation.

The authors would like to sincerely thank Mr. John Rust of the Dundalk Learning Network for his dedication in the development of, and commitment to the management, of the CaSE website.

The authors would like to extend their sincere thanks to Dr. Patricia Clarke, Mr. Andy Pollak and the staff of the Centre for Cross Border Studies, and Dr. Gerry McNamara (Dublin City University), for their valuable assistance and direction in the management of the CaSE project and associated meetings. In addition, the authors would like to thank the members of the Advisory Committee for their advice and support during each phase of this project.

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It was possible to make available a wide range of resources to support the CaSE Project due to the willingness of voluntary and statutory agencies, companies and government departments in the North and South of Ireland to make available such resources at minimal or no cost. Therefore the authors of this report would like to thank the following: An Taisce, BP Education Services, ECO-UNESCO, ENFO, Friends of the Earth, the National Youth Council of Ireland, the Food Safety Council, CSPE Support Service and, finally, Sustainable Energy Ireland.

The authors would like to thank the Special EU Programmes Body for project funding received from the EU Programme for Peace and Reconciliation (Measure 5.2) and to the Food Safety Promotion Board/ safefood, for providing additional funding for a CaSE final conference.

Finally the authors would like to thank all schools from the North and South who participated in this project. In particular, a special thanks must be extended to the forty teachers and their pupils, who helped decide on and shape the content of the modular materials, and who also contributed to the publication of web materials and discourse in the CaSE project.



Participating Schools and Teachers

Banbridge Academy, Banbridge
Dr. Bill Coulter
Dr. Pat Jeffers
Dr. Darrell Stewart

Beaufort College, Navan
Mr. Tom Lynch
Ms. Olivia Brady

Beech Hill College, Monaghan
Mr. Tony McHugh
Ms. Carmel Hennessy

De La Salle College, Dundalk
Ms. Therese Rooney
Ms. Edel Nolan

Drumglass High School, Dungannon
Mrs. Gillian Artt
Ms. Fiona McCartney

Fivemiletown High School, Fivemiletown
Mr. John Love
Ms. Emma Patterson
Ms. Diane Morrow

Kilkeel High School, Kilkeel
Ms. Tracey Coulter
Mr. John Knipe

Lismore Comprehensive, Craigavon
Ms. Olivia Smith
Ms. Una Coleman

Lurgan Junior High School, Lurgan
Mrs. Beverly Carson
Mrs. Caroline Walker

St. Aidan's High School, Derrylin
Mrs. Mary Mooney
Mrs. Christina O'Reilly

St. Macartan's College, Monaghan
Mr. Enda McCabe
Ms. Eileen Collins

St. Mary's College, Dundalk
Ms. Lynn McCardle
Ms. Siobhan Murphy
Ms. Anita White
Mr. Donal Hegarty

St. Mary's High School, Newry
Mr. Eddie Green
Ms. Margaret Patterson
Ms. Siobhan Fearon
Ms. Rosemary Murphy
Ms. Sandra McCullough

St. Oliver's Community School, Drogheda
Mr. Norbert McCabe
Ms. Una Pepper

St. Patrick's College, Banbridge
Mr. Peter O'Rourke
Mr. Seamus Mc Grath

St. Vincent's Secondary School, Dundalk
Ms. Criena Byrne
Ms. Carol Lawless

Advisory Committee

The Advisory Committee was made up of a diverse group of people including key figures representing Science and Citizenship education, Science and Citizenship advisors from both the Western and Southern Education and Library Boards, and technology experts. The members of the advisory committee were as follows:

Mr. Brian Trench (Dean, School of Communications, DCU, and Chairperson, CaSE Advisory Committee)

Mr. Andy Pollak (Director, Centre for Cross Border Studies)

Dr. Patricia Clarke (Centre for Cross Border Studies Research Manager and CaSE Project Manager)

Dr. Peter McKenna (CaSE Researcher, School of Education Studies, DCU)

Ms. Charlotte Holland (CaSE Researcher, School of Education Studies, DCU)

Dr. Gerry McNamara (Director, School of Education Studies, Dublin City University)

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Ms. Veronica Milligan (Science Advisor, Southern Education and Library Board)

Ms. Lynda McKee (International Advisor, Western Education and Library Board)

Mr. John Rust (Technology Advisor, Dundalk Learning Network)

Dr. Margaret Reynolds (Education Advisor, St. Mary's University College Belfast)

Mr. Stephen McCarthy (Education Officer, City of Dublin VEC)

Ms Marie Rooney (Project Director, Education for Reconciliation Project)

Mr. Pdraig Murphy (Science Communications, Dublin City University)

Dr. Miriam Judge (Technology Advisor, Dublin City University)

Ms. Margaret Farrén (Technology Advisor, Dublin City University)

Dr. Kevin Williams (Citizenship Advisor, Mater Dei Institute of Education)

The principal researchers were Dr. Peter McKenna and Ms. Charlotte Holland, with advisory panels on Citizenship (Ms. Carmel Mulcahy, Dr. Kevin Williams, Dr. Gerry McNamara) and Science (Dr. Odilla Finlayson, Dr Brian Trench) to inform the process. The project manager was Dr. Patricia Clarke from the Centre for Cross Border Studies.



Chapter 1

1.1 Introduction

The purpose of the Citizenship and Science Exchange (CaSE) project was to enable pupils to critically evaluate the inter-related roles of Science and Citizenship. It also aspired to raise an awareness of the interdependencies that exist between communities in the Irish border region.

The areas of science and citizenship were selected because of their growing emphasis in the second-level curriculum and their contrasting uses in facilitating North-South communication. Science is often presented as universally valid and neutral, while citizenship is a more culturally challenging topic. Therefore the aim of the CaSE project was to engage participants in reflection and discourse on issues that arose from developments in Science.

The CaSE project was influenced by a number of other factors, including the growing demand within society for more critical debate on issues that arise as a result of developments in new technologies; the concern about the importance of having 'informed citizens' at the centre of these debates; the need to improve communication between those living in the border areas on common issues that could impact on their quality of life; the exponential growth in the use of Information and Communication Technology (ICT) in all aspects of daily life resulting in an increased need for computer literacy; and finally the need for diversity in pedagogical approaches to teaching and learning, particularly in science.

1.2 Aims and Objectives of the CaSE project

The aim of the CaSE project was to foster a cross-border Citizenship and Science Forum that could be used to exchange views on the rights, roles and responsibilities of the citizen through an examination of Science in society.

The objectives of the CaSE project were:

- To raise an awareness of the dynamic relationship between science and citizenship
- To develop a process through which teachers and pupils could engage in a dialogue on issues relating to science and citizenship
- To foster critical thinking skills in the consideration of the linkages between science and citizenship
- To foster confidence in the exercise of citizenship in a science dependent society.
- To develop cross-border mutual understanding through the study of citizenship and science

1.3 Overview of CaSE project

This project centred on a shared Web resource <<http://www.caseschools.org/>>, with curriculum support materials, discussion areas and *Ask the Expert* services, where pupils and teachers interacted in debate and discourse on the rights, roles and responsibilities of the citizen in a society that was increasingly science-dependent.

The modules designed contained background information, experiments, activities, worksheets and other useful resources from science and citizenship perspectives. Pupils (age 11-15), who were studying in their first and second year of Key Stage 3 Science and Local and Global Citizenship (LAGC) in Northern Ireland, or first and second year of Junior Certificate Science and Civic, Social and Political Education (CSPE) in the Republic of Ireland, used the materials.

On completion of the practical experiments and class-based activities, pupils entered into an online dialogue with their peers from participating schools on issues that arose in the course of their examination of Science and Citizenship. They also published their findings on their personal web pages on the CaSE website.

1.4 Scope of the project

The CaSE project ran over a period of two and a half years. The design phase took-place from March to December 2003, the three stages of implementation and continuous evaluation occurred between January 2004 and June 2005.

1.5 Overview of the Report

Chapter one presents an overview of the aims, objectives and scope of the CaSE project. Chapter two presents the background to the Citizenship and Science perspectives that influenced the development of the CaSE project. Chapter three discusses the arrangements put in place to facilitate cross-curricula and cross-border working. Chapters four and five outline the action research methodology that guided this research, and provide an overview of developments in each of the three action research cycles. Chapter six details the developments and interaction on the CaSE website. Chapter seven present the findings and implications of the CaSE project. Finally, chapter eight contains the conclusions and recommendations.

Chapter 2

Laying the Foundations: Background to Citizenship and Science

Ms. Carmel Mulcahy (School of Education Studies, Dublin City University)

Dr. Kevin Williams (Mater Dei Institute of Education)

Dr. Odilla Finlayson (Dublin City University)

2.1 Introduction

This section presents the citizenship and science contexts, which formed the backdrop to the CaSE project. It begins with discourse from the Citizenship perspective, and concludes with discourse from the Science perspective.

2.2 Citizenship Perspective

Citizenship education in the Republic of Ireland has been part of the Junior Certificate curriculum in the South as Civic, Social and Political Education (CSPE) for some years, while in Northern Ireland the subject (as Local and Global Citizenship) is just being introduced to the curriculum and will be taken by all 12-16 year olds there by 2007 (starting on a phased basis in 2003). The issues addressed by both approaches to the curriculum are similar in their purposes. The developments in Northern Ireland have been influenced by the experience of CSPE in the South. Some of the major challenges which arise for citizenship education relate to the different societies in the North and South, and particularly in a science dependent age which is experiencing a period of unprecedented change.

It is interesting to examine how the concept of citizenship education in the Southern part of Ireland has evolved over a period of some thirty-five years. In this time, civic education has been uncoupled from religion and has come to assume a form more hospitable to the incorporation of science into the course. When attention was given to the design of a dedicated course in civic education in 1966, the relationship between religious and civic learning was emphasised (Williams, 2006). This had been affirmed previously in the course of comments and the general curriculum but was then integrated into the syllabus in 'Civics'. In the relevant document, it was argued that the moral and civic aspects of education derive from religious principles (Department of Education, 1966 in 1986/7 edition).

A dramatic change occurs in the concept of civic formation in the 1990s. The notion of tolerance mentioned in 1966 emerges as the defining value in the Civic, Social and Political Education (CSPE) document (Department of Education, 1996). This document endorses the secular values of liberal democracy and also places a very strong emphasis on communitarian values of social responsibility (ibid, pp.10-12). Much of the spirit and tone of the values of CSPE appear again in the document on the 1999 primary curriculum. One of fourteen issues on which there was 'consensus' among those drafting the document was the place of 'pluralism, a respect for diversity and the importance of tolerance' (Department of Education and Science, 1999, p.9). Whether this new spirit marks a considered change in state policy or simply a response to a new *zeitgeist* is difficult to say but the latter is probably the most plausible explanation.

All of this has therefore been a feature of a mind shift that has moved Ireland as a society from the mono-cultural certainty of the 80s, through the tentative excitement of pluralism in the 90s, the emergent concept of multiculturalism in the latter days of the last century and the new language of inter-culturalism which appears to dominate the media and society today. Just as new words and phrases become part of our vernacular so these terms have found their way in a largely uncontested fashion into our everyday lives.

On a more theoretical level, Keohane (2004) puts the notion of change in Irish culture into a wider context by making reference to other periods of dramatic transformation in Ireland. These would include: the fall-out from the Act of Union in 1800; the dramatic impact of the Famine on rural Ireland and the emergence of emigration as a pattern that would live with us for many decades; the political upheaval in the aftermath of 1916, and the entry to the EEC in the early 70s which brought us into a new relationship with the rest of Europe and changed our perception of identity from an outcrop on the edge of the Atlantic to a committed member of the European family. The point of Keohane's argument is that while what he refers to as the **content** of change is unique to the institutions and practices and the cultural and historically context in which the change occurs, the **form** of change, or as he explains it, the collective experience of transformation and the impact on society, is common to all (pp.1-2).

The phenomena that is change in society has been addressed at length by writers of note such as Habermas (2001), Beck and Giddens (1995) and Virillio (1985). In a society undergoing rapid change as we are currently experiencing in Ireland we experience a clash of cultures between old and new, national and international, traditionalism and modernity and our sense of identity can appear to be under threat. This rate of change is also influenced by the rapid generation and dissemination of knowledge, much influenced by the growth in technology and the creation of sophisticated global highways. Beck and Giddens (1995) refer to our attempts to assimilate this knowledge as " reflexive modernisation." As we assimilate new information, so our ability to grasp the new knowledge, respond to it and act upon it increases exponentially. This rapid acceleration of knowledge processing in turn leads to even greater acceleration in knowledge production thus leading to what Virillio describes as the instant reflexion of knowledge. What is being described is a rate of acceleration of knowledge production and reflexion, which is cyclical or gyre like. The difficulty, as Virillio argues, is that the knowledge is running on empty or turning on its own axis, yet achieving very little. We have access to knowledge, the ability to process it almost instantly, but we have no control over the rate of change.

Keohane (2004, p.5) draws a comparison between the concepts of Virillio, Beck and Giddens and the rate of change in Irish society. The rate of transformation of our social, cultural, political and religious identities has fallen victim to reflexive modernization and we as a society are at odds with the "interplay between the globalisation of the local and the re-localisation of the global." This concept is not a new one. The poet Patrick Kavanagh in his poem **Epic** captures the concept of the interplay between World War 2 and local issues in his native Monaghan which closes as follows:

Till Homer's ghost came whispering to my mind
He said: "*I made the Illiad from such
A local row. Gods make their own importance.*"
(Quinn, 1996, p.12)

This poem graphically illustrates the fragility of borders in our society.

Ireland as a society has as Keohane states “a foot – in both in many camps, and the experience of living in contemporary Ireland is that of living in an in-between world.” (p.6). Bauman (2000) refers to this period of uncertainty and change as living in a time of **liquid modernity**. The use of liquid as a descriptor for this time of change is a very apt one as it captures clearly the concept, not just of a single notion of modernity but the constant river which links past, present and future. For Giddens (1995, p.56) this linkage puts tradition at the heart of modernity, the notion of history being developed and expanded from old roots to form new branches. Yet at the heart of modernity lie the lessons, the myths and the influences of the past. These impact on the present modernity and form the post modernity of the future. The changing face or liquid modernity of Ireland will draw on past history and form the future

Keohane (2004, p.196) talks of “creating a critical, hermeneutic analysis of Irish culture under conditions of accelerated modernisation” as a way to discover unity in diversity. From the perspective of theorists such as Habermas, this unity is best achieved through communication and through this communication hopefully will emerge this unity.

As Gundara (2000, p.72) has rightly said: “What is important within our complex societies is to develop cross cultural negotiation and learning, and to develop common shared core values”. It is against this background that it is hoped that the CaSE project will foster growth in mutual understanding.

Barr (2000, p.133) puts the same challenge to schooling in a different way: “What learners require for human development in the knowledge society is a set of educational experiences set in an ethos that provides them with the capability to see connections, to move with ease between different contexts, to have the skills to compare, critique, connect disparate items in a world that is always changing and often not in ways over which the individual can have any effect.”

These scenarios find resonance in many Irish schools today. The challenge for Irish education is to provide a truly inclusive culture that supports diversity, challenges racism, and develops caring, concerned pupils who will engage with the inevitable issues that arise in such a fluid environment. It is to this challenge that the teaching of citizenship and science through the CaSE project endeavours to respond. There can be little doubt that the salience accorded to science in this project is consistent with a conception of citizenship that reflects an aspiration towards the creation of an inclusive society.

2.3 Science Perspective

Nano-technology, genetically modified (GM) foods and genetic engineering are examples of just some scientific areas that are now becoming part of our everyday lives and everyday vocabulary. Increasingly individuals are being asked to make judgements and decisions on scientific issues that will affect their lives, and the general public are showing an increased reluctance to accept the scientist's opinion or the expert opinion, and doubting the intentions of political and industrial figures.

Therefore the public must be made aware of the information and must be equipped with the skills to help make decisions. They must be familiar with the scientific process and with the ideas of **acceptable risk**, so that they can make informed judgements and decisions. This is normally termed scientific literacy.

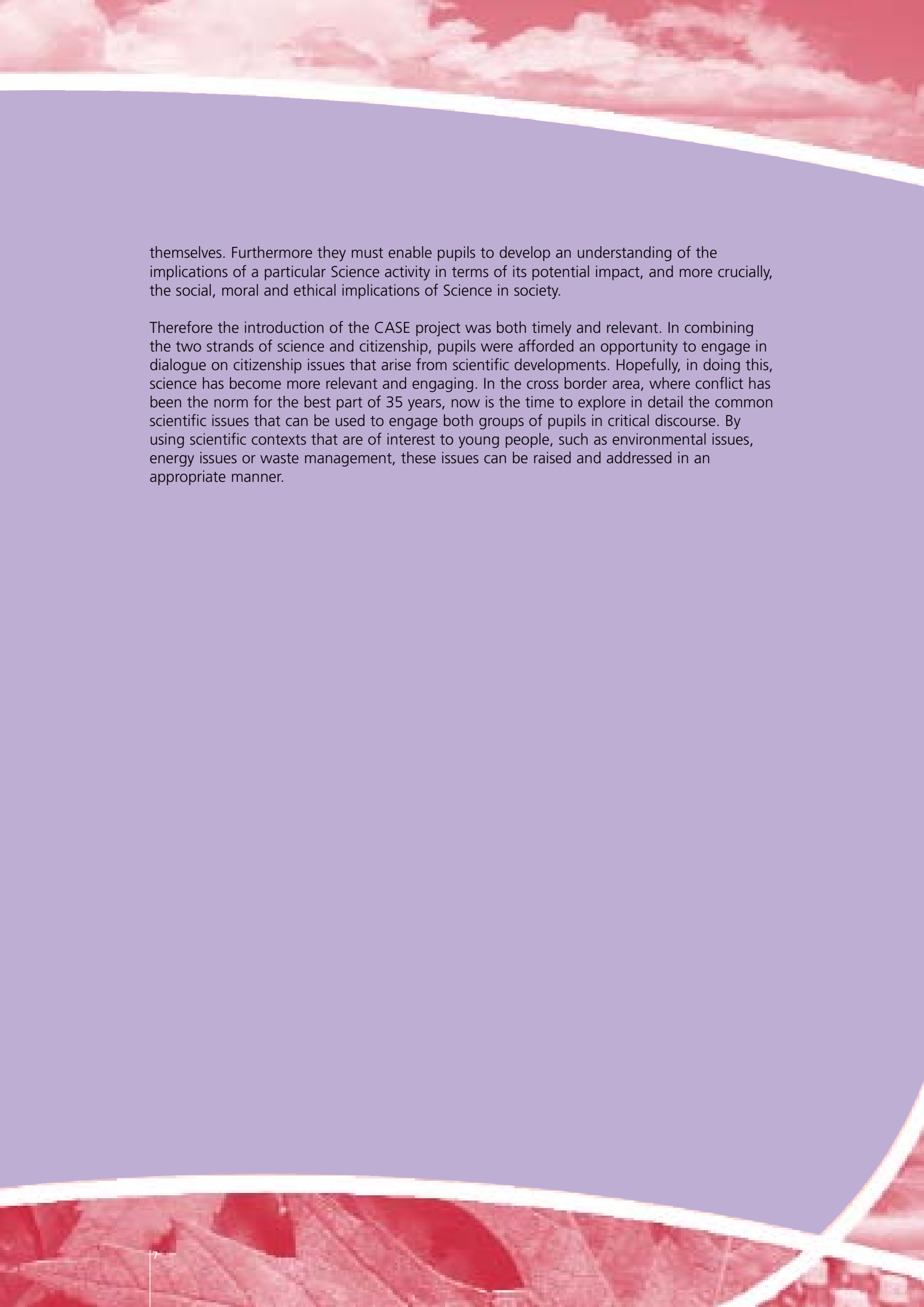
However, within the European context there is evidence that there is increasing disengagement with science by pupils in schools, particularly at second level. This translates into fewer pupils continuing to pursue science and technology courses at third level, giving an ever reducing number of graduates to fulfil the industrial needs and research opportunities that arise. This trend is very worrying and has indeed led to many national and international initiatives.

An international cross-cultural comparative study on young people's views and perceptions, attitudes, values, interests, plans and priorities relating to science and technology, the Relevance of Science Education (ROSE) project, has shown that pupils' views of science and technology in countries in the developing world are far more positive than those of pupils in the developed world (ROSE, 2005). Pupils in the developing world readily see the positive benefits of Science and technology in their lives.

Comparison of the ROSE data for Northern Ireland (NI) and Southern Ireland showed some interesting comparisons for example on the matter of trusting what scientists say, the girls of both samples had less trust than the boys; the Southern Ireland sample of pupils showed less trust than the NI sample of pupils, and both groups were highly sceptical of what scientists had to say. On the question of whether people should care more about the protection of the environment, both groups agreed that people should care more about their environment. However, the NI group held their belief in this less strongly than the Southern Ireland group. Also, interestingly, the boys were less concerned than the girls across both jurisdictions. Finally the ROSE data showed that science was not the favourite subject at school for either cohort of pupils. Furthermore study in the science area was not perceived to result in 'exciting jobs', and when asked if they would like a job in technology area, the girls answered 'definitely no' and the boys were ambivalent.

Therefore in an attempt to increase interest in science, reduce the lack of engagement in school science and address the greater need to have a scientifically literate people, there have been a number of national initiatives to improve school science recently. New science curricula have been introduced in Southern Ireland at both Leaving Certificate and Junior Certificate. The Junior Certificate syllabus has its emphasis on investigative science with pupils asked to carry out a range of experiments and investigations (some of their own choice) and also has an emphasis on relevance outside school. In Northern Ireland a major development has been the introduction of the Local and Global Citizenship strand in the school curriculum. Science at this level is also investigative in nature.

Issues arising from scientific developments must be dealt with in an informed manner. Issues such as waste management, road building, housing, food production (to name but a few), are issues that communities must decide on together. There can be many conflicting views presented. Within the school setting, it is possible to explore the conflicting views but also the conflicting rights and responsibilities: for example the right of the individual versus the public right, the rights and responsibilities of different groups, and also human values versus scientific evidence. Educators must prepare pupils in school to make decisions and judgements on scientific matters and developments in an informed manner, and help reawaken the curiosity within them so that they explore and understand these issues for



themselves. Furthermore they must enable pupils to develop an understanding of the implications of a particular Science activity in terms of its potential impact, and more crucially, the social, moral and ethical implications of Science in society.

Therefore the introduction of the CASE project was both timely and relevant. In combining the two strands of science and citizenship, pupils were afforded an opportunity to engage in dialogue on citizenship issues that arise from scientific developments. Hopefully, in doing this, science has become more relevant and engaging. In the cross border area, where conflict has been the norm for the best part of 35 years, now is the time to explore in detail the common scientific issues that can be used to engage both groups of pupils in critical discourse. By using scientific contexts that are of interest to young people, such as environmental issues, energy issues or waste management, these issues can be raised and addressed in an appropriate manner.



Chapter 3

Developing the process of working cross-curricula and cross-border

During the period April– September 2003 a series of preliminary activities took place which led to decisions on participants, content and process for the three CaSE cycles which followed. These activities included the establishment of management and finance arrangements, fine-tuning the original proposal, initial information meetings and recruitment of schools from the North and South and finally an orientation meeting where all the teachers, North and South met face-to-face.

3.1 Project Structure

The Citizenship and Science Exchange (CaSE) project was initiated by the Centre for Cross Border Studies in association with Dublin City University and supported by agencies and individuals in the educational sectors in both Irish jurisdictions. Two management structures, a Project Committee and an Advisory Committee, were established to oversee the planning, implementation and evaluation of the project.

The Project Committee (Centre for Cross Border Studies and Dublin City University) met regularly throughout the project. The Advisory Committee involved a diverse group of people including key figures representing science and citizenship education, science and citizenship advisors from both the Western and Southern Education and Library Boards, cross-border policy experts, and technology experts. It was agreed that the Advisory Committee would not be a decision-making body, but would be used for discussion and feedback.

3.2 Finance

The Citizenship and Science Exchange Project (CaSE) was supported by £150,385 funding from the EU Programme for Peace and Reconciliation, delivered through the Special EU Programmes Body. The budget was administered and the project managed by the Centre for Cross Border Studies.

The budget covered the costs of substitute cover, travel expenses and meals necessary for the attendance of participating teachers at all Citizenship and Science Exchange (CaSE) project in-service training days. The payment of teacher substitution cover was paid directly by the Centre for Cross Border Studies to the relevant Education and Library Boards in the North and to the Department of Education and Science in the South.

Educational materials were provided for the participating teachers and pupils. As part of this package each school was presented with a digital camera which could be used to capture images for posting on the web. In addition a small budget of £250 was reserved for any additional requirements that schools may have needed to enhance their participation in this project. Examples of relevant requests could involve either payment for a local speaker to attend the school or payment for a trip to an educational site. In order to comply with strict EU Peace and Reconciliation Programme regulations to submit a full account of all EU grant expenditure during each year of the project, the Centre dictated that all schools' requests for additional payments should be first approved and subsequently processed by the Centre. Under no circumstances could the Centre reimburse schools for any non-approved payments. In practice these small budgets were only utilised by seven of sixteen CaSE schools.

The Project Committee made the arrangements needed to prepare, organise, monitor and evaluate the CaSE Project.

3.3 Changes to Original Application

The original application involved the targeting of 15-16 year old students (Key Stage 4 in the North and Transition Year in the South). However following Advisory Committee discussions it was agreed that the most obvious link-up between age cohorts, North and South, in the citizenship area, would be between 12-15 year olds in the junior cycle, rather than 15-16 year olds originally envisaged (who don't do citizenship and have mismatched timetables because there is no equivalent of Transition Year in the North). There would be more timetable flexibility and more likelihood of matching curricula across the border in the younger classes.

It was originally envisaged that 12 secondary schools (six North, six South) should be invited to participate in the science education element and 12 (six North and six South) in the citizenship element. Allowing for some overlap in large schools that would be able to handle participation in both elements, it was expected that 20 schools would be selected to participate in the CaSE project. During early Advisory Committee discussions it was agreed that the science and citizenship elements should be more closely integrated and the number of schools should be limited to 16 (8 North and 8 South). The major premise for this change was the European Commission's Science and Society Action Plan which raises the need to improve school students' awareness of the contributions of science to social and economic development and to mainstream ethical training of scientists. It was felt that the CaSE project could contribute to the recommendations made in Ireland and the United Kingdom for the inclusion in school curricula of new subjects that consider science in social contexts.

3.4 Dundalk Wired for Learning Network

The CaSE project utilises the Dundalk Wired For Learning Network (DLN), a collaborative network between the Department of Education and Science and IBM, which provides a secure web environment aimed at developing the use of ICT for the entire school community including teachers, students, parents and mentors. This web based programme is made up of a suite of tools that support communication, collaboration and learning.

The Dundalk Wired for Learning Network (DLN) was approached by Dublin City University to become involved with the CaSE project because of its network of schools located in the southern border region and also because of the IT proficiency of the schools as a result of their affiliation with the DLN. Three of the participating CaSE schools from the South were already linked into the Dundalk Learning Network. Representations were made to the National Centre for Technology in Education to ensure that the role of the co-ordinator of the DLN would be maintained and this support could be used by the CaSE project.

In order to preserve the neutrality of the CaSE project a separate CaSE website, www.caseschools.org, was established to act as a doorway through to the Dundalk Wired for Learning Network (DLN), www.dundalklnet.com. The content of the www.caseschools.org website is minimal and includes such sections as About us, Contact us and Introductory pages. The code of ethics for users and all other facilities are included on the DLN website.

Email addresses were not provided as it was deemed preferable to encourage students and teachers to post their comments on the Internet site where their online exchanges could be monitored rather than contacting each other individually outside the moderated site.

3.5 Selection of Schools

The recruitment of schools was undertaken separately in Northern Ireland and the Republic of Ireland.

In Northern Ireland the existence of the regional Education and Library Boards who have statutory responsibility for secondary education within their areas provided a vital access point for facilitating the recruitment of schools in the border region. Schools from the Southern Education and Library Board (SELB) and the Western Education and Library Board (WELB) were invited to attend one of two information seminars at the Centre for Cross Border Studies in Armagh in May and June 2003. Representatives from the twenty-four schools who attended were introduced to the concept of the project by the project team and asked to register their involvement in the project. Of the 11 schools that requested a place in the project, eight were selected (six from the SELB and two from the WELB) and three others were placed on a waiting list until after the 2003 summer holidays. The principal of each school signed a participation agreement outlining his/her support for their school's involvement and nominating both a science teacher and a citizenship teacher who would represent the school.

In the South no equivalent regional management structure exists. The main challenge in recruiting schools in the South was in identifying and visiting schools who would be interested in hearing about the CaSE project before the end of May 2003, i.e. before teachers left for their summer holidays. Following introductory phonecalls, thirteen secondary schools were identified as possibly being interested in participating in CaSE and face-to-face meetings were arranged with each of these schools to discuss the project.

The initial reaction from Southern secondary schools was positive to the CaSE project. However a number of obstacles to participation in the CaSE project arose. These centred mainly around the already increased pressure on science teachers to implement the new Junior Certificate science curriculum in September 2003, the possibility of a strike by the teachers unions because of a lack of in-service training for the new curriculum, and the lack of 'spare' time available to science teachers to take-part in initiatives like CaSE. All southern principals wanted time to consider the CaSE proposal and September 2003 was agreed as deadline for submission of interest. A final group of seven interested schools emerged in September 2003. An eighth school was then selected from the Northern Ireland waiting list.

The participating schools are from Dundalk, Drogheda, Navan and Monaghan in the South, and from Craigavon, Banbridge, Kilkeel, Newry, Bessbrook, Fivemiletown, Omagh and Derrylin (Fermanagh) in the North.



Figure 3.1 Location of schools participating in the CaSE Project

The selected schools represent a geographical spread throughout the border counties and on both sides of the border. They are a mix of co-educational, single sex, Protestant, Catholic and disadvantaged schools, the presence of enthusiastic principals and teachers and a good balance of science and citizenship teachers.

The project was fully supported by the chief executive of the Southern Education and Library Board, Ms Helen Mc Clenaghan, and the then chief executive of the Western Education and Library Board, Mr Joseph Martin. It had also been approved by senior officials in the Department of Education and Science in Dublin and the Department of Education in Bangor.



3.6 Orientation Day

In October 2003 a one-day orientation meeting was held at the Centre for Cross Border Studies in Armagh involving thirty-four teachers and six facilitators. The purpose of this day was to familiarise teachers with the project and the work plan, to facilitate the teachers to reach a consensus on the themes and topics to explore, and to identify the support mechanisms available within each school.

Guidelines identifying the overlapping areas in science curricula North and South in the period January 2004-March 2005 were supplied to teachers to direct their discussions. These guidelines had been prepared in advance following meetings with science advisors, North and South. Teachers were instructed that the citizenship methodology would be embedded in the science curriculum. Following a series of workshops the teachers found it relatively easy to reach consensus on the nature and order of three overlapping CaSE themes (Environmental Perspectives, Food and Nutrition, and Energy). Most of the North-South differences encountered were on the methods of delivery rather than on the content of curriculum. These overlapping themes formed the basis for the development of the CaSE project curriculum materials.

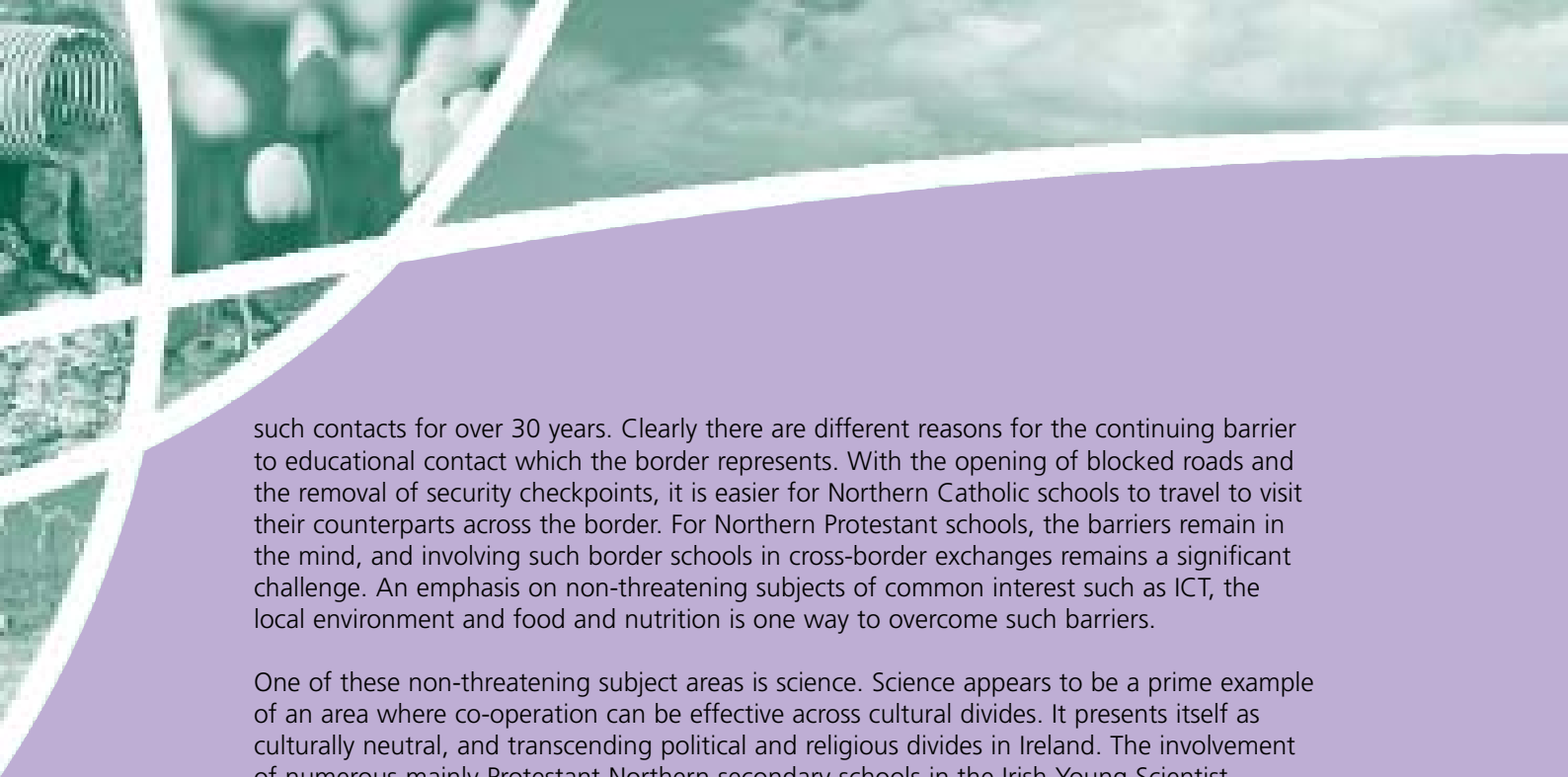
Teachers were asked to complete an IT survey which gathered details on the schools' IT facilities, the type of Internet access (broadband, ISDN, individual dial-up) available within each school and the need for additional IT training with the teachers. The teachers were asked in advance to bring along their timetables and school calendars.

3.7 Peace and Reconciliation

Within the work of the Centre for Cross Border Studies, promoting cross-border co-operation in the education sector has been given special priority. With funding from the EU Peace and Reconciliation programme it has initiated four cross-border education action research projects one each at pre-school, primary, post-primary (CaSE) and tertiary education levels.

With funding from the Department of Education and Science in Dublin and the Department for Employment and Learning in Belfast, the Centre for Cross Border Studies also acts as the secretariat for two new North-South higher education 'umbrella' bodies: Universities Ireland, which brings together the nine universities on the island for joint projects and conferences; and the Standing Conference on Teacher Education North and South (SCoTENS), which does the same for the colleges of education and other teacher education providers. In addition the Centre, under its Border Ireland project, is currently developing an online catalogue of all cross-border research and development co-operation in the education sector since 1990. (Further details of the educational work of the Centre are given in Appendix A.)

The CaSE project sought to address problems generated by the conflict in Northern Ireland which have had a particular impact on secondary schools. In some border areas particularly affected by the conflict (e.g. South Armagh, North Louth, South Tyrone, North Monaghan, Derry and parts of Donegal) secondary schools have experienced difficulties in making connections with schools that are geographically close but across a border which, because of mutual fear and suspicion and/ or counter-terrorist measures, has been virtually closed to



such contacts for over 30 years. Clearly there are different reasons for the continuing barrier to educational contact which the border represents. With the opening of blocked roads and the removal of security checkpoints, it is easier for Northern Catholic schools to travel to visit their counterparts across the border. For Northern Protestant schools, the barriers remain in the mind, and involving such border schools in cross-border exchanges remains a significant challenge. An emphasis on non-threatening subjects of common interest such as ICT, the local environment and food and nutrition is one way to overcome such barriers.

One of these non-threatening subject areas is science. Science appears to be a prime example of an area where co-operation can be effective across cultural divides. It presents itself as culturally neutral, and transcending political and religious divides in Ireland. The involvement of numerous mainly Protestant Northern secondary schools in the Irish Young Scientist competitions and exhibition every year in Dublin appears to bear this out. International research also suggest that the biggest successes in science education have been in extra-curricular activities, such as science clubs, ICT link-ups and visits to science centres like the W5 centre in Belfast's Odyssey complex. The incorporation of a website containing facilities like a shared 'ask the expert' resource (with the involvement of professional scientists) was designed to make the CaSE project attractive to mainly Protestant Northern schools who would not normally be interested in cross-border exchanges.

There are mutual benefits to be gained by working on a cross-border basis in developing science and citizenship policy and practice. There is a perceived crisis in the declining numbers taking science in second level schools in both jurisdictions, while citizenship is a new and increasingly important element in both curricula. The CaSE project helps to increase our understanding of how active learning methods, which facilitate dialogue on the citizenship issues that arise from scientific developments, can make science a more relevant subject for pupils.

Citizenship education has been recognised by the Department of Education in Northern Ireland as having particular importance in a divided society. Two linked and rapidly expanding programmes are being implemented in the North, one aimed at providing citizenship education (modelled partly on the South's Civic, Social and Political Education course) to all 12-16 year olds by 2007; the other to provide a new GCSE course to cover local and global citizenship, employability and personal, social and health education.

Citizenship in Ireland is a culturally more charged and more difficult topic than science. In this context, it was anticipated that the online discussion forum that was planned as part of the CaSE project would provide a 'safe space' for communication between students of different backgrounds. In addition the CaSE project would provide a cross-border contribution to the Southern Department of Education and Science Task Force's recommendation to construct a "virtual learning environment for science" and to promote "innovation and research in the teaching and learning of science".

It was hoped that as a result of the CaSE project new relationships and friendships would develop between pupils, teachers, education officials and researchers within a region that extends from Banbridge in the North to Navan in the South and that a blossoming of activities outside the CaSE project would link schools North and South in other science and citizenship activities.

Methodology

4.1 Introduction

An action research model was used for the CaSE project. The central thesis of this work was that interaction within the proposed Science and Citizenship curriculum could be improved through action research and that teachers and pupils were best placed to conduct such enquiry.

The rationale for choosing an action research model for the CaSE project was as follows. "Firstly, naturalistic settings are best studied and researched by those participants experiencing the problems" (McKernan, 1996, p.5). In the CaSE project the teachers and pupils were both participants in the process and were able to report on their experiences as they progressed through the three modules of the CaSE project. Secondly, "behaviour is highly influenced by the naturalistic surrounding in which it occurs" (ibid). Therefore the information was gathered in the least intrusive means possible, i.e. directly from pupils and teachers involved in the process and/or through the online medium that they were interacting with. Thirdly, "qualitative methods are perhaps best suited for researching naturalistic settings" (ibid). Therefore qualitative methods were used to gather information from the CaSE project, and these included:

- Interviews with individual teachers at key stages in the process
- Feedback from teachers by email, phone calls etc throughout project
- Reflective diaries kept by teachers to record observations, feelings, thoughts, attitudes
- Publication of web pages by pupils on CaSE website
- Interaction of pupils in CaSE pupil discussion forum
- Interaction of teachers in CaSE discussion forum
- Focus group meetings with pupils in the latter half of the CaSE project

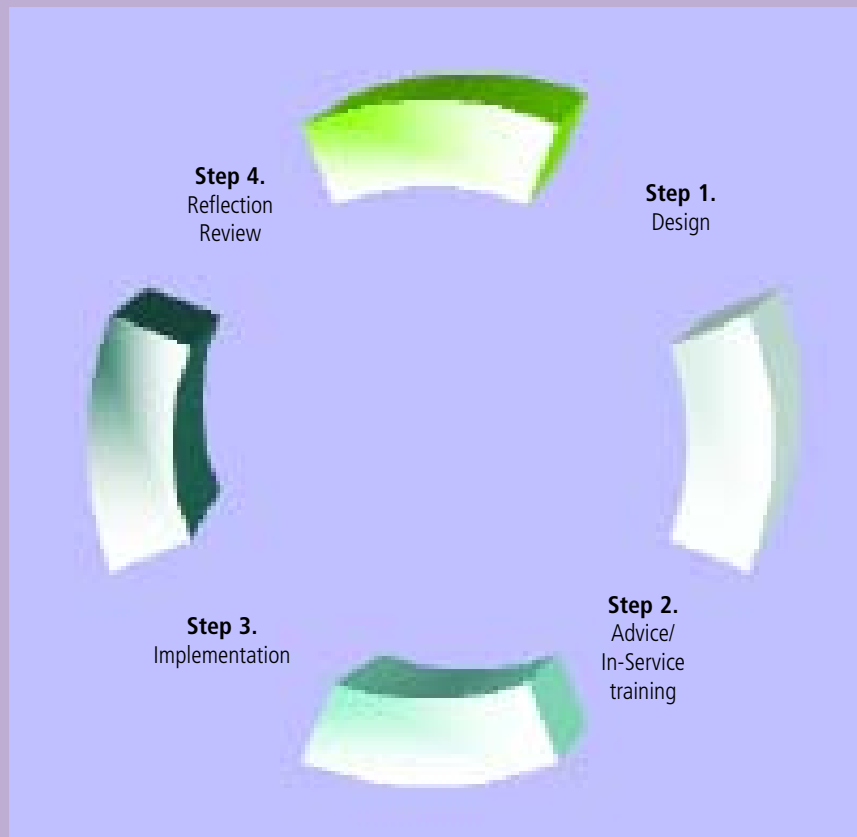
4.2 Action Research Methodology

There were three cycles in the action research process of the CaSE project. These cycles coincided with the design, delivery and evaluation of the implementation of each of the three modules of the CaSE project. Hence the first cycle started in September 2003 and ended in June 2004, the second cycle started in September 2004 and ended in January 2005, and the third cycle started in February 2005 and ended in June 2005.

Each cycle involved a four-step process: firstly the design of the course materials and the website for the particular module; then provision of advice and/ or training for teachers and pupils; then implementation of materials and strategies by the teachers and pupils, and finally reflection and/ or review by the researchers to find out how effective the process had been.

Figure 4.1 illustrates the four steps in each cycle.

Figure 4.1: Diagram of the four-step process in each action research cycle



The findings from the reflection/ review phase were fed back into the next cycle, and appropriate revisions were made to the materials, website and/or process. After the third and final cycle, the final report detailed the implications of the Citizenship and Science exchange from the experiences of the CaSE project.

Overview of the three Action Research cycles

This chapter provides an overview of each step in the three cycles of the CaSE project.

5.1 Cycle One:

Cycle one of this action research project started in March 2003 with the meeting of the Advisory Committee, where the boundaries for the CaSE project were established. This was followed by the drawing up of a tentative design brief to inform schools of the nature of the project. Over the summer of 2003 the focus was on the recruitment of sixteen schools to take part in the CaSE project; this resulted in the engagement of nine schools from the North and seven schools from the South.

The CaSE project involved two or three teachers and one group of pupils from each of the sixteen second-level schools as listed at the outset. Therefore, there were forty teachers and around four hundred pupils enrolled in the CaSE project. The participating pupils were in the 11-15 year old age-bracket.

Step 1: Design

The three themes chosen were *Environmental Perspectives*, *Food & Nutrition and Energy*. Of these, *Environmental Perspectives* was chosen as the theme to run in the first implementation of the CaSE project, which started in January 2004. The other two modules ran in the second and third cycles concurrently.

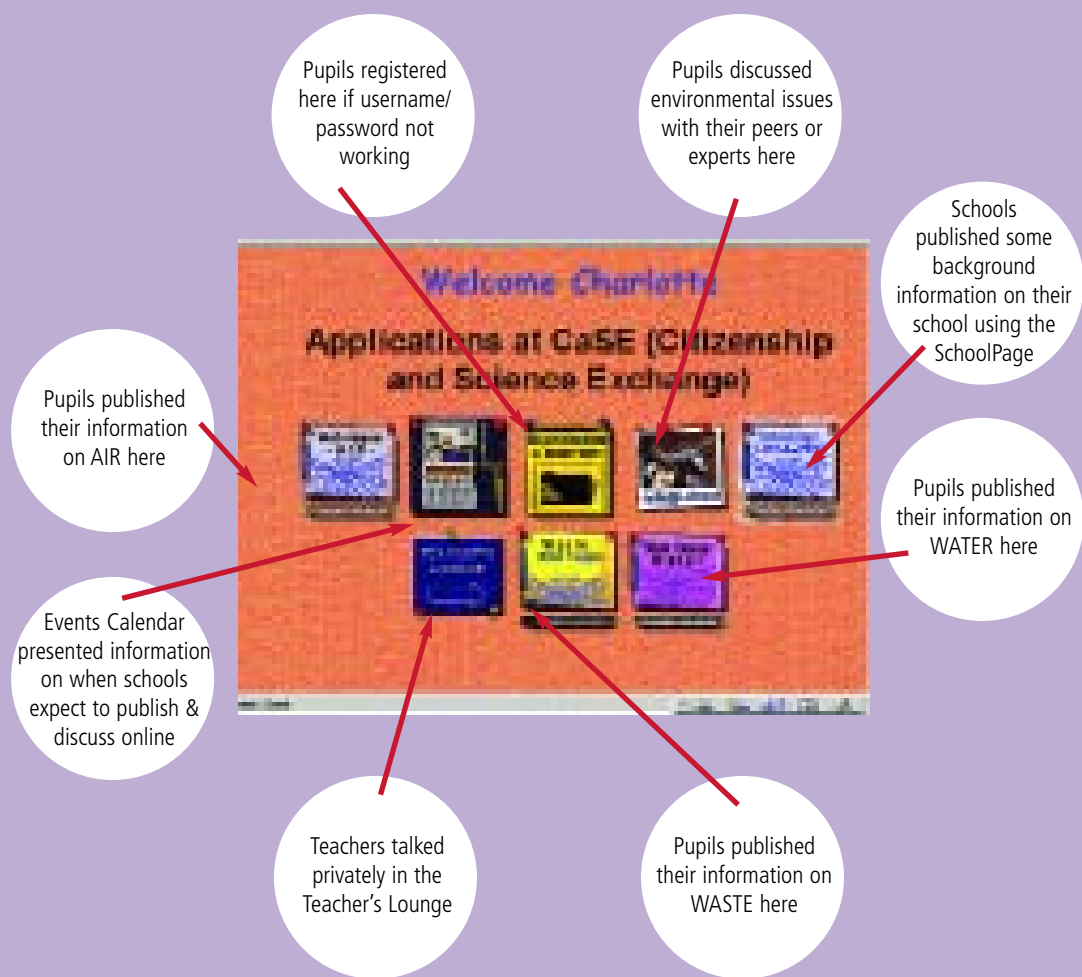
In October and November 2003 the science and citizenship curriculum materials were developed and additional resources were sourced for the Environmental Perspectives module. The curriculum materials presented consisted of four chapters: the first chapter was a broad introduction to the theme of Environmental Perspectives; the second chapter focused on the topic of Air Pollution; the third chapter on Water Pollution and the final chapter on Waste Management. The materials developed included science and citizenship activities and experiments in each of the sections on air pollution, water pollution and waste management. Each chapter contained a theory section detailing the topic, followed by a set of science activities and a set of corresponding citizenship activities, and a final page that asked them to provide a report on the CaSE website and interact in online discussion.

The format of each of the science activities involved an introduction to the topic area, followed by an experiment or activity, followed by discussion and the writing of a report on what was covered in class, and, finally, publication of web pages and discussion on the CaSE website. The citizenship materials were designed with the four-point action plan promoted by the Civic Social and Political Education Unit of Department of Education and Science in mind, where pupils undertook citizenship activities, wrote a report and specified an action to be taken. The science and citizenship activities were supported by a set of an additional forty resource sheets, posters, booklets and a CD from various environmental organisations, such as ENFO and ECO-UNESCO (see Appendix B).

At this stage, the CaSE website was also designed. It included discussion areas for both teachers and pupils, as well as an area where pupils could publish web pages and a chat-room where pupils could pose questions for experts.

The main elements incorporated for the initial implementation of the CaSE website were discussion strands where the pupils and teachers could discuss issues arising from the activities, and three areas (air, water and waste) where pupils could post web pages detailing the work they had undertaken. Furthermore, there was a calendar where each school could post expected start and end-dates for each phase of the project and an area for each school to post a homepage. (See Figure 5.1 illustrating Homepage of CaSE website).

Figure 5.1: Homepage of CaSE website <<http://www.caseschools.org/>>



Step 2: Advice/ In-service Training

All of the teachers attended a two-day in-service training programme in Monaghan in October 2003. The main objectives at the first in-service day were to brief the teachers on the materials produced for the first module, Environmental Perspectives, to up-skill the teachers in publishing and interacting in discussion in an online medium, and to persuade them to record their observations, thoughts, feelings and opinions in a reflective diary (see Appendix C) during the implementation of the first cycle.

The delivery of the in-service focused on teachers interacting in the process of learning, rather than passively listening to an outline of the materials produced. This materialised as a number of workshops where both science and citizenship teachers became 'pupils' and interacted in citizenship activities and science experiments. A seminar on 'breaking-the-ice' was also built into the first in-service day to help ease the communication process for teachers from North and South.

The second in-service day involved training on how to use the CaSE website, for publication and discussion. The teachers were brought through basic web-page design and shown how to post messages online. Furthermore, teachers were shown how to keep reflective diaries and informed of the importance of these in the research process in a research workshop.

The atmosphere for the two-day in-service was excellent: teachers really enjoyed the hands-on approach taken and the feedback was very positive on materials produced.

A number of requests emerged from the in-service:

1. More training on how to design web-page
2. More information on the format of the information to be posted by pupils on web-page
3. Request for opportunity for pupils involved in CaSE to meet face-to-face

The decision to provide additional web page design training, for those teachers who felt they needed extra help at their individual schools, was ratified shortly after the in-service days. Additional information on the format of information to be posted on CaSE website and details on how the additional ICT training sessions would be sequenced in January/ February 2004 was also provided.

Step 3: Implementation

Fifteen¹ schools were involved in the implementation of module one of the CaSE project. Each school decided which topic/s to cover from the Environmental Perspectives module. Once the topic was chosen, particular science and citizenship activities were chosen from the portfolio presented and these were implemented in the classroom.

However whilst the classroom materials were implemented and reports written, the teachers or pupils could not fully interact in the CaSE website until additional ICT training sessions had been completed. ICT Training took place from January 2004 through to end of March 2004. In all, twelve of the fifteen schools requested additional ICT training sessions. Most schools delayed implementing Module 1 of CaSE until they had their ICT training session.

¹ One school withdrew prior to the implementation of cycle one due to a change in staffing.

The calendar on the CaSE website was updated in January 2004, with proposed start and finish dates submitted by each school, so that teachers knew who else would be publishing or discussing around the same time.

The pupils' online discussions, which started in March 2004, were mediated by the researchers and/ or experts in environmental issues. The publication of web pages also started at this time.

Step 4: Reflection/ Review

The researchers visited all the schools in May and June 2004, and met with the teachers involved in the CaSE project, as well pupils at some of the schools. The outcome of these meetings is discussed in chapter six of this report.

5.2 Cycle Two:

Cycle two started in November 2004 and ran until January 2005. The materials for cycles two and three were designed over the summer of 2004. The two modules were *Energy* and *Food & Nutrition*. Both modules opened with an introduction to the two topics. This was followed by a set of science and citizenship activities, and experiments, with associated worksheets in each section and instructions on providing a report on the CaSE website and interacting in online discussion.

Step 1: Design

The science aspect of the *Energy* module centred on examining renewable and non-renewable sources of energy. Science experiments included Solar Energy, Wind Energy, and Energy Conservation. The first three science experiments were undertaken in practical laboratory sessions, whereas the last experiment was based on the web.

The format of the practical experiments involved the pupils interacting, for example, with a solar-cell, then answering questions on worksheets provided, engaging in class discussion, writing a science report on what they did, and publishing this report on the web for pupils in other schools to see. Finally they engaged in online discussion on the issues that arose on the CaSE website. The format of the web-based science activity involved the pupils interacting in 'live' activities on particular websites, having in-class discussions on completion of the web-based activity, writing a science report and finally publishing a web-page outlining what they did and interacting in discussion with their peers on the CaSE website.

Similarly the citizenship activities comprised four sections; action, discussion, report and exchange. The citizenship activities for the *Energy* Module included: Energy Saving at Home, Energy Saving at School, Renewable Energy and *The Day After Tomorrow: Fact or Fiction*. The first three citizenship activities involved the pupils getting involved in surveys or debates, and the preparation of posters or letters highlighting the issues discussed within their school. The last activity involved the pupils viewing the video of *The Day After Tomorrow*, and discussing which parts were factual and which were parts were fictional, which led into a general discussion on the implications of global warming. Furthermore, forty-two additional support resources in the form of leaflets, websites, and science kits were supplied with the energy activities (See Appendix D).

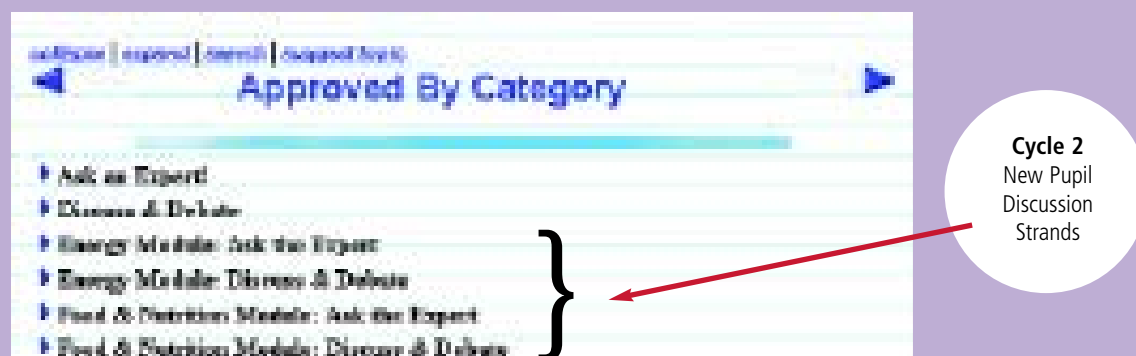
In terms of the third module, *Food and Nutrition*, the science activities included testing and identifying nutrients present in certain types of food; ascertaining the energy content in foods; reading food labels and an online activity that enabled pupils to examine their daily intake of foods, and associated issues. The citizenship activities included examining issues associated with genetically modified foods, agrochemicals and fair trade, and a final activity called the chocolate game, which enabled pupils to examine the origins of the chocolate they consume and the implications of this.

The format of the activities was the same as the format of the energy activities as outlined above. Furthermore twelve additional support resources in the form of leaflets, website and games were supplied with the *Food and Nutrition* module (see Appendix E).

There were four main changes to the CaSE website in the second cycle of the CaSE project. The first two of these were facilities that allowed the CaSE evaluator to have private conferences with pupils, and allowed pupils to email the evaluator. The rest of the changes were made to the internal structuring of the two discussion forums, namely, **talk@school** and the 'Teacher's Lounge.'

The 'talk@school' forum was restructured to reflect the new clusters of schools that had been formed, as shown in figure 5.2. In total, there were four clusters: the first three clusters examined the *Energy* module and the fourth cluster examined the *Food and Nutrition* module. The pupils posted messages for each other under the *Discuss and Debate* option and for experts under the *Ask the Expert* option.

Figure 5.2 New Pupil Discussion Strands in Cycle 2



Teachers Forum

New discussion strands were also added to the Teachers Forum in advance of cycle two as shown in figure 5.3, which included a facility to update teachers on new developments, and four discussion strands, one for each cluster of schools. Finally technical problems were notified in the final discussion strand.

Figure 5.3 New Teacher Discussion Strands in Cycle 2



Cycle 2
New Pupil
Discussion
Strands

Step 2: Advice/ In-service Training

The training for modules two and three took place at the same time, as both modules ran concurrently at a one day in-service training programme in Omagh in late October 2004. [This day was the subject of reports in the *Irish Times* and on RTE's radio science programme 'Future Tense'.] The teachers were presented with a manual containing a detailed description of each of the energy and citizenship activities and associated support materials. They were given an opportunity to review and discuss the activities presented.

The schools were also divided into clusters to facilitate peer-to-peer pupil communication. The teachers from each cluster met at the in-service day and agreed on which module would be delivered before Christmas 2004, and which module would be delivered in 2005. They also agreed on a tentative date when they expected their pupils to be ready to engage in online discourse.

The teachers were also briefed on the 'new look' of the CaSE website interface. The interface now had online *Discuss and Debate* and *Ask the Expert* sections divided into clusters, so that it was easier for pupils to engage with each other in discussion on various topics presented. The use of the teachers' forum was also promoted, and teachers were shown how to post messages, and how to report technical faults on this online facility.

The teachers were also presented with a list of field trips that would be suitable for the topics under examination. These included a description of fieldtrips that were available to wind farms (Fermanagh and Derry), energy conservation centres (ECOS in Ballymena) and environmental centres, such as Magillan in Derry. Each cluster group was encouraged to undertake at least one field trip in cycles two or three.

The final part of the in-service day involved the teachers engaging in the online science activities. This was the first time that the majority of teachers had undertaken an online activity, and the response was unanimous as to their effectiveness in presenting the particular topic areas.

Step 3: Implementation

The *Food and Nutrition* and *Energy* modules ran concurrently in both cycles two and three. The pupils were asked not to publish web pages in cycle two, as the promotion of online discourse was prioritised instead. (However, pupils were allowed to publish all web pages from cycle two in cycle three.) Each cluster group delivered chosen activities in science and citizenship in either the *Food and Nutrition* or the *Energy* module. The pupils then entered into online discussion in each cluster on issues that arose from the examination of the materials. The pupils also engaged in discussion with experts on issues that arose in the examination of topics in this cycle.

Some of the schools in each cluster met up on school trips at various centres. The centre most visited was the ECOS centre in Ballymena, where pupils from participating schools were divided into groups of three and undertook various activities at the centre.

Step 4: Reflection/ Review

The feedback from cycle two was gathered from teachers through a research template document (See Appendix F). The teachers recorded their thoughts, feelings and opinions on four aspects. Firstly they recorded any difficulties they had encountered with the introduction of the particular module that was undertaken. They recorded any difficulties experienced in the delivery of the experiments and the activities, and noted the degree of engagement and critical discourse undertaken by pupils in classroom discussion. Finally they recorded their thoughts on the online discussion forum. They also identified challenges in each area, and included inputs on how the various sections could be improved. The feedback from this section is discussed in chapter seven.

5.3 Cycle Three:

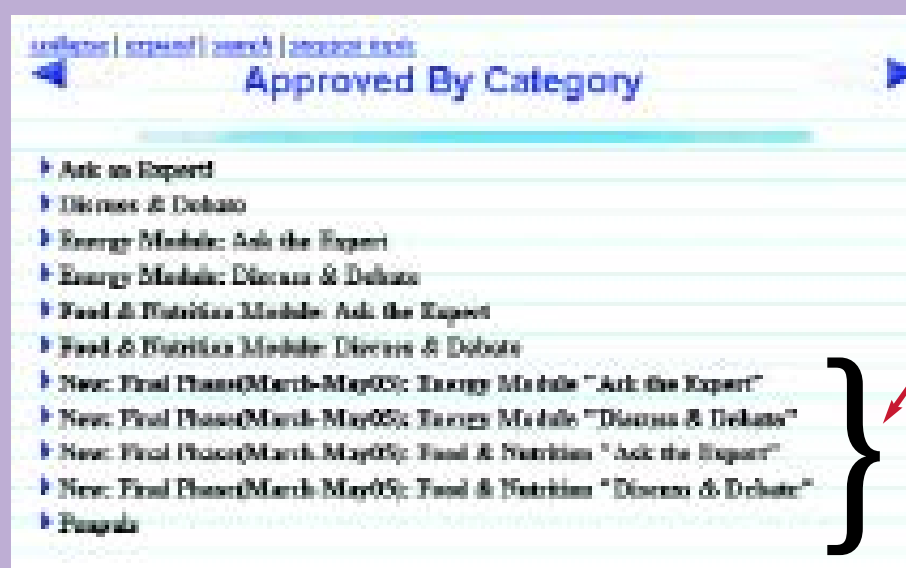
Cycle three started in February 2005 and ran until the end of June 2005. As the teachers reported that they were extremely happy with the materials designed for both the *Food and Nutrition* and *Energy* modules, there was no need to make any changes to the materials and support resources that had been provided for cycle three.

Step 1: Design

Some schools had requested some changes to the CaSE website. Therefore, a 'Pen pal' facility was added so that pupils could make direct communication with each other. Also, as the postings in each of the clusters were extensive in cycle 2, a decision was taken to develop a new set of categories for cycle 3. Finally the facility to allow web pages to be posted was also re-activated, so that pupils could post web pages that they developed before and after Christmas.

In the third cycle the final two options were added to the CaSE website: the facility for posting web pages for the *Energy* and the *Food and Nutrition* modules. Also the pupil discussion forum was restructured to include new discussion strands under the **Talk@school** facility, as shown in figure 5.4. This basically involved starting new strands for Energy and Food and Nutrition, as the strands created for cycle two had too many postings and were difficult to moderate. Furthermore a pen pal facility was added to allow pupils make direct contact with a pupil in another school.

Figure 5.4 New Pupil Discussion Strands in Cycle 3



Cycle 2
New Pupil
Discussion
Strands

Therefore the final interface for the CaSE website encompassed the web page facilities for topics in the initial module, *Environmental Perspectives* (Air, Water and Waste), as well as web page facilities for the final modules on *Energy and Food and Nutrition*, as shown in figure 5.5. The discussion forums for both staff and pupils were updated and restructured to enable easier access to postings, and thus more streamlined communication. Pupils were able to communicate with the CaSE evaluator and vice-versa.

Figure 5.5 Interface of CaSE website at the end of the CaSE project.



Step 2: Advice/ In-service Training

As the changes in cycle three focused on the structure of the CaSE web interface, there was no need to hold an additional in-service day to up-skill teachers. Instead the teachers were informed of the changes through postal communication, and through updates on the 'Teacher Forum' on the CaSE website. 'News flashes' were sent out regularly to inform teachers of what other schools were doing and how they were progressing, and they were encouraged to keep in touch with partner schools in each cluster.

Step 3: Implementation

The *Food and Nutrition* and *Energy* modules ran concurrently in cycle three. Pupils now had the opportunity to publish web pages and engage in online discussion. Each cluster group delivered chosen activities in science and citizenship in either the *Food and Nutrition* or the *Energy* module. The pupils then entered into online discussion in each cluster, on issues that arose from the examination of the materials. They also posed interesting questions for the experts, which included Dr. Larry Staudt from Dundalk IT for the *Energy* perspective, and representatives from the North/South body *safeFood* for the *Food and Nutrition* perspective.

More of the schools in each cluster met up on school trips at various centres. Once again, the centre most visited was the ECOS centre in Ballymena, with visits to the Magillan Field Centre in Derry and one to W5 in Belfast.

Step 4: Reflection/ Review

The researchers kept in continuous contact with the teachers in each school throughout cycles two and three. In May and June 2005 thirteen schools that took part in the project were visited, and both teachers and pupils were interviewed during each visit. In addition samples of materials that were developed were viewed, and photographs taken of the work done. Two of the schools were unable to facilitate a school visit due to logistical problems, but the teachers from these school sent back feedback on how the project progressed using the cycle three research template document (see Appendix F). The findings and implications of these visits are outlined in chapter seven.



Chapter 6

Overview of interaction on the CaSE website

6.1 Introduction

This chapter presents an overview of the interaction on the CaSE website in each cycle of the CaSE project. The first section outlines the activity on the CaSE website in cycle one. Pupils were encouraged to publish web pages on their chosen sub-topic, and also to engage in discussion on issues arising from an examination of this sub-topic. The second section presents an overview of teacher and pupil interaction on the CaSE website in the second cycle. No web pages were published in cycle two, as the focus was to promote the use of the online discussion at that point. The final section presents an overview of teacher and pupil interaction on the CaSE website in the third cycle. Pupils were encouraged to post web pages outlining what they did in cycle two and cycle three in this stage, as well as interacting in the online discussion forum.

6.2 Overview of Interaction on CaSE website in Cycle 1

Publishing of material on Web pages

Approximately five hundred web pages were posted in this initial phase of the CaSE project. The intention was that pupils, individually or in groups, would publish their findings in one of the three main topic areas of Air, Water or Waste. In addition, each school could publish a homepage in the schools web-page section. A huge volume of interesting and useful information was published on the learning that took place at various schools. The following gives a brief outline of what information was published in each section.

Air Pollution

There were thirty-five pupil web pages and twenty-nine teacher web pages hosted in this area of the CaSE website. The pupil websites were mainly from Banbridge Academy and Fivemiletown High School, and a few other personal web pages from pupils in six other schools. Fivemiletown High School published the information they gathered on air pollution in the Clogher valley area here, and outlined their main findings in science and citizenship. Some pupils used this as an opportunity to practice publishing draft web pages and in some cases, publishing their personal web pages. Teachers also used this area to publish draft websites during their training sessions.

Water Pollution

There were over one hundred and seventy web pages in the water pollution section, with representations from nearly every school involved in CaSE project. There were some excellent web pages here. Schools that dealt with the topic of water included Drumglass High School, Banbridge Academy, Beaufort College, St. Macartan's Secondary School, St. Mary's High School, St. Oliver's Community College and St. Patrick's College.

Waste Management

There were seventy-nine pupil web pages to be viewed in the waste area. The main participants in publishing in this area were Beech Hill College, De La Salle College, St. Vincents Secondary School and Kilkeel High School.

De La Salle College and Kilkeel High School publications were very informative on waste management and highlighted local issues with waste disposal. The digital camera was used extensively to capture images for their web pages and these images were particularly useful in setting the context for their findings. Pupils in Beech Hill College used this area to publish personal web pages. One pupil from St. Macartan's cleverly linked industrial waste to air pollution.

Schools Homepage

Most schools published a web page detailing the topic and activities that had been chosen for investigation in their school. Some schools also provided links from this web page to the main school website, and others included links to websites of interest.

Guestbooks

Many of the pupil personal homepages contained guest books for visitors to sign and post a few comments. The comments posted were made public or kept private. The guest book was very useful in allowing pupils and teachers to post supportive comments on other pupil's web pages, as illustrated in figure 6.1.

Figure 6.1 Sample entry in Guestbook



However in a number of cases, the guest books contained a number of inappropriate comments. It was time-consuming for the CaSE administrator to track and remove these messages.

Interaction in Pupil Chat-room – Talk@School

The 'Talk@School' discussion forum as outlined earlier was divided into two areas, one for discussion with experts and the other for discussion with peer pupils.

In total, one hundred and fifty individuals (pupils, researchers and experts) were involved in posting messages. The posting started in February 2004 and the interaction ended on June 22nd 2004. There are approximately five hundred and fifty postings in the 'Talk@School' forum. The busiest month for posting was May 2004 when over two hundred and seventy messages were posted. (See Figure 6.2)

Figure 6.2: Interaction in 'Talk@School' Forum on CaSE website



Interaction in the Ask the Expert Forum

The *Ask the Expert* forum was moderated by a number of experts, including Dr. Odilla Finlayson from the science perspective, and Dr. Peter McKenna and Charlotte Holland from citizenship and science perspectives.

To begin with pupils posted questions for experts to answer. The experts duly answered these questions and/ or posed more thought-provoking questions to engage the pupils further. In addition in May 2004, questions were posted by the researchers, and experts, to further engage the pupils in critical reflection on the process. Overall the discussion here was good. There were some delays in responding to pupil messages due to the volume of messages and the sparse number of experts available to respond at particular times.

Interaction in the Discuss and Debate Forum

The *Discuss and Debate* forum was designed to allow pupils to discuss some of the issues arising from their findings.

The level of interaction on this aspect of the 'Talk@School' forum was very high, with around four hundred messages posted. The content of the messages posted varied greatly: from initial postings of pupils saying 'hi' to other pupils to thought-provoking discussions on who was responsible for managing and controlling environmental pollution, see figure 6.3.

Figure 6.3: Sample Discussion on Water Pollution in Cycle 1

Pupil: *How can we stop water pollution in our town/neighbourhood?*

- Good question. I think we are first and foremost responsible for our own actions i.e. we should not contribute to the pollution. How often have we seen other kids throwing cans into rivers. Why are we too lazy to throw litter into the bins provided?
- its not up to one person to stop the community have to work together
- Check them regularly
- Although it seems as if it's easy to take action against preventing water pollution in our locality, it's not actually as simple as we tend to think. We can't just go right to the source and stop it. If Beaufort is anything like Banbridge, there will be more than one source of pollution (Sewage works, large super markets etc). I believe the best way we can approach targeting clean water, is by approaching our local council about it. there is a website call green peace (<http://www.greenpeace.com>) that gives us on advice on how to do so, possibly in letter writing or by telephone call.
- We can stop polluting the waters of our Lakes, rivers and streams!!We should be careful of how we treat our environment and what way we go about it!!
- I think that the best we could do is send a letter to the county council and tell them about your Problem
- We could stop water pollution by telling all the farmers not to spread slurry or fertilizers on water logged fields to stop it running into the springs/streams and polluting the water and maybe even the animals drinking the polluted water and getting sick.

(Please note that these messages have been re-produced exactly as presented on the CaSE discussion forum; grammatical errors have not been corrected.)

There were a number of challenges identified in interacting in, and the moderation of, the discussion forum. There were a few incidents of inappropriate 'language and imagery' being used in the messages posted and on some web pages. This prompted the removal of the offending remarks or images from the discussion forum, the cancellation of particular pupil privileges and contacting the school in question to advise them of the pupil's misdemeanour. The tracking of these offences was very time-consuming and labour-intensive. In the expert forum there were time delays in other pupils responding to messages posted. Initially these time delays were significant, sometimes as much as a fortnight. In some cases this was because no other schools were at the exchange stage. In other cases the messages were not immediately 'visible' because they were automatically moved onto a new page when the old page was full.

Interaction in Teachers Forum

The Teacher's Forum was an area where teachers and researchers discussed progress or issues. It was activated in April 2004. In total there were seventeen messages posted on this forum, most of which related to information bytes posted by researchers on what was happening in terms of training, additional information etc at various times in the implementation of cycle one. There were a number of messages posted by teachers requesting help with 'lost web pages', and these were duly answered. (See figure 6.4)

Figure 6.4: Sample Posting on Teachers Forum in Cycle 1

- **Teacher:** *I am having great difficulty inserting photos of pupils doing practicals and our trip, which I have on disc. When I put them in the file repository and then try to use them they cover half the page and cover the text and there doesn't seem to be a facility to edit. Help!*

Events Calendar

The Events Calendar was set up in order to keep track of when each school would be starting cycle one, and in particular when they expected to publish and interact online. These dates were entered onto the calendar by the researchers in early January 2004. It was hoped that teachers and pupils could use this to stimulate conversation with peers who were online at the same time.

However in practice the Events Calendar didn't reflect who was really publishing and discussing online, as the projected 'start and finish dates' weren't accurate. Most schools delayed starting the CaSE project until the teachers' ICT training session had been completed, and the training sessions ran right up to the end of March 2004.

Registration

Pupils' usernames were designed so that it would be clear in the online discussions which school each pupil came from; for example Student5 BeechHillCollege would be Pupil 5 from Beech Hill College. However the passwords were randomly generated and case sensitive, which made them difficult to remember and awkward to enter.

Pupils had the option to change to a more memorable username and password using the 'Registration' option. Some pupils used this option. However, a number of issues arose in allowing pupils access to this facility. Firstly, if they changed their username to their own name, then it was impossible to identify which school the pupil came from. Secondly, if they used a 'pseudo-name', then the pupil identification was even harder to pin down. Also teachers at each school were only able to track their pupils' progress if they were made aware of the changes and this didn't always happen.

Summary of changes at end of Cycle 1:

- Therefore the following advice was given to participants, and/ or the following changes were made to the CaSE website at the end of cycle one:
- Teachers and pupils were reminded of the importance of choosing the correct category when posting a web page. It was hoped that this would reduce the number of inappropriately positioned web pages in cycles two and three.
- The option of including guestbooks on pupil web pages was re-considered for the following phases of the CaSE website. However it was decided to allow the guestbooks but to include a warning about posting inappropriate messages in the new Netiquette policy.
- Additional experts were sourced to answer pupil queries in cycles two and three, and these experts were encouraged to reply to pupil messages more promptly.
- A *Netiquette* policy was introduced for the second and third cycle of the CaSE project outlining the rules of engagement of online publication and online discussion. (See Appendix G) In particular, pupils were reminded of the importance of appropriate consideration of others in their postings.
- An investigation in how to promote more prompt interaction in the online discussion forum was undertaken in advance of cycle two and three, and this resulted in the formation of school clusters. It was envisaged that the formation of clusters of three to four schools would enable teachers to communicate more effectively, and thus agree on suitable dates for publishing and interacting on the CaSE website.
- The use of the Teachers Forum was promoted in the various schools as a means of teachers keeping in touch with each other in cycle two and three of the CaSE project. It was also expected that this forum would be extensively used in cycle two and three of the CaSE project to keep track on progress of various schools, and to help identify and rectify issues that arose in a much faster, more dynamic manner.
- For cycles two and three, each cluster of schools agreed on a date that they would be publishing and interacting online. Therefore the events calendar on the CaSE website was not used.
- In cycles two and three, teachers were advised to inform the CaSE administrator of passwords that didn't work and these were re-issued. This negated the need for pupils to devise new usernames and passwords, and it was envisaged that this would reduce the confusion caused by pupils creating their own usernames and passwords.

6.3 Overview of Interaction on CaSE website in Cycle 2

Interaction in Pupil Chat-room – Talk@School

Energy Discussions

Three of the clusters (twelve schools) chose to deliver the Energy module in cycle two. There were fifty postings with three hundred and forty-two replies in the Energy discussion strand. The discussions started in November 2004 and ended around 24th February 2005. Topics such as renewable energy and discussion of the implications of the film the 'Day after Tomorrow' dominated this discussion strand.

The sample discussion in figure 6.5 below is just one example of the many discussions on Renewable Energy. This discussion illustrated some interesting opinions and perspectives on wind and solar Energy usage in Ireland.

Figure 6.5 Sample Discussion on Renewable Energy

Researcher: Which is a better choice for Ireland, wind energy or solar energy?

- I think that wind energy is a better decision for Ireland because Ireland don't get much light any more, well not enough to power big things like shops or very big buildings! do you agree?
- I think that wind energy is much more efficient because we don't always get enough sun not like in other countries like Spain and other hot countries. But I wish we had more sun than wind in Ireland.
- How could solar energy be better than wind energy because the sun never comes out
- I think wind because we've more wind than sun in Ireland
- im sophie. ya i think so to. wind energy rocks
- wind energy is better as there is no sun in ireland and solar cells are expensive!!
- neither of them are that good. Wind energy is a blemish on the scenery + solar is real expensive.
- there is a lot of wind in ireland and rain but not a lot of sun!!!!!!!!!!!!!!
- I think wind energy is better. Because we get a lot of wind but not that much sun. Which is nothing to be happy about though
- how on earth could anyone think that solar is better than wind. It the only option for ireland i hope you agree with me.

(Please note that these messages have been re-produced exactly as presented on the CaSE discussion forum; grammatical errors have not been corrected.)

Food and Nutrition Discussions

One cluster (four schools) chose to deliver the Food and Nutrition module in cycle two. There were fifty postings in the Food and Nutrition discussion strand, with two hundred and forty-one replies. The discussion started in November 2004 and ended in January 2005. The FairTrade topic dominated these postings, with sub-topics such as 'healthy diets' also strongly featured. The sample discussions, as shown in figure 6.6 and figure 6.7, illustrated a good degree of understanding of the FairTrade and healthy foods debate, and critical reflection on issues such as the low profile of FairTrade products in some establishments.

Figure 6.6: Sample Discussion on FairTrade

Pupil: *Fair Trade is a good thing! Do u agree?*

- Too right. Have you tried many of the products?
- no have u? what do they taste like?(are they nice?) wb
- yeah fairtrade chocolate is lovely
- I think it is disgraceful that people have to slave to get coco beans and get such a small pay and I agree i think fairtrade is a good thing even though if i'm honest i probably don't buy it. It might help if it was better advertised.
- I think Fair Trade is a good idea because the third world people get more money for their produce.
- I DO AGREE BECAUSE IT GIVES PEOPLE A CHANCE TO LIVE A LIFE AND BE TREATED AS EQUALLY AS WE ARE.ALOT OF PEOPLE DON'T BUY FAIRTRADE PRODUCTS BECAUSE THEY DON'T KNOW ABOUT IT(I DIDN'T KNOW ABOUT IT UNTIL I STARTED c.s.p.e)and i think we should advertise it more ,for example stick up posters and explain briefly what it is. what do u think?
- I DON'T BUY FAIRTRADE PRODUCE BECAUSE I CANNEVERFIND IT IN THE SHOP. THEY DON'T SAY CLEARLY WHERE THE PRODUCE IS AND I THINK THERE SHOULD BE A LABELL ON THE SHELF STATING THAT IT IS A FAIRTRADE PRODUCE.

(Please note that these messages have been re-produced exactly as presented on the CaSE discussion forum; grammatical errors have not been corrected.)

Figure 6.7: Sample Discussion on Healthy Foods

Pupil: *Opinions on Healthy Foods*

- I know its a shock but pupils in my school actually want healthier foods for lunch, we want less of the unhealthy burgers, battered sausages and chips and more brown bread healthy sandwiches, salads and more use of vegetables. A recent survey carried out by Swapitshop which is a youth marketplace asked over 1,000 children aged 7-16 what they thought of their school meals over 90% said they would like more options of healthier food other replies where as follows: 'More options than chips. In my canteen there is only enough healthy meals for 30 people out of the 700 that take school dinners.' this is one of the many responses that we received which we don't want. A better reply would be 'My school food is great...free salad & veg and they put on a healthy set meal... they could advertise more about healthy food though' so which reply do you want for your school? !!!Please Reply!!
- I'm a farmer and i don't care about market gardeners. i want people to eat more meat. People should have what they want. Rabbit food is no good. there is no protein in it.
- yes i totally agree healthy food is great and think schools should provide their pupils with more healthy options!
- actually i agree with you i love my chips and stuff but i think i would prefer the option of salads or something in the canteens. We just got a load of new vending machines in with lots of fair trade products but it only encourages you to eat junk

(Please note that these messages have been re-produced exactly as presented on the discussion forum; grammatical errors have not been corrected.)

Some challenges that arose in cycle two included difficulty in moderating the huge volumes of messages that were generated in the pupil discussion strands. Also some pupils requested a facility that would allow them to directly contact a pupil in another school.

Interaction in the 'Ask the Expert' Forum

There were twenty-one messages posted, with fifty-five replies by experts, in the Energy *Ask the Expert* forum. The discussions started in December 2004 and ended in February 2005. The resident experts Dr. Larry Staudt and Dr. Odilla Finlayson answered pupil queries. These queries centred on discussions on whether wind energy or solar energy was a viable source of energy.

There were eight messages posted, with thirteen replies by experts, in the Food and Nutrition 'Ask the Expert' forum. These messages covered a range of topics from FairTrade to healthy eating, and were answered by a number of experts including representatives from the Food Safety Promotion Board/ safefood.

Interaction in Teachers Forum

The Teachers Forum was only used to a limited extent in cycle two. In cluster one and cluster three teacher discussion strands a total of sixteen messages were posted with twenty-one replies. These messages focused on technical problems, but some of the messages were in relation to the setting up of school trips with other schools in the cluster. However in cluster two and four four messages were posted with no replies. This indicated that the teachers in these clusters were not using the discussion forum to communicate with each other.

Reporting Technical Problems

In terms of reporting technical problems, there were thirteen messages relating to problems with logging on, transferring materials from CD to the CaSE website and re-sizing images on the 'Technical Problems' discussion strand.

CaSE Evaluator Strand

The CaSE evaluator's discussion strand had five postings, with eighteen responses. There were also a further fifteen messages from the evaluator incorrectly positioned in a cycle one discussion strand. The discussion in the CaSE evaluator's strand was primarily with one participating teacher.

Summary of changes at end of Cycle 2:

Therefore, the following advice was given to participants and/ or the following changes were made to the CaSE website at the end of cycle two:

- New discussion strands were added so that pupils could access messages posted under the two topics that were running concurrently.
- A pen-pal discussion forum was also added, so that pupils could interact directly with each other.
- Teachers were reminded of the importance of using the Teachers Forum to communicate with their peers in each cluster.

6.4 Overview of Interaction on CaSE website in Cycle 3

Publishing of material on Web pages

There were one hundred and fourteen pupil web pages posted and four teacher web pages posted in the *Energy* section of the CaSE website. These websites gave an overview of what energy topics were completed by each pupil, with reports on surveys and activities covered under renewable energy. Many of the pages contained photographs of the pupils engaged in activities. The degree of detail on what was completed varied across the web pages, but the reports were very engaging and contained a wealth of information on what was completed in class and on school trips.

There were seventy-three pupil web pages posted and three teacher web pages posted under the Food and Nutrition section of the CaSE website. These web pages highlighted the popularity of the examination of FairTrade issues in the schools. Once again, there were plenty of photographs showing the pupil engaged in activities.

The number of hits on particular web pages was as high as thirty-eight, which showed that pupils were interested in viewing each others' pages. Comments posted in the guest books of these web pages indicated that pupils were very supportive of each other.

However some of the web pages posted were blank, which indicated that a number of pupils had problems publishing or editing their web pages.

Interaction in Pupil Chat-room – Talk@School

Energy Discussion Strand

There were nine postings, with thirty-three replies, in the Energy chat room in cycle three. The postings started around the middle of March 2005 and ended at the end of May 2005. Energy efficiency in the home dominated much of the discussion (see figure 6.8.) No questions were posted for experts to answer. The relatively low number of postings in the Energy section in this cycle may have been because only one cluster needed to complete the Energy module, and thus fewer pupils were involved in discussions. Also many pupils concentrated on publishing their web pages during this cycle, and therefore had less time for interaction in the discussion forum. Furthermore some messages were inadvertently incorrectly positioned under the pen pal discussion facility, and hence were not seen by members of the Energy cluster.

Figure 6.8: Sample Discussion on Energy Discussion Strand in Cycle 3

Pupil: *Energy Efficiency In the Home*

- I have carried out a survey of my home and found it to be very inefficient. I have written a letter to my parents recommending changes that they could make. I hope they listen and don't take the hump! I hope they can afford the changes and I hope that i still get my pocket money!
- I hope that all works out well and that your parents act fast and change the problems they have in their home. Hope you still get your pocket money.
- hi helen it is tina have ur parents made any changes please respond soon
- i hope ur parents don't take the hump and u don't loose ur pocket money
- In our science class we found out what energy efficient/non energy efficient products we had in our home. We then wrote a letter to our parents and we had to sit down and discuss with our parents what we think. Have you done this with your school?
- Yeah I have. My house is not very efficient though. I haven't wrote a letter yet. My parents don't know anything about it and they won't know its from me. I can't wait to see their faces because I said they would get a £*** fine if they didn't fix the changes in time!!!
- what did your parents say, were they willing to make changes?
- I haven't given them the letter yet but i am giving it to them tomorrow. I will tell you what they have said on Monday because I am not at school on Friday because it is a teacher training day. Thanks 4 replyin.
- Well i gave the letter to my mum although she knew it was me she wasnt that willing she didnt talk about it much

(Please note that these messages have been re-produced exactly as presented on the discussion forum; grammatical errors have not been corrected.)

Food and Nutrition Discussion Strand

There were twenty-five postings, with seventy-five responses, in the Food and Nutrition discussion strand in cycle three. The postings started around the middle of March 2005 and ended at the end of May 2005. The discussion was dominated by discourse on FairTrade issues, and also on the importance of food labelling in identifying sources and percentages of ingredients (see sample discussion in figure 6.9.)

Figure 6.9: Sample Discussion on Food & Nutrition Discussion Strand in Cycle 3

Pupil: *Did you know about FairTrade before this year? I didn't and I think it should be better advertised.*

- I Would Put Posters Up In The Main Places Of My Community Telling People About Fair Trade.
- we could set up a stand to give some FREE fair trade products and put an advertisement in de newspaper what bout u
- NO I DIDNT AND I AGREE WITH YOU IT SHOULD BE ADVERTISED BETTER. I THINK EVERY ONE SHOULD KNOW ABOUT FAIR TRADE.
- No i didn't but was annoyed that people do not care where their food comes from.. The people there are treated very badly and for what? so we get food on our table every evening.. NOT right
- I would probably go around all the classes and have an information day on all the information to do with fair trade. This would need any money and would be a good idea for your cspe project
- I didn't know about fair trade before i started the Case Schools Project. It helped me understand the aspect of Fairtrade.

(Please note that these messages have been re-produced exactly as presented on the discussion forum; grammatical errors have not been corrected.)

Interaction on Food and Nutrition 'Ask the Expert' Forum

There were four postings, with sixteen replies, in the Food and Nutrition Ask the Expert section, and these centred on FairTrade and Genetically Modified Foods. The sample discussion in figure 6.10 shows responses from experts to a pupil query on GM foods.

Figure 6.10: Sample Discussion on Ask the Expert forum

Pupil: *Is it true that GM foods can have harmful side-effects?*

- **Expert 1:** *There is a lot of research being undertaken to try and establish if there are harmful effects which result from GM foods. There is a concern that there may be harmful side effects but the European Community has allowed the use of GM foods in certain circumstances and on condition that the presence of GM in foods is clearly labelled. Some regions and countries have decided to ban GM foods until any possible bad effects of GM foods becomes clearer.*
- **Expert 2:** *The debate about genetically modified (GM) foods is complex involving a range of questions concerning environmental protection, food safety, the ethics of globalisation and monopolisation of the feed and food markets and the ethics of genetic manipulation of plants and animals. safefood, the Food Safety Promotion Board concerns itself with the food safety dimension of the debate. The numbers of available GM foods is increasing and some benefits include longer storage life of foods and claims of benefits to human health. Consumers should expect that at least GM foods should be as safe as the original product and equivalent conventional foods. These GM foods should present no threat to human health. GM technology requires careful regulation to ensure no threat to human health. To ensure public confidence in the safety of GM foods and allow consumer choice, these products should only be released onto the market after careful risk assessment and they should have accurate product information and be appropriately labelled.*
- **Pupil:** *Well of course they're bad for you but it wouldnt really do much to you*

There were thirty-six postings, with thirty-five replies, positioned incorrectly in the cycle one *Discuss and Debate* category. Furthermore there were also ninety-six postings, with sixty-two replies, on both *Energy* and *Food and Nutrition* topics incorrectly positioned in the cycle one *Ask the Expert* discussion forum. The topics that dominated these discussions were the same as those listed previously in cycles two and three.

Interaction in the Pen Pal facility

The pen-pal facility had five postings, with eight replies. The interaction really involved just four pupils (see sample posting in figure 6.11.) The pen-pal postings started in March and ended at the end of May 2005. There were some time delays in pupils responding to requests for a pen-pal, which made the process frustrating for those pupils posting messages in this facility.

Figure 6.11 Sample Posting from Pen Pal facility

Pupil: Hi I'm Student 7, looking for a web pen-pal. I'm aged 13 and I like playing chess and reading books especially adventure books based in the Middle Ages (sword & shield) with magic. Please reply?

The findings and implications from the interaction on the CaSE website in all three cycles are discussed in the chapters to follow.

Chapter 7

Findings and Implications from the CaSE Project

7.1 Introduction

This chapter presents the findings from cycles one, two and three of the CaSE action research process. The findings were drawn together on the basis of the reflective diaries kept by teachers and through researchers meetings with the teachers and pupils from the CaSE schools in May 2004 and again in May/ June 2005. Teachers recorded their reflections on how the CaSE project had influenced their teaching and their impression of the cross border dialogue that resulted from the project. The teachers and pupils were also asked to give their views on the learning experienced in the CaSE project.

This chapter is in two sections: the first deals with the findings, and the second deals with the implications of these findings for the CaSE project, further developments of this project or future projects of a similar nature.

Section one of this chapter is in four parts, and deals with the positive experiences and challenges encountered by the teachers and the pupils in the evolution of the CaSE project. Part 1 deals with the 'General Comments' which teachers and pupils made about the CaSE project, focusing on how it enhanced or inhibited the motivation and enthusiasm for learning in pupils. Part 2 deals with the 'Activities, Exchanges and Pupil Engagement' in the project. Part 3 records perceptions of 'Discussions, Reports and the Critical Thinking' taking place during the project. Part 4 seeks evidence of the impact of Information and Communication Technologies used during the project.

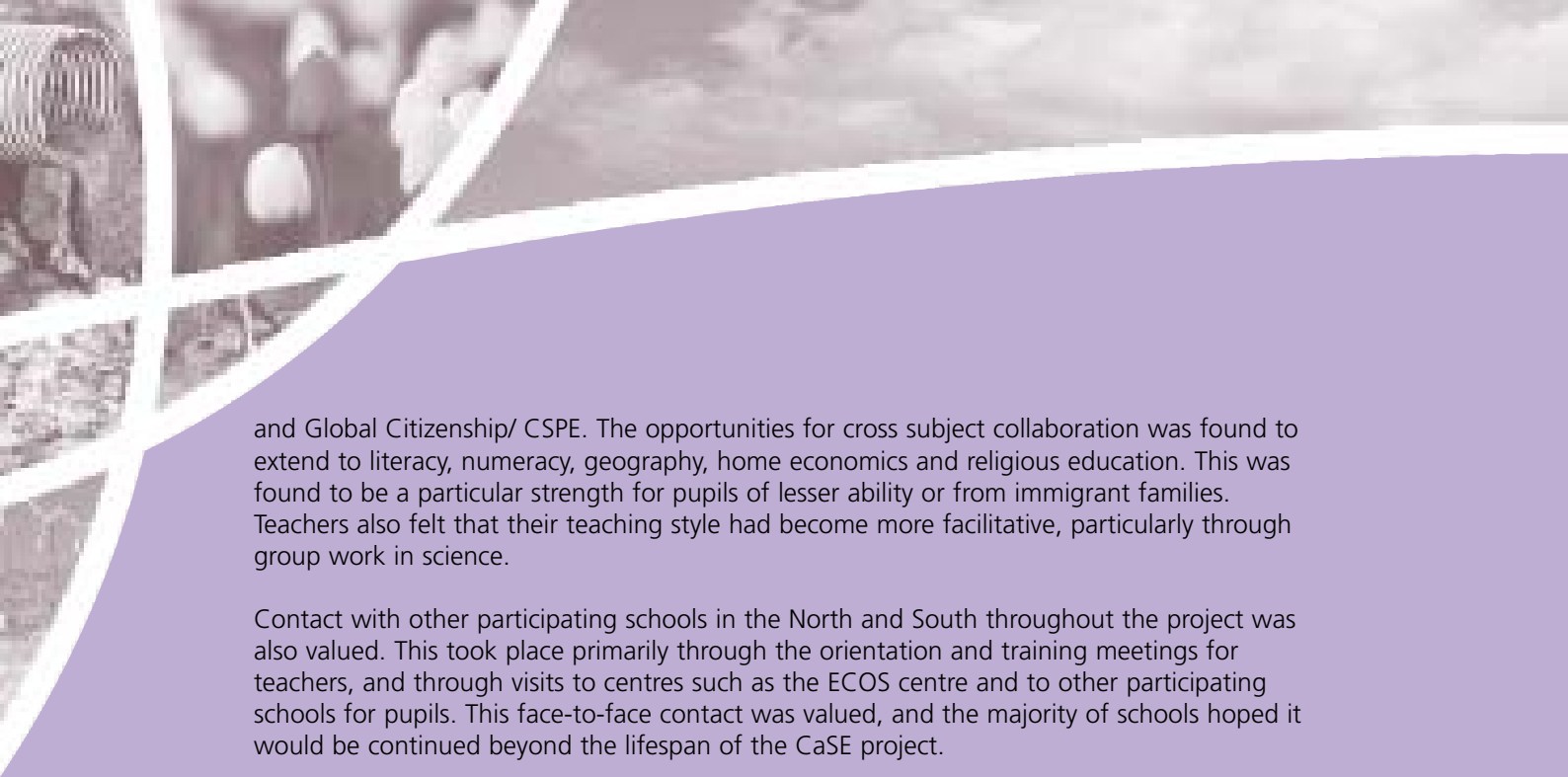
7.2 Findings

General Comments

All the teachers expressed a positive experience of the project, which they found motivating for themselves and their pupils. Expressions which captured this were as follows: *'Delighted'*, *'Enjoyed it'*, *'Involved the whole school'*, *'Engaged other teachers'*, *'Raised awareness of recycling'*, *'Good cooperation between science and citizenship teachers'* and *'No extra work for science teachers'*.

General aspects of the project singled out for positive comment were the quality of the resources (*'the resources were excellent'*); personal engagement in the project by those contributing to it; the use of Information and Communication Technologies which were *'motivating to all'*, and the digital cameras given to schools which were *'a great asset and were used extensively'*.

All teachers expressed appreciation for the CaSE resource booklets, as well as the videos and equipment made available to project participants. They were considered to be excellent, and other teachers in the participating schools made use of them in their own classes. Most teachers had gained valuable experience in collaborative teaching across Science and Local



and Global Citizenship/ CSPE. The opportunities for cross subject collaboration was found to extend to literacy, numeracy, geography, home economics and religious education. This was found to be a particular strength for pupils of lesser ability or from immigrant families. Teachers also felt that their teaching style had become more facilitative, particularly through group work in science.

Contact with other participating schools in the North and South throughout the project was also valued. This took place primarily through the orientation and training meetings for teachers, and through visits to centres such as the ECOS centre and to other participating schools for pupils. This face-to-face contact was valued, and the majority of schools hoped it would be continued beyond the lifespan of the CaSE project.

Pupils were highly motivated by the project, and devoted themselves to the tasks associated with the project with great enthusiasm. They all expressed considerable interest in the work they undertook. Teachers found that pupils' creative endeavours, that included power-point presentations and posters of findings and recommendations, aroused interest and enthusiasm amongst pupils, even of those who would be difficult to motivate.

While the science materials for the project fitted well into the Science curricula for schools in the North and South, there were challenges in establishing the links to Citizenship due to the brief periods (30 minute class period per week) allocated to CSPE or Local and Global Citizenship in most schools. The pressure of tests and examinations, particularly in the North, also made it very difficult for teachers to complete aspects of the CaSE project. This was compounded in some Northern schools where Local and Global Citizenship was not perceived to become a likely subject in the school. Interestingly, teachers in the South felt that the issue of time could be resolved if the CaSE project was run in Transition Year.

Many teachers also cited a lack of time as a problem, particularly when it came to gaining access to computers, getting on the network, uploading pictures and editing files on the CaSE website. This led to frustration for some teachers. To improve access, future projects would need to have forward planning in place sufficiently early to allow school timetables to take account of its computer needs. There was a suggestion that pupils could have interacted with the CaSE website in their own time at home. However some teachers commented that, whilst a substantial number of pupils had access to the Internet from home, to emphasise this would have promoted inequality in the learning environment.

The CaSE website was perceived as difficult for pupils to use by some teachers, particularly by those in the North whose pupils could not upload their information simultaneously. On the other hand, pupils had little difficulty with it apart from entering passwords, which were found to be too complicated.

A number of schools expressed concern that principals were not proactive in their support of the CaSE project. This materialised as a lack of support for school visits or visiting speakers. The only concern raised by pupils, in relation to their engagement on the CaSE project, was the fear that the project might have impinged on time available for their examination subjects.

Activities, Exchanges and Pupil Engagement

The teachers commented that the CaSE materials were very well organised, with good experiments for science. The teachers found that energy conversion fitted well into the science syllabus. Pupils enjoyed the use of solar kit experiments. They found the interactive computer based exercises in designing an energy efficient house fascinating. The scientific illustrations used on the activity sheets were found to be very helpful. Energy surveys were carried out in schools and homes which became the basis for reports and posters.

In terms of the citizenship activities, pupils enjoyed the activities, in particular the Environmental Perspectives bathing water role-play. Also, good synergy was reported between citizenship values and those promoted in other disciplines, such as pastoral care. One school developed two booklets, one for Science and one for Citizenship based on the CaSE materials, and used these in conjunction with CaSE resources throughout the school.


Some schools visited landfill sites and re-cycling plants, which the pupils enjoyed immensely. The many interviews with local shopkeepers, farmers and householders worked well in engaging pupils and raising awareness about waste management and pollution. Furthermore all schools reported that the inclusion of visiting speakers on was excellent. In one school a cake sale was organised by pupils to raise money for waste bins for each classroom. Once the waste bins were positioned in classrooms, there was intense competition between pupils to secure the prize for most waste collected. The teachers reported whole school engagement in this activity.

Visits to centres, such as the Magillan Field Centre and the ECOS centre, were found to be very interesting. The ECOS visits involving groups of schools provided an opportunity for teachers to exchange views and for pupils to do likewise. The best exchange for the pupils took place over lunch. This was sealed by an exchange of Rangers and Celtic football jerseys in one such visit.

The most effective exchange between pupils resulted from a visit by a Southern school to a Northern one. The visit involved a briefing about the differences in schools North and South and a series of ice-breakers which facilitated dialogue amongst the pupils. As a result of these visits pupils did remain in contact with one another by e-mail, via the discussion forum on the CaSE website and by text messaging.

There were reports of interesting developments resulting from engagement with the CaSE project. Pupils from one Southern school were invited to attend the National Broadband Meeting. The report by another school on the use of green cones for waste disposal on the CaSE website led to other schools following up this initiative. Pupils in many schools contacted local councils on a variety of environmental issues; in one school, for example, a letter was sent to the local council concerning smoke control. A number of Southern schools decided to incorporate the citizenship report into their mandatory CSPE project.

Finally there was good exchange between pupils and experts via the 'Ask the Expert' discussion forum on the CaSE website. The visit to web pages on the CaSE website also led to an increased interest by pupils in engaging in discussions with their peers.



The teachers and pupils found the group work proposed for science different and rewarding. The structure of the citizenship activities was found to facilitate group work, which resulted in pupils taking responsibility for following up different aspects of the topics under consideration.

There were a number of challenges encountered by teachers and pupils at different stages of the CaSE project. Some of the teachers found that it was hard to motivate some pupils at the outset of the project, and that an introduction to basic chemistry was needed for some of the science activities. The citizenship material and activities for cycles two and three were reassessed following feedback from some teachers that the early material was too extensive and that some of the activities were too difficult for the target group. However there was still perceived to be a lack of time for completion of the citizenship activities generally.

At one of the field centres there were too many activities to complete and pupils didn't get a chance to chat informally with each other until they met up for lunch after the visit to the centre. Some individual pupils found group work tedious and others got frustrated when some members of groups did not do their share of work. Other pupils became distracted in group work and failed to become engaged.

Some teachers had a sense that other schools or other teachers may not have been sufficiently committed to the CaSE project to engage in an exchange of views. One school in particular found the lack of response to their postings on the CaSE website resulted in disappointment for the pupils. This was partly due to the different timescales within which schools took part in the project, but it was unfortunate.

Discussions, Reports and Critical Thinking

The wide range of CaSE materials meant that individuals and groups could report to the rest of their class. This led to very dynamic exchange of views. Following cycle one additional guidance was given to schools on writing reports for the CaSE website and excellent reports were prepared on home and school energy audits. The findings from these were made available to the rest of the school through posters, and were sent to principals and parents through letters and reports. This was highly motivating for all pupils and enhanced their literacy and numeracy skills. The computer based activities on energy efficient homes led to critical thinking and discussions on energy conservation and energy sources. Furthermore the pupils of two Northern schools engaged in the CaSE project acted as reporters on renewable energy and energy conservation for a BBC Scotland digital television programme on 'Energy Activities'.

There were very good discussions around the sugar content of food and drink frequently consumed by pupils, around the labelling of food and the distortion of food helpings in food outlets. The visual display of findings from work carried out in the CaSE project was very striking and was used on open days in a number of schools.

Following the viewing of the film *The Day After Tomorrow* good discussions took place in class. This was informed by pupils' research into global warming which led them to argue strongly for and against the scenarios being presented in the film. This discussion was seen to reflect a level of critical thinking appropriate for the pupils.

Very animated discussions took place about the unjust wages and conditions of work for producers of tea, coffee, bananas and cocoa in the third world. The issues discussed required good research and critical thinking. This led to many FairTrade activities in schools, which

were reported in local papers such as the *Dundalk Democrat* and the *Lurgan Mail*. In one school, there was excellent synergy between the CaSE pupils and the members of the school's Social Justice Group. This led to a number of FairTrade products being made available in the school, and to a FairTrade stall that was hosted in local church halls. The success of the CaSE Citizenship experience was summed up by one of the pupils: 'Think globally, act locally'.

Some pupils expressed a concern that the CaSE resources were so comprehensive that they inhibited creative lateral thinking about solutions to the problems being discussed. In one school a creative drama script about energy conservation being prepared by pupils and teachers had to be shelved to meet the requirements of a visiting television company. In some instances reports on energy audits were not communicated outside of the school setting.

Information and Communication Technology Impact

Most pupils were very positive in their response to the use of information and communication technology while working on the CaSE project. During cycle one there were a number of difficulties with the CaSE website. Indeed in one school the computer platform in use was not compatible with the CaSE website. However over time the website became easier to use, particularly when the pupils became more familiar with it. The number of hits on pupil and school web pages indicated a high level of activity. Teachers and pupils both expressed their appreciation for the advice and support supplied by experts, the technical support manager and the researchers.

Teachers perceived the inclusion of information and communication technology as a 'hook' to engage pupils in learning. The resources made available on CD ROMS were well laid out and encouraged research. The technology was found to be particularly effective in engaging those of lesser ability. The creation of Powerpoint presentations to report on progress was perceived to be empowering and motivating by pupils. The quality of such work was very high and reflected the ability of team members to support and coach one another.

The computer based interactive science exercises were excellent for involving the pupils in learning. The online tests also proved to be excellent for revision. Many teachers thought that the computer based interactive science exercises provided a more focused use of the Internet.

Those pupils who accessed the CaSE website from home found it was faster to upload web pages, view the pages of other pupils and to interact in the discussion forum. The digital cameras made available to the schools proved to be an invaluable way of capturing activities, reports and posters that could be communicated to others.

However, there was a lack of time to carry out Information and Communication Technology related activities, such as loading information and graphics to web pages on the CaSE website, editing, viewing other web pages and messaging. Parental clearance was needed for pupils' photographs on the CaSE website.

While the initial shyness experienced by some pupils in using the CaSE forum dissipated, the issues of passwords continued to be a problem for users of the CaSE website throughout the final cycle. Multiple, simultaneous uploading of information to the CaSE website was not

possible. This caused major problems since access to computers was class based. The uploading of graphics in Northern schools also continued to be very difficult (involving a three-step process), due to restrictions imposed on interacting with external websites on the C2K system.

Access to computers was impossible in some schools and very limited in others. During cycle one this created problems for pupils who spent a lot of time on presentation of reports that were uploaded to the CaSE website but were not viewed by other schools for some time. Some teachers felt that to encourage pupils to use the Internet from home as part of the CaSE project would have been divisive and could have resulted in a sense of exclusion amongst those who did not have access to this technology. A number of teachers found the CaSE website very difficult to use. Furthermore some teachers believed that the use of information and communication technology in learning environments was too focused on the work of the individual, and thus limited social interaction.

The CaSE website was 'offline' on a number of occasions, which led to problems in re-scheduling computer rooms in some instances. In some cases, when the pupils encountered difficulties in engaging with the CaSE website, class discipline became a problem.

7.3 Implications

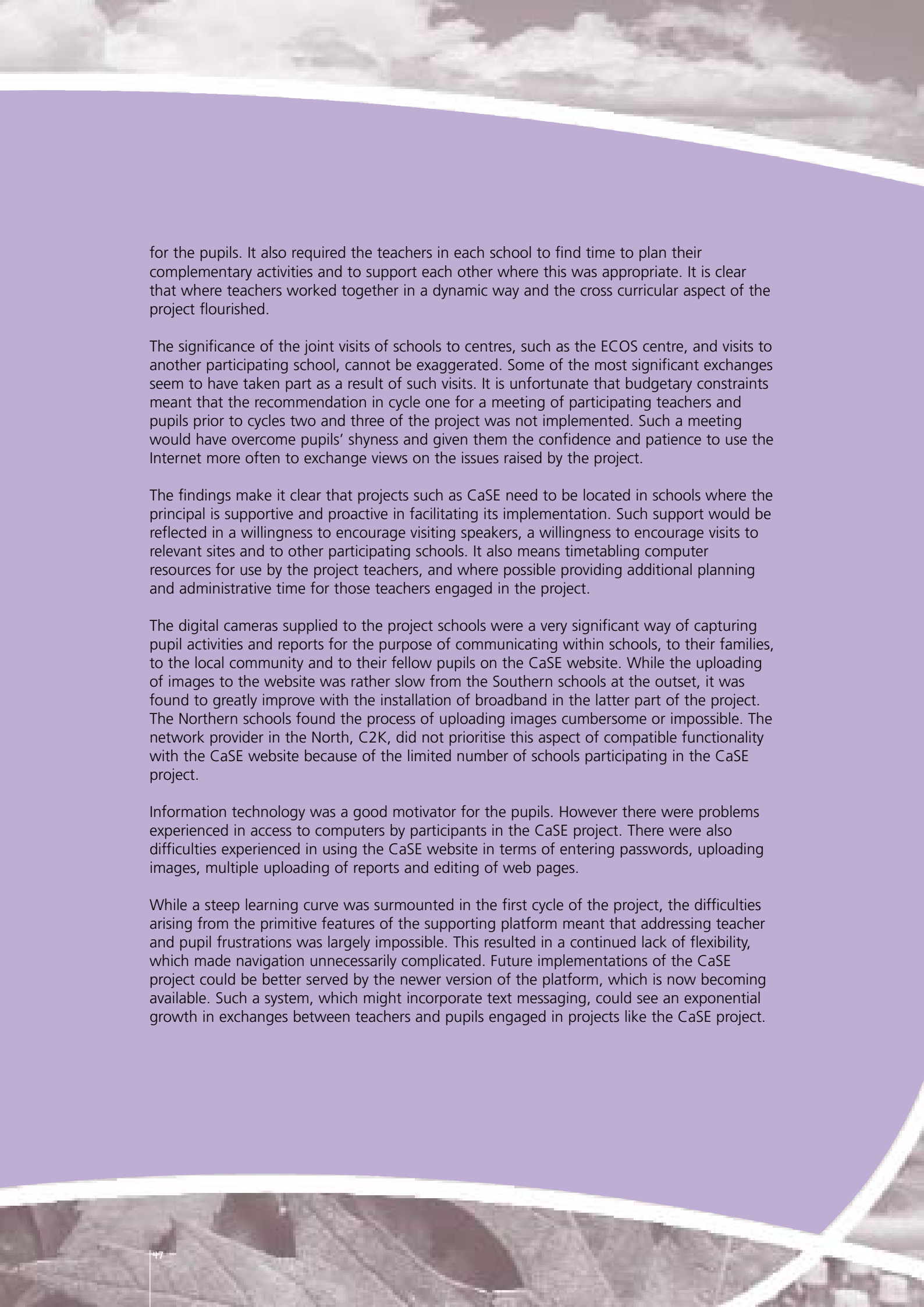
The implications of the findings from the three research cycles throw light on the success or otherwise of adjustments made to the project materials following cycle one, and pedagogical strategies for cycles two and three. The findings also have implications for a continuation of CaSE project, a scale-up of the CaSE project (as has been suggested by some education advisors) or an implementation of this cross curricular initiative in one or other of the two jurisdictions which took part in the CaSE project.

Lack of time was a major problem for teachers and pupils taking part in the CaSE project in the first cycle. This was due to the demands of the CaSE activities, the report writing, accessing the CaSE website, uploading information and reviewing or responding to the web pages of other schools. Teachers within the same schools also found that it was difficult to set time aside for inter-disciplinary discussion on the delivery of the science and citizenship aspects of the CaSE project.

The materials made available for carrying out the CaSE project were highly valued by teachers but it was clear from the feedback that a number of adjustments needed to be made in their design. The citizenship section needed to be simplified, and the proposed activities shortened, so that they could be used in brief thirty minutes class periods each week. Furthermore, more group activities had to be designed for both the science and citizenship perspectives.

Teachers made it clear that they appreciated receiving the CaSE booklet for cycles two and three of the project prior to the training workshop in October 2004. This gave them time to discuss with colleagues the topics and activities that would fit most readily into their curricula and how best the science and citizenship dimensions could be combined.

The reduction in the citizenship activities, and the strategies for group work embedded in the materials, made the implementation of the cycles two and three of the project easier for teachers and more rewarding for pupils. While this approach to learning was facilitative, it did require considerable organisation and the provision of additional support and supervision



for the pupils. It also required the teachers in each school to find time to plan their complementary activities and to support each other where this was appropriate. It is clear that where teachers worked together in a dynamic way and the cross curricular aspect of the project flourished.

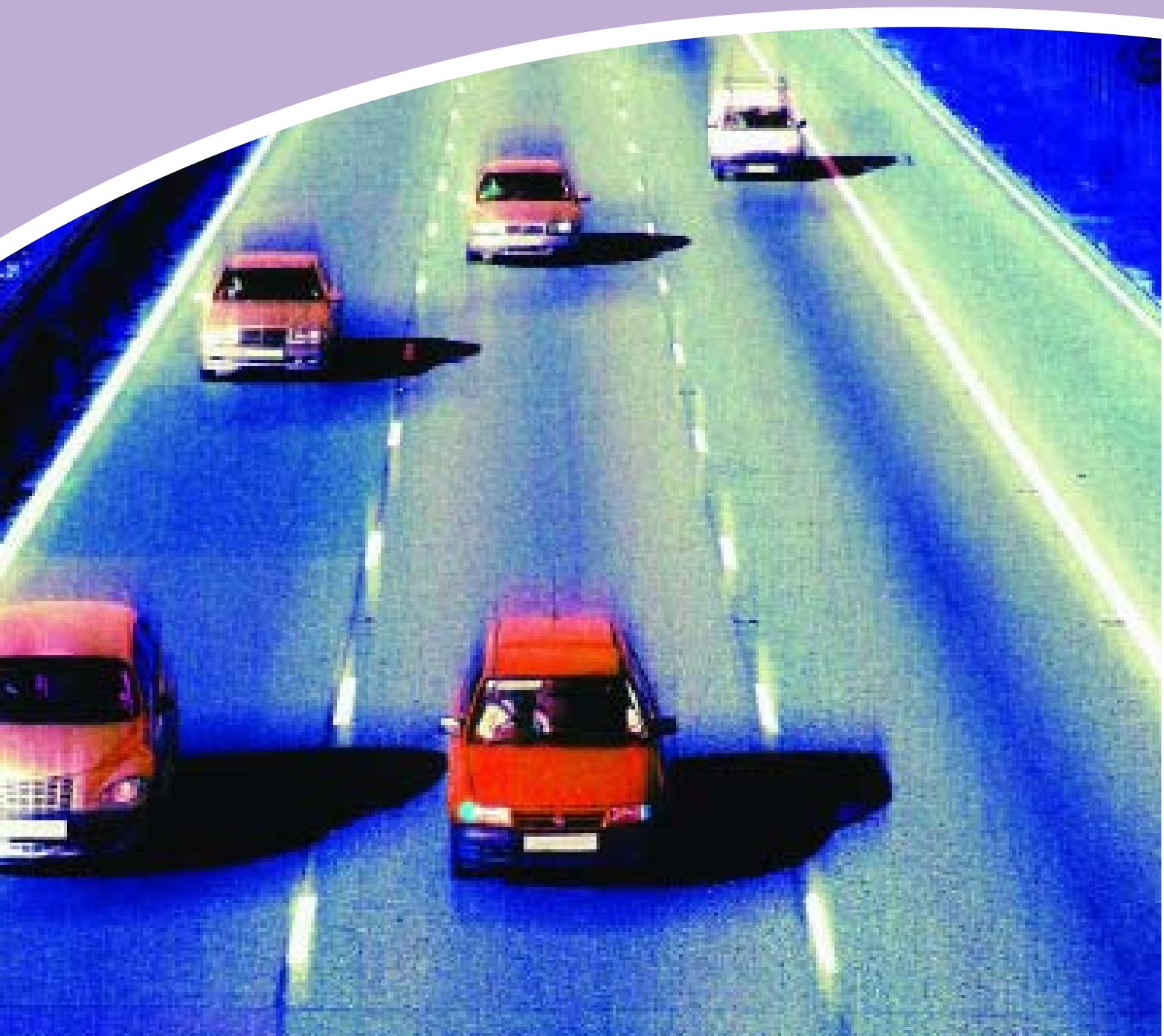
The significance of the joint visits of schools to centres, such as the ECOS centre, and visits to another participating school, cannot be exaggerated. Some of the most significant exchanges seem to have taken part as a result of such visits. It is unfortunate that budgetary constraints meant that the recommendation in cycle one for a meeting of participating teachers and pupils prior to cycles two and three of the project was not implemented. Such a meeting would have overcome pupils' shyness and given them the confidence and patience to use the Internet more often to exchange views on the issues raised by the project.

The findings make it clear that projects such as CaSE need to be located in schools where the principal is supportive and proactive in facilitating its implementation. Such support would be reflected in a willingness to encourage visiting speakers, a willingness to encourage visits to relevant sites and to other participating schools. It also means timetabling computer resources for use by the project teachers, and where possible providing additional planning and administrative time for those teachers engaged in the project.

The digital cameras supplied to the project schools were a very significant way of capturing pupil activities and reports for the purpose of communicating within schools, to their families, to the local community and to their fellow pupils on the CaSE website. While the uploading of images to the website was rather slow from the Southern schools at the outset, it was found to greatly improve with the installation of broadband in the latter part of the project. The Northern schools found the process of uploading images cumbersome or impossible. The network provider in the North, C2K, did not prioritise this aspect of compatible functionality with the CaSE website because of the limited number of schools participating in the CaSE project.

Information technology was a good motivator for the pupils. However there were problems experienced in access to computers by participants in the CaSE project. There were also difficulties experienced in using the CaSE website in terms of entering passwords, uploading images, multiple uploading of reports and editing of web pages.

While a steep learning curve was surmounted in the first cycle of the project, the difficulties arising from the primitive features of the supporting platform meant that addressing teacher and pupil frustrations was largely impossible. This resulted in a continued lack of flexibility, which made navigation unnecessarily complicated. Future implementations of the CaSE project could be better served by the newer version of the platform, which is now becoming available. Such a system, which might incorporate text messaging, could see an exponential growth in exchanges between teachers and pupils engaged in projects like the CaSE project.



Conclusions and Recommendations

The CaSE project was carried out in a collaborative action research mode. This provided for teachers, pupils, researchers, experts, advisers from both jurisdictions, and the staff of the Centre for Cross Border Studies, to contribute to the research process. This involved contributing to the planning, design, training, implementation and reflection stages of the research over its three cycles.

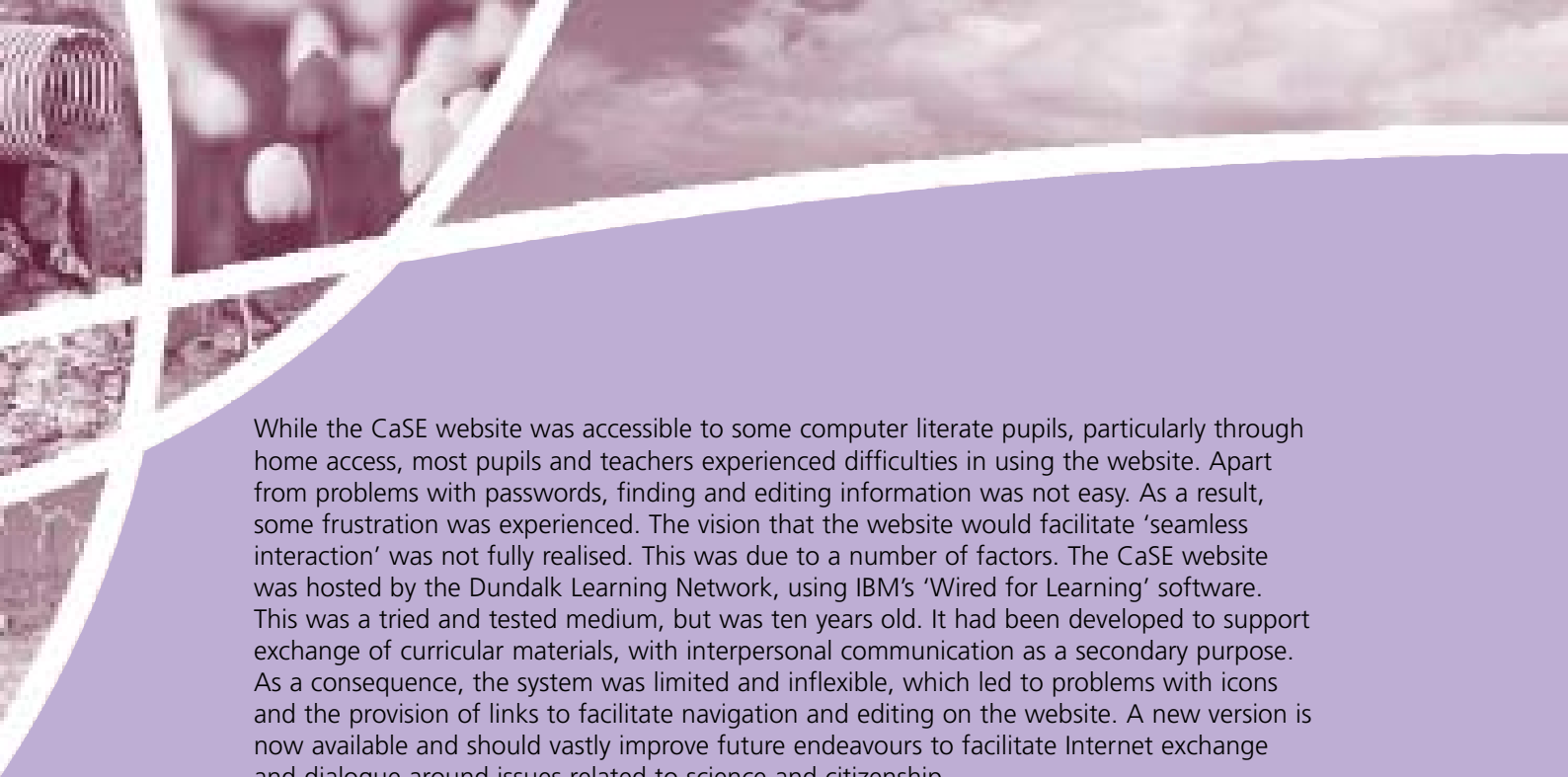
While some concern was expressed at this ambitious approach to the project, the findings and their implications do seem to indicate that the objectives of the CaSE project were met.

The first objective of the project was: *To raise awareness of the dynamic relationship between Science and Citizenship.* The findings in chapters six and seven of this report clearly indicate a greater awareness amongst pupils and teachers of the dynamic relationship between science and citizenship. In the activities and discussions in which pupils engaged, and the reports they formulated and disseminated about the rights and responsibilities of citizens in relation to scientific aspects of the Environment, Energy and Food/Nutrition, they exercised an appropriate level of critical thinking. This was a particular challenge, given that the participating pupils were in the early years of secondary education. However it does seem to have been successful and led to meeting the third objective of the project: *To foster critical thinking skills in the consideration of the linkages between Science and Citizenship.* This means that a sound foundation has been established for the CaSE pupils on which they can build an understanding of the relationship between science and citizenship during their years of secondary education.

The second objective of the project was: *To develop a process through which teachers and pupils can engage in a dialogue on issues relating to Science and Citizenship.* In the course of the project teachers had an opportunity to dialogue during the training workshops. Pupils engaged in face-to-face exchanges of views during their visits to sites, and through visiting another CaSE school. These meetings encouraged pupils to actively exchange information on the CaSE website or by text messaging. Where 'ice-breaker' exercises were provided, these meetings were especially fruitful in subsequent communication.

The basis for exchanges of views on the CaSE website were the reports and web pages which pupils and teachers posted on it. Most pupils had an opportunity to view the postings. The volume of hits on the postings indicated a reasonable level of activity, which grew substantially in the second and third cycles of the project. Pupils and teachers also dialogued with the researchers, the subject matter experts, the Information and Communication Technology supporter and the project evaluator, Kate Ennals.

However difficulties were experienced in the kind of universal electronic dialogue between pupils and teachers which might have been expected of the project. Obtaining access to Internet linked computers proved problematic for many schools and impossible for some. Schools in the South found their Internet connections very slow, and it was time-consuming to upload and/ or download graphics or just to interact online. This problem was addressed in the final weeks of the project when a number of schools were given broadband Internet access.



While the CaSE website was accessible to some computer literate pupils, particularly through home access, most pupils and teachers experienced difficulties in using the website. Apart from problems with passwords, finding and editing information was not easy. As a result, some frustration was experienced. The vision that the website would facilitate 'seamless interaction' was not fully realised. This was due to a number of factors. The CaSE website was hosted by the Dundalk Learning Network, using IBM's 'Wired for Learning' software. This was a tried and tested medium, but was ten years old. It had been developed to support exchange of curricular materials, with interpersonal communication as a secondary purpose. As a consequence, the system was limited and inflexible, which led to problems with icons and the provision of links to facilitate navigation and editing on the website. A new version is now available and should vastly improve future endeavours to facilitate Internet exchange and dialogue around issues related to science and citizenship.

A further obstacle to electronic exchange was the lack of compatibility between the C2K Internet backbone linking schools in the North and the CaSE website. This made it difficult to upload photographs, and in some instances schools could not upload their reports and web pages. If the CaSE project is to be continued or scaled up, this problem would need to be addressed.

Given the difficulties which were experienced and whose identification was part of the CaSE project's purpose, it did succeed in achieving a good level of exchange. Clearly a number of teachers felt that this level was less than they had hoped for.

The fourth objective of the CaSE project was: *To foster confidence in the exercise of Citizenship in a Science dependent society.* The confidence, which pupils acquired from interacting in the online discussions, is clear from the findings already presented. They went on to formulate reports, and to prepare presentations using text, graphics and photographs. Their findings and considerations were forwarded as reports or letters to the principals of their schools, to parents, local and regional officials and in one instance to the National Broadband Committee in the South. This clearly represents a 'can-do' approach to the exercise of citizenship in a science dependent society.

What was particularly significant about this outcome was that it led to confidence building in less able and less interested pupils. Another interesting synergy arising from the cross curricular dimension of the CaSE project was how it was seen to enhance literacy, numeracy, home economics, geography and religious education, particularly amongst immigrant children.

The fifth objective of the CaSE project was: *To develop cross-border mutual understanding through the study of Citizenship and Science.* The findings indicate that both teachers and pupils engaged in dialogue with their peers on both sides of the border, and that a mutual understanding of the rights, roles and responsibilities of an active citizen in particular cross-border contexts was realised. The teachers reported that the in-service meetings were particularly effective in raising their awareness and understanding of the commonalities and diversities in the design and delivery of the Science and Citizenship curriculum employed in both jurisdictions. The students commented on the effectiveness of the discussion forum on the CaSE website and the multi-school field-trips to centres, such as the ECOS centre, in enhancing their understanding of Citizenship and Science issues in a cross-border context. However, there were some concerns that visits to field-centres were too rigidly focused on a particular subject-domain and the completion of activities within a set time, rather than on

fostering communication between participating students from either side of the border. Interestingly, the teachers and students of two schools that engaged in a cross-border school visit, as well as a visit to a field-centre, considered the school visit to be the most effective mechanism to promote dialogue and mutual understanding in a cross-border context.

It is clear from the findings that a project such as CaSE must ensure that the principals of participating schools must support it wholeheartedly. Such support would be manifest in a willingness to agree to visits to relevant sites, to invitations to visiting speakers, to the hosting and visiting of other project schools. In addition, the briefing of principals well in advance of the project would make it possible for them to agree timetables which would provide readier access to computers and lessen the extra tension which tests and examinations create for those taking part in the project.

The frustration of teachers who found themselves isolated in the course of the project due to lack of response from other schools could be addressed by more advanced planning. However the timescale for this is long, since it needs the agreement of teachers on when they can integrate the materials provided to support cross curricular activity. Scheduling matches then have to be found between pairs or clusters of schools that want to engage simultaneously in activities, reports and exchanges. The challenge that this presents, given the rigid nature of secondary school timetables, is a daunting one.

It is clear from the findings of the CaSE project that the support materials and handbook provided for teachers were considered excellent. This was due in no small measure to the support provided by voluntary and statutory agencies, government departments in the North and the South, and firms from the private sector. Their advice and the provision of literature, videos and CD-ROMs at modest or no cost resulted in a rich resource which could be provided with the project budget. It does need to be borne in mind that if the project is to run into the future, the materials provided for the first cycle of the process would need to be re-edited in the light of the findings from this reflective process.



Recommendations

1. The CaSE project be scaled up to include twenty schools from Northern Ireland and twenty schools from the South of Ireland in order to determine the viability of the universal provision of a cross curricular Science and Citizenship programme in both parts of Ireland.
2. The CaSE materials for cycle one be revised in the light of the findings in this report
3. The latest version of Wired for Learning software be used to support any future CaSE Website
4. Full compatibility be established between a future CaSE website and C2K
5. Future CaSE schools be selected on the basis of full support from principals, the commitment of teachers to collaborative cross curricular provision and easy access to broadband internet connectivity
6. Clusters of schools taking part in a future CaSE project would agree to schedule their CaSE activities at the same time, so that a rich exchange would be facilitated
7. If a single jurisdiction, non-cross border implementation of CaSE is envisaged, support should be sought separately from the Department of Education and Science in the South and from the Department of Education in the North to continue the CaSE project in this way based on a representative cross-section of secondary schools in both jurisdictions.
8. Any future implementation of the CaSE project should use an action research developmental strategy involving pupils, teachers and researchers

References

- Barr, I (2000) Planning for Ethos. In C. Furlong & L. Monahan. *School Culture and Ethos, Cracking the Code*. Dublin: Marino Institute of Education
- Bartolme, L. (1994) *Beyond the Methods Fetish: Towards a Humanising Pedagogy*. Harvard Educational Review. Vol. 64, pp173-194
- Bauman, Z. (2000) *Liquid Modernity*. Cambridge: Polity Press
- Beck, U., Giddens, A. & Lash, S. (1995) *Reflexive Modernisation, Politics, Tradition and Aesthetics in the Modern Social Order*. Cambridge: Polity Press.
- Department of Education (1986/7) *Rules and Programme for Secondary Schools* Dublin: The Stationery Office.
- Department of Education and Science (1996) *The Junior Certificate: Civic, Social and Political Education Syllabus* Dublin: The Stationery Office.
- Department of Education and Science (1999) *The Primary School Curriculum: An Introduction* Dublin: The Stationery Office.
- Department of Education and Science. (2003). *Report and Recommendations of the Task Force on the Physical Sciences*. Dublin: The Stationery Office.
- Gundara, J. (2000) *Interculturalism, Education and Inclusion*. London: Paul Chapman
- Habermas, J. (2001) *The Postnational Constellation*. London: Polity
- Keohane, K. & Kuhlig, C. (2004) *Collision Culture: Transformations in Everyday Life in Ireland*. Dublin: Liffey Press
- McKernan, J. (1996). *Curriculum Action Research: A Handbook of Methods and Resources for the Reflective Practitioner*. 2nd ed. London: Kogan Page
- Quinn, A. (1996) *Patrick Kavanagh: Selected Poems*, Harmondsworth, Penguin
- Relevance of Science Education project, ROSE, (2006). *Sowing the Seeds of ROSE*. Department of Teacher Education and School Development: University of Oslo.
- Virillio, P. (1986) *Speed and Politics*. New York: Semiotext.
- Williams, K. (2006) *Faith and the Nation: Religion, Culture and Schooling in Ireland*. Dublin: Dominican Publications.



Appendices

Appendix A:

The Educational Work of the Centre for Cross Border Studies

The Centre for Cross Border Studies undertakes North-South research, development and administration projects at all levels of education: pre-school, primary, secondary and tertiary. In November 2004 it published *Diversity in Early Years Education North and South: Implications for Teacher Education*, the report of a two-year, EU-funded study which examined the difficulties facing schoolchildren aged 4-7 and their teachers in areas of inter-community tension on both sides of the Irish border, with a view to developing a framework for preparing young teachers working with very young children in these areas.

Apart from the Citizenship and Science Exchange (CaSE) project at second level, it is currently involved in the following projects.

Pride of our Place: a cross-border environmental project for primary schools.

This four-year project (2002-2006), funded by the EU Peace and Reconciliation programme, has been extended for a year because of demand from teachers and parents. It brings together 10-12 year olds from a group of primary schools in the border region of both jurisdictions to study a key environmental feature in their locality by looking at it historically and geographically, and then exploring it in the company of their cross-border partner schools. In the past year this work has been extended to joint art, music and story-telling projects. An event to 'showcase' the work of the 12 schools involved will take place in Armagh in May 2006.

North-South Student Teacher Exchange Project.

This three year project (2002-2005) brought together students from seven colleges of education in Belfast, Dublin and Limerick to study and do part of their assessed teaching practice (a key part of their degrees) in schools in the other jurisdiction. It is based on the belief that young teachers have a key role in overcoming prejudice and misunderstanding. In her 2005 report, the project evaluator called this "a courageous, inclusive and ground-breaking exchange" which "translates into reality some of the aspirations of the 1998 Belfast Agreement." The Centre, together with Stranmillis University College and St Patrick's College Drumcondra, currently has an application with the EU Peace Two (Extension) programme to continue this project into a second research-based phase in order to measure its impact on the attitudes and practices of participating student teachers.

Standing Conference on Teacher Education North and South (SCoTENS)

The Centre acts as the secretariat for SCoTENS, which was set up in 2003 by a group of senior teacher education specialists from colleges of education and other teacher education agencies in both Irish jurisdictions. The joint chairs of SCoTENS are Prof John Coolahan, professor emeritus at NUI Maynooth and Prof Richard McMinn, Principal of Stranmillis University College. SCoTENS runs an annual international conference (the November 2005 conference will be on teacher education in culturally diverse societies), and funds sectoral conferences and research projects in a range of areas. These include social, scientific and environmental education; initial teacher education; citizenship and diversity education; special educational needs; continuing professional development; student perceptions of history, geography and science; school leadership; and linguistic and intercultural education. Its award-winning website (www.socsci.ulst.ac.uk/education/scte) concentrates on special needs and citizenship education.

Universities Ireland

The Centre also acts as the secretariat for Universities Ireland, set up in 2003 to promote co-operation in 'niche' areas between the nine universities in Northern Ireland and the Republic of Ireland. Universities Ireland has undertaken work in the following areas: a research project on harmonising regulations, awarding joint degrees and developing joint credit transfer arrangements between the universities on the island (received, with action points, by the UI Council in September 2005); a symposium on 'eLearning as a Strategic Imperative for Universities in Ireland' (November 2004), with a follow-up action proposal in medical informatics; a visit by a high level UI delegation to Uganda and Ethiopia to explore enhanced links with HEIs in those countries (November-December 2005); regular meetings to discuss matters of mutual interest with Universities UK (September 2004, January 2006); a study to examine the feasibility of an all-island technology transfer and intellectual property service to be built around the nine universities (to be delivered in December 2005); and a series of high level conferences and seminars to explore closer collaboration between universities and business on the island (June and September 2005).

Education for Reconciliation

The Centre, along with Prof Tony Gallagher of Queen's University Belfast, acts as the evaluator for this three-year (2002-2005) EU-funded project, organised by the City of Dublin Vocational Education Committee. The project brings together 33 secondary schools, North and South, to work on an 'education for reconciliation' module to be incorporated into the citizenship curricula for 12-15 year olds in both jurisdictions. CDVEC is currently seeking EU Peace Two (Extension) funding for a follow-up phase.

Conferences and Seminars

The Centre has organised regular conferences and seminars on various aspects of North-South educational co-operation in recent years. Among these have been: Introduction to Education, North and South (2000); School, Youth and Teacher Exchanges (2001); European Citizenship Education (2001); Ireland as a Centre of Excellence in Third Level Education (2002); International Education: A Capacity Builder for the Island of Ireland? (2003); Widening Access to Third Level Education on the Island of Ireland: Towards Better Policy and Practice (2003); Cross-Border Higher Education Co-operation in Ireland and Europe (with Universities Ireland, 2004); and Higher Education and Business: Beyond Mutual Incomprehension (with Universities Ireland, 2005).

Border Ireland

The Centre is currently developing **borderireland.info**, the definite guide to information on cross-border activities in Ireland. One of the key areas of information within Border Ireland.info is the education sector.

When it is launched in January 2006 the system will act as a one-stop shop for researchers, policy makers, community development workers, businesses and the general public providing, for the first time, an electronic gateway to the full range of cross-border research material, publications, funding opportunities and other information available in Ireland, North and South and, in particular, to material that has been relatively underused in the past. The

system will provide a central point for supporting and developing constructive relationships in the wider community, enabling groups from both jurisdictions to share their experiences and to research the practical experience of working on a cross-border basis within the dimensions of the Good Friday Agreement.



Visit www.borderireland.info now

Appendix B: Indexed Environmental Perspectives Resources

1. ECU UNESCO: Investigating Air Pollution (1)
2. ENFO leaflet: Air Pollution
3. EHSNI Fact Sheet 36 Environment Matters: Air Quality
4. ENFO Leaflet: Air Quality Data
5. EHSNI Fact Sheet 33: Environment Matters: Transport and Air Quality
6. EHSNI Fact Sheet 37: Environment Matters: Smoke Control Areas
7. ENFO: A Better Place to Live
8. ENFO Leaflet: Acid Rain
9. EHSNI: Who we are and What we do
10. EHSNI: Ambient Air Quality Monitoring
11. EHSNI: Air Quality: Online and other information
12. ENFO: A Shopping and Investment Guide to Sustainable Living
13. ECO UNESCO: Investigating Air Pollution
14. ENFO: Lichen Poster
15. Green Code: Drive to Beat City Gridlock
16. ENFO: Sustainable Transport
17. ENFO: Choices for Sustainable Motoring/ Transport
18. Acid Rain Role Play
19. European Union Press Room: Rules to ensure clean bathing water across the EU
20. EU Impact Assessment Form of Bathing Water Directive
21. Blue Flag Beeches/ Marinas
22. EUROSTAT: Pathways of Agricultural N Cycles
23. DOE: Water Pollution of Incident and Prosecution Statistics
24. Department of Environment Heritage & Local Government: Attitudes and Actions 2003
25. Understanding Our Environment: Water Pollution Role Play
26. Department of Environment Heritage & Local Government: Waste Management – changing our ways
27. ENFO Leaflet: Litter and the Law
28. ENFO Leaflet: Litter Action and Local Image
29. ECO UNESCO: Organising an Anti-Litter Campaign
30. ECO UNESCO: Waste Not Want Not
31. Environmental Protection Agency: Household Hazardous Waste
32. ENFO Leaflet: Recycling in Ireland
33. ECO UNESCO: Setting up Recycling
34. ENFO Leaflet: Recycling Textiles
35. ENFO Leaflet: Recycling Batteries
36. ENFO Leaflet: Recycling Oil
37. ENFO Leaflet: Recycling Glass
38. ENFO Leaflet: Recycling Plastics
39. ENFO Leaflet: Recycling Metals
40. Southern Waste Management Partnership: Waster Management Policy in NI
41. Southern Waste Management Partnership: Executive Summary
42. ECO UNESCO CD-ROM
43. ECO UNESCO Young Environmentalist Awards 2004

Appendix C: Guide for Reflective Diary in Cycle One

Step 1 - Introduction:

- Learning Opportunities
- Learning Obstacles
- Personal Responses
- Positive Aspects
- Negative Aspects

Step 2 - Action:

- Learning Opportunities
- Learning Obstacles
- Personal Responses
- Positive
- Negative

Step 3 - Report:

- Learning Opportunities
- Learning Obstacles
- Personal Responses
- Positive
- Negative

Step 4 - Exchange:

- Learning Opportunities
- Learning Obstacles
- Personal Responses
- Positive
- Negative

Appendix D: Indexed Energy Resources

1. Energy Resources in Ireland, Chapter 1
2. www.for.co.uk, Pages 1 & 2
3. An Introduction to Energy Use, The Environment and You
4. Ireland's Energy Situation
5. Sustainable Energy and You
6. Thermometer
7. Your Home and the Environment
8. Green Schools: Towards a Sustainable Life Style: Energy
9. BP Renewable Energy Video
10. Welcome to the Solar Age
11. Attitudes to Renewable Energy in Northern Ireland
12. SEI Update, Winter, 2003
13. Solar Homes Catch the Sun
14. Yield Models for Energy Coppice of Poplar and Willow
15. Happy Christmas Northern Ireland: Wind Power Doubles
16. Cronalaght Wind Farm
17. Attitudes Towards the Development of Wind Farms in Ireland
18. Wind Farm on the North Coast
19. Wind Farms in Northern Ireland
20. Airtricity Wind Farms in Ireland - South
21. Wind Farms: Negative Features
22. Climate: Northern Ireland Campaign
23. Climate: Climate Change
24. Climate: The Day After Tomorrow - Fact or Fiction?
25. Global Warming - Overview
26. Young Environmentalist Awards 2005
27. Climate change and Enhanced Greenhouse Effect
28. Climate Change
29. BP Service Station Renewable Energy Use
30. BP Solar Kit
31. ECO-UNESCO CDROM: Your Environment Your Choice [CaSE Environment Resource]

Indexed Teachers' Readings

1. The Greenhouse Effect
2. The Ozone Layer
3. Sustainable Energy
4. SEI CDROM: See the Light: No Bills from the Sun
5. Research Reflections' Template
6. ECO-Unesco: Young Environmentalist Awards 2005 - Handbook



Appendix E: Indexed Food and Nutrition Resources

1. World Annual Armaments Budget
2. Estimated Annual Budget Needed to Eliminate Starvation and Unclean Drinking Water
3. The Food We Eat
4. Interdependence Quiz
5. Interdependence Answer Sheet
6. Video: Fair Comment
7. Video Questionnaire
8. Boost for Fair Trade
9. Producer Profile
10. Organic Milk Chocolate
11. The Chocolate Game
12. Dice

Indexed Teachers' Readings

1. Foundations for Our Future
2. Trade Sustainability
3. Materials Order Form
4. Research Reflections' Template

Appendix F: Guide for Reflective Diary in Cycles Two and Three

1. Has the CaSE Project Influenced my activity as a teacher?

- Highlight any cross-disciplinary and/or cross-border influences?
- What part have I taken in the exchange of views on the CaSE website?

2. Positive Aspects of the following CaSE processes?

- The Introductions?
- The Actions?
- The Classroom Discussions?
- The Reports?
- The Exchanges?

3. Negative Aspects of the following CaSE processes?

- The Introductions?
- The Actions?
- The Classroom Discussions?
- The Reports?
- The Exchanges?

4. Has the CaSE project helped to motivate pupils?

- Have the pupils demonstrated enthusiasm for learning during the project? Please explain.
- Has the use of Information and Communication Technologies aroused interest? Please describe.
- Have pupils engaged positively in activities as individuals and in groups? Please explain.
- Have the pupils demonstrated critical thinking in their activities, discussions, reports and exchange? Please describe.

Appendix G: CaSE Netiquette Policy

The purpose of the CaSE website is to facilitate educational use of the Internet through the provision of: chat-rooms for pupils and teachers, web-page publication areas, and an expert discussion forum so that teachers and pupils can exchange information and engage in discourse in the areas of Environmental Pollution, Energy and Food & Nutrition.

It is the responsibility of all participants in the CaSE project to maintain the security of usernames and passwords. Do not allow someone else to use your username and password. If you have difficulty with your username/ password, contact the CaSE administrator, John Rust at his email address: john.rust@iol.ie

Responsible users will:

- Be polite
- Not swear or use inappropriate language which may be offensive to others
- Not use the website in a way that will disrupt its use by others
- Not use the chat-rooms for frivolous or mischievous purposes
- Not interfere with or change computer files or documents belonging to others
- Not attach inappropriate files, images or animations to messages/ web-pages

Advice to users posting messages in chat-rooms:

- Be supportive to other users – let them know what is good about their thoughts or publications.
- Use punctuation
- Use capital and small letters
- Read what you've written before you hit send
- Don't use all capital letters – it's considered 'shouting'
- Don't 'flame' – flame means to send angry or insulting messages

NOTE: If you notice inappropriate or offensive material in the chat-rooms or on a web-page, use the 'back' button to exit the page and immediately notify your teacher, who will inform the CaSE administrator John Rust (john.rust@iol.ie)

PENALTY:

Any pupil who posts offensive material on the CaSE website will have their access to the CaSE website withdrawn immediately, and furthermore may be subjected to internal penalties imposed by their school.

I have read the above and agree to abide by the policy as stated.

Signed:

Witnessed:

.....
Pupil Name

.....
Teacher/ Parent

